



Pittsburg State University

Student Research Abstract Writings Spring 2021

Category



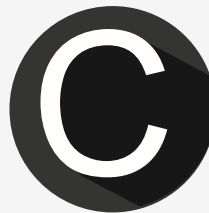
Sciences and
Technology

Category



Business,
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Creative
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Topical
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Undergraduate: Category A

Science and Technology



Students: Braden Shelton, Isabella Friemel, and Charles Neef

Student Status: Undergraduate

Major: Chemistry

Title: Electrochemical Analysis of Coffee

Abstract:

The objective of this study was to determine if there is a correlation between the chemical analysis of coffee and its variety of flavors. Different types of coffee have varying chemicals, with one of the components being the differing types and quantities of polyphenols. In order to study the correlation of coffee structure and flavor, electrochemical analysis of varying coffee samples was performed. The types of analyses utilized include Cyclic Voltammetry and UV Spectroscopy, along with pH. Cyclic Voltammetry was an excellent method since it is quick, easily performed, and cost effective. UV Spectroscopy was also used to compare the structures of the varying coffee types with the determined flavor profiles of each sample. The differing acidity and alkalinity between the coffee types may play a role in the taste of each sample, which was also analyzed in this study. Flavor profiles were determined by a panel of taste testers who were given specific parameters that were used to characterize the tastes of the coffees sampled. Although taste is usually subjective among individuals, the results of the electrochemical analyses were compared to the flavor profiles assigned to each sample.

Student: Brandon Kincheloe

Student Status: Undergraduate

Major: Engineering Technology

Title: Machine Learning on the Edge

Abstract:

Research into Internet of things (IoT) began January 21st, 2021, as part of the subaward of Kansas NASA Space Grant 1, regarding machine learning on the edge. The research is multifaceted and pertains microcontrollers capable of running neural networks, and deep learning through the assistance of real-time operating systems (RTOS). The study included a multistep process which involved an understanding of a microcontroller which is capable of RTOS and neural network functionality, such as the MSP432 microcontroller. An understanding of the advantages and limitations of microcontroller regarding on the edge applications is also necessary. The premise of edge machine learning pertains to the necessity of being able to train neural networks using powerful computing. After a neural network is trained, the neural network may be implemented on smaller, less powerful devices. This is beneficial where high latency and restricted bandwidth may impede access to cloud computing. Using the software Excel, PyCharm, and Google Colab, the research has progressed into a deeper understanding of forward propagation, weights, biases, multi-hidden layer networks, and activation functions. Small feedforward neural networks have been developed in Excel in order to better understand the mathematics of training neural networks. This information can later be used in larger neural networks. The research is currently moving into a deeper understanding of backpropagation and training of neural networks which includes an understanding of gradient descent and cost functions. These processes will likely include the application of developed libraries.



Students: Caleb Durbin and Mary Whiteacre

Student Status: Undergraduate

Major: Biology

Title: Mammal communities in Kansas mined lands: Second year of Snapshot USA data collection

Abstract:

Recovery efforts on reclaimed mined lands are ongoing; however, there is a lack of data to indicate whether reclamation efforts are productive and effective. In 2019 and 2020, we participated in Snapshot USA, a collaborative, concurrent, nationwide camera trapping effort to collect data on local mammal communities. Our objective was to determine how mined land vegetation structure impacted mammal community composition and species richness, and evaluate differences between sampling years. In September and October, we deployed camera traps in 14 forested mined land locations in Crawford County, KS for over 1,000 trap nights. At each site, we measured canopy coverage, ground cover, shrub density, and tree abundance and size. We observed 17 species across both years within 27,553 photographs. White-tailed deer (*Odocoileus virginianus*) and fox squirrels (*Sciurus niger*) were consistently among the most abundant species, while rare species included red fox (*Vulpes vulpes*) and southern flying squirrels (*Glaucomys volans*). More mammal species were observed at sites with greater tree abundance, woody debris, and smaller diameter trees. Our hope is to continue to explore the impact of mined land restoration on mammal communities, especially in urban settings. We plan to continue participating in Snapshot USA for the foreseeable future to monitor the land and its impact on the mammal communities across multiple years.

Students: Caleb Jones, Kage Negron, Zeel Patel, Trenton Vaughn, and Jeanne Norton

Student Status: Undergraduate

Major: Engineering Technology

Title: Blending of PLA and TPU in a Single Screw Extruder to Create 3D Printing Filament

Abstract:

3D printing has become of interest to the plastics industry to mainstream manufacturing because it can significantly increase the speed and reduce the cost of part production compared to traditional manufacturing methods for small production runs in the plastics industry. Poly lactic acid (PLA) is a hard, strong thermoplastic material that is processed in several different ways, including extrusion for 3D printing filament. Given its rigid nature, adding thermoplastic polyurethane (TPU), which is highly elastic, will improve filament flexibility while maintaining the desirable physical properties from PLA in a blended filament despite the two being immiscible with each other. Initial blending of the two materials was performed on a single screw Yellow Jacket extruder. PLA and TPU were blended in the following ratios: 100% PLA/0% TPU, 90% PLA/10% TPU, 70% PLA/30% TPU, 50% PLA/50% TPU, 30% PLA/70% TPU, 10% PLA/90% TPU, and 0% PLA/100% TPU by weight. Extrusion process parameters were adjusted until consistent filament diameters were achieved. The filaments were then analyzed by TGA and DSC for thermal properties and tensile testing for mechanical properties. The blend ratio by weight of 70% PLA/30% TPU and 50% PLA/50% TPU were found to have the most uniform diameters compared to the other ratios. The thermal analysis from TGA and DSC showed little thermal degradation after processing and the mechanical testing showed promising results for use as 3D printing filament.



Students: Caleb Thompson, Elijah Harris, Abigail Howard, Michael Majors, and Paul Herring

Student Status: Undergraduate

Major: Engineering Technology

Title: Scientific Injection Molding Using the Frisbee Mold

Abstract:

The Engel e-Motion 85 injection molding machine is an electric, 85-ton machine that is equipped with many IQ features including Authentig, IQ Weight Control, Industry 4.0, and e-Flomo. Being able to learn how to use these features is important, as it enhances student knowledge and applies a new method for analyzing data. In addition to the Engel capabilities, the RJG e-Dart can monitor part quality in real time. Different scientific molding trials were conducted: in-mold flow, cavity balance, pressure drop, gate seal, and process window. Upon finishing molding trials, scientifically-tested parts were observed and compared to previously-made parts. During these trials, the e-Dart system properly received its signals throughout the part's cycle time. These signals then displayed graphs that directly correlated with the machine actions. With the e-Dart, the production process is more efficient, allowing the process engineer to track real-time production, and allowing for multi-stage planning within the production chain. Throughout our process, we were able to properly troubleshoot intelligent control modules within the injection machine, understand how the molten plastic flows through the mold, determine which cavity in the mold portrays the most efficient pressure, and develop the cosmetic and dimensional processing window that will allow for successful mass production. This work will impact future plastic engineering technology students as they will have knowledge of the parameters needed to make quality frisbees and they will also be able to observe and understand the impact of the intelligent features within the machine.

Student: Easton Morrill

Student Status: Undergraduate

Major: Physics

Title: Phantom Event Horizons

Abstract:

Assuming that a Neutron star has a non-constant density profile, we postulate that there exists a point beneath the surface where the pressure is high enough to condense the neutrons at the core into a black hole. We discuss a numerical calculation and a mathematical proof of such a possibility and conjecture ways to test such a hypothesis. Additionally, we theorize about the mechanics to maintain a shell of neutrons around a black hole.



Students: Garrett VanBecelaere, Camille Holman, Jarod Mortensen, Evan Murphy, and Paul Herring

Student Status: Undergraduate

Major: Engineering Technology

Title: Extrusion Processing of 3D Printer Filament

Abstract:

The plastics industry has been utilizing 3D printing more over time. The process of 3D printing allows prototypes to be made without molds, more quickly, and at lower cost than traditional methods. The goal of this project was to produce commercial quality 3D printing filament utilizing one of PSU's extrusion machines. The 3D printer filament extrusion was accomplished using a Yellow Jacket extruder in the Pittsburg State University Plastics Lab. Previously, groups struggled to produce filament with the dimensional and quality standards required for standard printing. This led to issues in 3D printing, such as under extrusion and lack of bed adhesion. The parameters for the filament was determined by matching the industry standard: circular, rather than oblong, was 1.75 mm with a tolerance of +/-0.05 mm in diameter. Filament was made from different types of materials to determine the success of extrusion. Extrusion temperatures were reduced from those used previously. Also, the water trough was heavily reconfigured: the third wheel on the trough was adjusted closer to the extruder, and the water level was raised to cool the material before it reached the first wheel. This would allow the filament to keep its circular shape by allowing it to solidify before it turned 90 degrees. Multiple materials, including acrylonitrile-butadiene-styrene (ABS), red ABS, and polylactic acid (PLA), were successfully extruded, processed through the printer, and tested using tensile testing. Printed layer adhesion and strength of the product was the focus of tensile testing of 3D printed dog bone parts.



Students: Kameron Swenson, Jacob Woody, Matthew Long, Lexington Peterson, and Jeanne Norton
Student Status: Undergraduate
Major: Engineering Technology
Title: Investigation of Post-Consumer Re grind Content in ABS and Polystyrene for Consumer Packaging Applications

Abstract:

One of the major issues the plastics industry is trying to solve today is the lack of a circular economy. Plastics do not biodegrade fast enough to keep up with the waste being generated, and therefore present ecological and environmental problems. To take discarded plastics and continuously give them new life in a variety of applications is the goal of many plastics industries. However, to reprocess plastics, referred to as post-consumer regrind (PCR), has presented many challenges. This research focuses on comparing the thermal and mechanical integrity of both virgin and resins with significant post-consumer recycled content for acrylonitrile butadiene styrene (ABS) and general-purpose polystyrene (GPPS) in the conventional injection molding process. The GPPS's were processed and ground in Pittsburg State University's plastics labs until three generations were produced. The thermal results include comparisons of virgin resin to PCR resins via thermal gravimetric analysis (TGA) to determine and compare degradation temperatures and differential scanning calorimetry (DSC) to determine and compare glass transition temperatures. Melt flow index (MFI) was determined to indicate how the resins would behave in the melt during injection molding and note any marked rheological differences between virgin and PCR resins. The mechanical results include comparisons in tensile and impact testing data via Instron and Izod testing, respectively. Initial TGA results demonstrated that PCR resin was less thermally stable than its virgin counterparts for ABS.

Student: Kinsey Morey
Student Status: Undergraduate
Major: Chemistry
Title: Bifunctional CuMoS₄ for green energy production and storage

Abstract:

The growing need for energy and sustainability issues demand green energy production and storage. Research in this field needs better materials that can efficiently produce and store energy. Modified electrode materials with better electrochemical properties that can work as bifunctional materials to produce and store energy are much needed. In this work, copper-molybdenum sulfide synthesized using a self-assembled synthetic route was dip-coated onto nickel foam for energy generation (hydrogen via water splitting) and storage (supercapacitor). For water splitting applications, CuMoS₄ displayed an overpotential of 207 mV to reach a current density of 10 mA/cm² for hydrogen evolution reaction (HER). The Tafel slope associated with the HER activity of this material was 118 mV/dec. The overpotential needed to reach a current density of 10 mA/cm² for oxygen evolution reaction (OER) was 270 mV. The OER activity of copper-molybdenum sulfide showed a Tafel slope of 82 mV/dec. Copper-molybdenum sulfide showed a specific capacitance of 3678 F/g at 2 A/g when tested for supercapacitors. The material showed great stability and experienced specific capacitance retention of 86.9% after 4,000 cycles. CuMoS₄ produced results comparable to many other materials in literature and has promising results for applications for water splitting and supercapacitor.



Students: Logan Lord, Masen Cook, William Hopkins, Tanner Smith, and Paul Herring

Student Status: Undergraduate

Major: Engineering Technology

Title: Injection Mold Heat Transfer Study with The Carabiner Mold

Abstract:

Knowing how heat is displaced throughout an injection mold during plastics processing can allow the plastics processor to ensure the overall process is running at its optimal settings. The mold on which we performed our studies was a carabiner clip mold. Previously, the mold was modified for our lab's machines. In our study, initially, thermocouples were added to tops and bottoms of the cavity and core halves of the mold. The thermocouples were plugged into a data logging thermometer that allowed for graphing the temperatures of each thermocouple in the mold over a period of time. After the thermocouples were added, preliminary tests were performed to establish processing parameters and to identify a material that was best suited to our application. Four different materials were tested: unfilled nylon, red/gray acrylonitrile-butadiene-styrene (ABS), 18% glass-filled nylon, and polybutylene terephthalate (PBT). Unfilled nylon was identified as the best material for this application. During material testing, our parts were sticking in the cavity side of the mold. For this reason, material was removed along the top edge of the clip to prevent parts from sticking during final testing. Final testing will consist of studying how heat transfers throughout the mold after the mold has been in different environments.

Student: Madeline Gay

Student Status: Undergraduate

Major: Biology

Title: Trends in soil chemistry and O-horizon depths across an urbanization gradient

Abstract:

Urbanization impacts soil quality due to elevated pollutants and fertilizers levels, soil compaction, and reduced water infiltration, which results in altered soil chemical properties and a reduction in habitat quality for plants and wildlife. We hypothesized that soils within the most urbanized locations were more likely to exhibit elevated pH levels, soil nutrients, and have less organic material (O-horizon) than more rural soils. This study examined soil quality in three locations along Pittsburg's urbanization gradient: Pittsburg State University (Urban), Wilderness Park (Urban-Rural boundary), and the Rob Prairie (Rural). We quantified urbanization by calculating the percent impervious cover within a 500 m buffer of the sampling area with ArcGIS. We confirmed our hypothesized urbanization rankings for each site, as the three sampling locations were surrounded by 93.4%, 39.4%, and 27.7% impervious cover, respectively. We collected three soil samples from each site in February 2021. We measured the depth of the O-horizon with a soil corer, and tested soil chemistry with LaMotte soil kits. Specifically, we tested for soil pH and the concentration of soil nutrients: Phosphorous (P), Nitrogen (N), and Potassium (K). Our soil core samples showed that Pittsburg State University has less O-horizon than that of Wilderness Park and the Rob Prairie, confirming our predictions. We are waiting for the soil samples to dry to start the pH and nutrient analysis. This study will help us determine the effects of urbanization on soil quality and what steps we will need to take to decrease impacts on urban soils.



Students: Maggie Moody, Dylan Hiersche, Jacob Robertson, Tanner Tribble, and Douglas Wells

Student Status: Undergraduate

Major: Engineering Technology

Title: Investigation of Post-Consumer Re grind Content in Polyethylene and Polypropylene for Consumer Packaging Applications

Abstract:

With the rise of plastics products in waste streams, both consumer products companies and consumers are looking for greener methods to produce the same products with less of a carbon footprint. One way of achieving these goals is to include recycled plastic into consumer goods. These recycled greener alternatives provide many of the same benefits of virgin plastic material. The goal of this project was to determine what, if any, differences are there between virgin resins and resins that contain post-consumer recycled content (PCR). Control and experimental resins were obtained and injection molded to create samples for analysis. Control resins were Ineos H05A-00 Polypropylene Homopolymer and Marlex 9012 High-Density Polyethylene. Experimental resins included Plastic Bank SDS clear polypropylene (Social Plastic), KWR-621 Post Consumer Recycled FDA Polypropylene Resin, and KW Post-Consumer Recycled Polyethylene Resins: KWR 102 BM High-Density Polyethylene and KWR 101 150 Natural High-Density Polyethylene. Samples underwent thermal testing by differential scanning calorimetry (DSC) and thermogravimetric analysis (TGA) to determine key thermal transition and material degradation temperatures to compare each of the experimental materials to the virgin resins. Mechanical testing included tensile testing and Izod impact testing to determine the mechanical strength of each experimental materials to compare to the virgin resins. Melt flow was performed to determine the rheological properties of the virgin and post-consumer recycled (PCR) resins in the melt.

Student: Margaret Murray

Student Status: Undergraduate

Major: Biology

Title: Temperatures Decrease Mammalian Species Richness Nationwide

Abstract:

Climate change includes changes in temperature and precipitation; even the slightest deviations can throw off the equilibrium of an ecosystem. The purpose of this research was to investigate the trends between temperature, precipitation, and mammal communities. We used data from Snapshot USA, the first nationwide camera trap survey of the United States. Over 1,500 cameras were deployed over 52,000 trap nights from August – November, 2019. Cameras were placed throughout a variety of habitats, including desert, grassland, wetland, forest, and urban. We used Student's t-tests and generalized linear models to analyze the data in Program R. Climates were moderate for that time of year, with an average temperature of 18°C and 0.19 cm precipitation. The average species richness was about 4 mammal species per camera trap location. We found that temperature had a significant negative relationship with mammal species richness, while precipitation was not an accurate predictor. The next step of our study is to assess these trends across an urbanization gradient, as cities tend to be warmer compared to adjacent rural areas. These findings are important as climate change is projected to increase temperatures nationwide in the upcoming decades, at the potential detriment to the mammal community.



Student: Samantha Shakes

Student Status: Undergraduate

Major: Nursing

Title: Birth Outcomes of Patients Who Received Early vs Late Prenatal Care

Abstract:

Early prenatal care is a pivotal factor in decreasing the risks of poor birth outcomes. The United States is far behind when it comes to maternal and fetal mortality when compared to similar countries. This needs to be addressed. In this research, I look for structural barriers that are causing the inequities in this country. Especially for black women and women of color. It is important to research why people either don't seek out early prenatal care or do not have access to it, in addition to what healthcare providers can do to change this.

Student: Sara Goins

Student Status: Undergraduate

Major: Biology

Title: Surveillance study on Culex sp. in Southeast Kansas and prevalence of West Nile Virus in the mosquito population

Abstract:

West Nile virus (WNV) is the most common mosquito-borne disease in Kansas and the United States. Culex species mosquitoes are the most common carrier of WNV in the U.S. The Kansas Department of Health and Environment (KDHE) announced that Kansas and neighboring states are becoming increasingly hospitable to Culex mosquitoes as average temperatures rise. According to the U.S. Centers for Disease Control and Prevention (CDC), 80% of people infected with WNV show no symptoms; for the remaining 20%, symptoms can include headaches, body aches, joint pains, vomiting, diarrhea, or rash. KDHE reported 600 cases of the worst form of the disease in KS, including 30 deaths (1999-2017). KDHE recently designated different areas of the state at high and moderate risk levels for contracting WNV. Our study is aimed at sampling mosquito populations from landscaped vegetation at residential & commercial properties and wetland habitats in urban and suburban areas of southeast Kansas. The mosquitoes were identified using taxonomic keys and sexed. Total RNA will be extracted and prevalence of WNV will be determined using real-time reverse transcriptase-PCR (RT-PCR) assays. In addition to the surveillance data available from KDHE, the outcome of this study will provide unique information about viral load in these vectors and host populations and seasonal testing of the mosquito vectors will detect temporal changes in the viral load.



Student: Skyler Hausback

Student Status: Undergraduate

Major: Physics

Title: Effect of Graphite/Graphene Addition to MBBA Liquid Crystal

Abstract:

We are familiar with matter existing in three phases, solid, liquid, and gas. However, there is an intermediate phase called the mesomorphic phase which is intermediate between solid and liquid. Certain organic materials do not exhibit a single transition from solid to liquid but have different phases of transitions. These materials are called liquid crystals. They have long-chain molecules that are rod-like or disk-like. There is some order in the direction of the molecules; they tend to be parallel to some common axis. Because of these interesting orientation properties, liquid crystals have been used in display panels in televisions and computer monitors extensively. One of the phases of liquid crystals is called the Nematic phase in which molecules have no positional order, but tend to point in the same direction. Creating order in molecules may be achieved with external controls such as temperature and electric field. However, is it possible to achieve order without these external controls? This is the question this study investigates. In this study, Graphite/Graphene addition to liquid crystal MBBA is studied. If it is not possible to order molecules, what new phase transition temperature and an applied electric field are needed to achieve order? Results will be reported.

Students: Sydney Nippoldt, Hallee Belgum, Cassady Utley, Narinder K. Sharma, and Anuradha Ghosh

Student Status: Undergraduate

Major: Biology

Title: Prevalence of ticks and tick-borne pathogens in mined land areas of southeast Kansas

Abstract:

Ticks serve as vectors for many disease-causing pathogens, particularly bacterial and rickettsial pathogens. Diseases such as Lyme, Anaplasmosis, Ehrlichiosis, Rickettsiosis, Rocky Mountain Spotted Fever, and Tularemia can result after bitten by ticks. These tick-borne diseases are more common in the Great Plains region than is recognized. The present study aimed to conduct a three-year long surveillance on various tick species in the mined land area in Cherokee County (KS) using dry ice bait as well as flag-drag technique. Over eight visits (June 2020 - January 2021) to the collection site, ticks were collected using both trapping methods. Detailed environmental data was also collected during each visit on-site. The collected ticks were brought to the lab in vials kept in ice-cooler and differentiated by species, sex, and life stage in the laboratory using a dissectoscope. A total of 103 adults and nymphs as well as 112 larvae were collected from both woodland and grassland areas. The majority of which were identified as *Amblyomma americanum* (91.3%; Males-12, Females-4, Nymphs-78) followed by *Dermacentor variabilis* (8.7%; Males-2, Females-7). Pathogen testing on these ticks will be carried out by our collaborator at Oklahoma State University. This long-term ecological study will help better understand the variations in tick-pathogen prevalence influenced by various environmental parameters and thus appropriate management programs can be implemented to reduce the risk for human/animal diseases.



Student: William Corlett

Student Status: Undergraduate

Major: Environment and Safety Management

Title: Motion Capture and Photogrammetry Data Collection for Ergonomic Musculoskeletal Repetition in a Real-World Environment

Abstract:

This research project will determine if there is a strain on the musculoskeletal body in a world where many repetitive motions and movements are used to complete various tasks. The research project will study the motions of the human body in a real-world environment setting. The process will use photogrammetry to help display the movements and the utilization of a motion capture suit in a real-world environment. To ensure the data collected can generate two-dimensional and three-dimensional objects. Drone technology will provide a video of the activities performed using the RoKoKo motion capture suit in the predetermined environment. The motion capture suit will capture data of tasks commonly required in the construction and general industry environments. The final step is merging all the data from the three various technologies into Bentley software to digitalize the activities. The data collected will help understand the musculoskeletal components effected while performing repetitive motions during simple tasks.

Student: Yash Worlikar

Student Status: Undergraduate

Major: Technology

Title: Impact of the number of autonomous vehicles on interstate highway traffic congestion in the U.S.

Abstract:

The purpose of this study is to investigate how effectively Interstate Highway traffic can be controlled and managed depending on the number of autonomous vehicles in the U.S. The study is conducted under quantitative methodology. Using a Correlational type of design, responses of the customers at automotive dealerships across Pittsburg, KS, and Joplin, MO would be recorded using a survey. The survey consists of 15 multiple choice questions to evaluate the efficiency of interstate highway traffic control. On average, An American commuter loses 90 hours yearly due to traffic congestion. It also accounts for an annual wastage of 1.9 Billion gallons. The increasing number of autonomous vehicles could be the answer to the long highway traffic conditions. Vehicle-to-Vehicle communication (V2V) and Vehicle-to-Infrastructure communication can be used to achieve better traffic management. This study would potentially aid the Federal Highway Administration (FHWA) to maintain an efficient system of interstate highways concerning its design and safety parameters. Furthermore, it would analyze how an organized traffic flow would contribute towards a convenient and efficient travel experience. It was hypothesized that there will be a correlation between the number of autonomous vehicles and interstate highway traffic congestion in the U.S.



Students: Zachary Pagel and Dawson Vogel

Student Status: Undergraduate

Major: Technology

Title: The Volta ElectroBlade

Abstract:

The ElectroBlade is a multi-axis cutting device capable of slicing and dicing your fruits and vegetables autonomously, freeing up your hands so that you can be elsewhere in the kitchen, which greatly reduces the amount of time you spend cooking. The ElectroBlade takes the edible as an input and presents it cut to the user's specification as an output. Featuring a dynamic knife capable of moving on two axes, a turntable, and Thor's Hammer, the ElectroBlade achieves full multi-directional cutting capabilities. The cutting surface is a removable cutting board constructed from food-grade plastic. This project is designed, funded, and built entirely by the creators.



Graduate: Category A

Science and Technology



Student: Adara Wolfe and Anuradha Ghosh

Student Status: Graduate

Major: Biology

Title: A pilot study on detection of lead in residential garden soil in tri-state mining area

Abstract:

Lead is toxic and a known human carcinogen, affecting millions of children in USA. Some of these effects on children includes permanent nervous system damage, and disabilities. High level of lead in soil may affect overall crop yield, soil health as well as health of the consumers. Our study focused on determining lead concentration in soil collected from residential gardens in Pittsburg (KS) and Alba (MO). With the background of mining in this tri-state area, this project aimed to increase community awareness on the soil quality and its potential impact on human and animal health. Soil was sampled from equal number of sites from both Pittsburg and Alba as well as control soil samples were collected from Pitcher (OK) chat piles. These samples were thoroughly dried and homogenized and tested for lead concentration using a commercially available kit (Industrial Test Systems Lead Soil Check) and also was analyzed using Inductively Coupled Plasma Atomic Emission Spectroscopy. Along with lead, other nutrients like phosphorus, nitrogen, and potassium levels and pH of the soil were also measured using Luster Leaf's Rapitest Soil Test dip kit. Homeowners were provided with a short questionnaire survey regarding concern of lead exposure. Three out of a total of 24 subsites tested showed level of lead above the EPA guideline of 400 ppm. The data obtained will be shared with the owners and recommendations will be provided, if needed. A full-scale follow-up study will be conducted in future to enhance mindfulness among the community regarding environmental health.



Student: Alexandra King

Student Status: Graduate

Major: Biology

Title: A black spot on our record: invasion history of the nonnative Blackspotted Topminnow (*Fundulus olivaceus*) in the Spring River Subbasin of Kansas, with a comparison to long-term trends in Blackstripe Topminnow (*Fundulus notatus*) prevalence

Abstract:

The Blackspotted Topminnow (*Fundulus olivaceus*) is not native to the Spring River subbasin of Kansas where it was first collected from Shoal Creek in the early 2000`s. Little is known regarding the contemporary prevalence of the Blackspotted Topminnow or how populations of the closely related Blackstripe Topminnow (*Fundulus notatus*) have varied since Blackspotted Topminnow were introduced into the system. Thus, we sampled 55 sites using backpack electrofishing and seining during 2017-2020 and then compared long-term trends in occupancy and relative abundance of the Blackspotted and Blackstripe Topminnows using three separate datasets (1962-1964, 1993-1995, 1995-2013). Between species comparisons of temporal trends were made for the entire SRS of KS, and for physiographic regions within the SRS. In our contemporary survey, we detected the Blackspotted Topminnow at 11% of sites (6/55), including four Shoal Creek sites and two sites in the Spring River below Empire Lake. Blackstripe Topminnow prevalence was relatively stable above Empire Lake where Blackspotted Topminnow were absent. In contrast, between 1995-2013 and 2017-2020 time periods, Blackstripe Topminnow exhibited a declining trend in prevalence within the Ozark Plateau where it was sympatric with the Blackspotted Topminnow. This decline was only observed below Empire Lake where Blackspotted Topminnow were present, which was likely attributed to negative biotic interactions (e.g. competition; hybridization) with the Blackspotted Topminnow. Regardless, our research shows that Blackspotted Topminnow is now an established nonnative in Kansas and further monitoring is necessary to document the spread and provide a better understanding of the ecological impacts of this introduction.



Students: Anudeep Reddy Dasari and Phanindar Reddy

Student Status: Graduate

Major: Automotive Technology

Title: Air pollution affect the health conditions of pedestrians in metropolitan cities

Abstract:

The purpose of this study is to explore the impact of air pollution on the pedestrians in metropolitan areas of California, USA. This area was picked since; California is one of the main leading states in manufacturing industries in United States. As indicated by this, the pollution levels in California would be adequate enough to explore this issue. The study is conducted under qualitative methodology and case study design. This examination includes meeting of 15 to 20 pedestrians in California, USA. One of the burning problems world is the environmental pollution caused by the emission of smoke which is released from the factories, moving vehicles and from some other sources. In late decades, there is threatening increment in air pollution levels. Carbon monoxide is one of the primary pollutants which is discharged from vehicles and other medical industries. Carbon monoxide indicates misleading impact on the lungs of people. As indicated by W.H.O(World Health Organization), people on foot(pedestrians) make up to 85% of the casualties of air contamination, this investigation will give clear experiences to pedestrians and environmental control board on vital measures to be taken to diminish the effect of air pollution. This investigation will even help officials to alter the ecological laws to reduce the contamination levels.

Student: Bhupinder Kaur

Student Status: Graduate

Major: Information Technology

Title: Investigation of reasons which lead engineering professionals in India to switch their occupation from engineering positions to business administration

Abstract:

The purpose of this study is to investigate and understand why engineering professionals discontinue programming as a profession. What are the reasons that force engineering professionals to switch even after being paid fairly? Research under this topic will be concluded on a sample of 20 people. This includes the engineering professionals with 2-3 years of engineering experience before switching to business administrative positions. These are the graduates with working experience in top 10 software companies of north India. This study will help us to understand the significance of programming for graduates not only in professional life but also in everyday life. People can face several difficulties because coding is all about problem-solving and making algorithms. Time and energy, both are invested in the regular practice of algorithms which make our minds sharp, while programming we counter a lot of small problems. Debugging and decoding complex programs consume a lot of time. It can be overcome with a lot of practice and learning lively examples. Practice and experience develop a sense of confidence in an individual that he can solve problems. Also, the study will highlight the need for enough industrial experience. Most essentially, the practice on live projects before graduation so that the graduates opting for programming-related jobs already have an exact idea of what they are getting into and how to tackle it.



Student: Darby Harvey

Student Status: Graduate

Major: Nursing

Title: Neonatal Abstinence Syndrome Nonpharmacological Intervention Education for Healthcare Professionals Caring for Newborns

Abstract:

Neonatal Abstinence Syndrome has increased significantly in the United States over the past few decades due to the increase of maternal substance abuse. The overall goal of caring for these infants is effective management of the withdrawal symptoms, including both pharmacological and nonpharmacological interventions. However, nonpharmacological interventions have been shown to improve infant outcomes and reduce length of hospitalization. This project sought to increase healthcare professionals' knowledge and confidence regarding neonatal abstinence syndrome and the utilization of nonpharmacological interventions when caring for infants diagnosed with neonatal abstinence syndrome through the provision of an educational presentation. This study utilized a one-group pretest-posttest design with healthcare professionals caring for newborns in a hospital setting. Healthcare professionals were recruited via convenience and snowball sampling through social media platforms. Participants' knowledge and confidence were measured before, after, and six-weeks following an educational presentation. According to the findings, the educational presentation improved healthcare professionals' knowledge and confidence regarding neonatal abstinence syndrome and the utilization of nonpharmacological interventions when caring for an infant diagnosed with neonatal abstinence syndrome. These findings determine that education can be beneficial for increasing healthcare professionals' knowledge and confidence regarding neonatal abstinence syndrome and the utilization of nonpharmacological interventions.



Student: Devapriya Segaran

Student Status: Graduate

Major: Biology

Title: Plant Based Compounds Inhibits Proliferation, Alters Cytomorphology and Decreases Migration of Human Cancerous Cells

Abstract:

Adenocarcinoma is an aggressive form of lung cancer that has a high risk of recurrence with a survival rate of 33%. In recent years, there has been much interest in the ability of naturally occurring plant derived phenols to inhibit specific type of cancers. Compounds like curcumin derived from turmeric, rutin derived from citrus fruits and resveratrol derived from blueberries have been of particular interest. In this thesis I studied the anti-cancer effects of the above-mentioned compounds on a human a549 adenocarcinoma cell line. Inverted phase contrast microscopy was used to observe alterations to the cytomorphology of cells. An MTT assay was used to measure cell viability. Dose and time dependent A549 cell viability were observed following treatment with curcumin, rutin and resveratrol. The effects on cell migration after treatment with compounds was determined by wound-healing assay and MTT assay demonstrated that the survival rates of curcumin treated cells reduced at higher concentrations after 24 hours treatment when compared to rutin and resveratrol treated cells, although resveratrol showed lower viability than rutin. After 48 hours of treatment the viability of curcumin treated cells almost went to 10% with rutin 18% and resveratrol 12%. The morphological analysis showed that compound treated cells became round and the normal spindle shape disappeared. Over a period of 6h to 24h, the number of bright circular dead floating cells increased. Treatment with curcumin and resveratrol strongly reduced wound repair and significantly inhibited the migration of A549 cells in a concentration dependent manner whereas rutin scarcely inhibited migration although it reduced wound repair. These findings provide support to the potential utility of curcumin, resveratrol and rutin as natural molecules with anticancer activity against adenocarcinoma.



Student: Emma Buckardt

Student Status: Graduate

Major: Biology

Title: Herpetofauna Communities on Mined Lands in Southeast Kansas

Abstract:

Southeast Kansas has a rich history of coal mining, with decades of strip mining that severely altered ecosystems. The resulting habitat composition of forests, prairies, and wetlands makes this a unique area for the state, in addition to its location along the narrow swaths of the Cherokee Lowlands and Ozark Plateau. Since 2018, herpetofauna surveys have been conducted on mined lands with the use of drift fence arrays that included funnel traps, pitfall traps, and cover boards. To expand herpetofauna surveys, we conducted call surveys and larvae sampling at 24 wetlands across the Mined Land Wildlife Areas in 2020. Surveys were conducted from May 15 to August 14, during which time we documented 12 reptile and 6 amphibian species at 5 drift fence arrays and 6 reptile and 5 amphibian species at wetland sites. Most notably we encountered adult and juvenile Broadhead skinks at a drift fence array location. Our project will be expanded for the 2021 and 2022 field seasons to encompass anuran distributions and wetland herpetofauna communities on mined lands.

Student: Felipe de Souza, J. Choi, and Ram K. Gupta

Student Status: Graduate

Major: Polymer Chemistry

Title: Bio-Based Rigid Polyurethane Foams Made Flame-Retardant after Addition of Aluminum Hypophosphite

Abstract:

Olefins present unsaturations that can be chemically modified to introduce hydroxyl groups. This process was performed on carvone, an essential oil extracted from bay leaf, that reacted with 2-mercaptoethanol (2ME) through a UV catalyzed reaction at room temperature and solventless process named as thiol-ene click chemistry. The novel carvone-derived polyol was characterized through hydroxyl number, viscosity, IR spectroscopy, and size exclusion chromatography. Then it was used to make flame-retardant polyurethane foams, at which a synthesized inorganic compound named aluminum hypophosphite (AHP) was blended into the mixture. Separately, aluminum trihydroxide (ATH) was also added for comparison. Both sets of foam were analyzed in terms of density, closed-cell content, compressive strength, thermostability, burning test, and weight loss percentage. The foams had 95% of closed cell content. Weight loss went from 45 to 3.06% (8.9 wt.% AHP) in comparison to 12.23% (15.43 wt.% ATH). Also, burning time dropped from 98 to 5.2s (8.9 wt.% AHP) and 58s (15.43 wt.% ATH). The difference was addressed to AHP's action for the formation of a char layer promoted by phosphorus that dehydrated the polyurethane's surface, leading to a denser carbonaceous layer. On top of that, it released radical species that captured reactive radical fragments, effectively preventing fire from spreading. Simultaneously, aluminum promoted an endothermic decomposition that released water and formed a diffused alumina layer. The combination of these two fire mechanisms occurring at the same time surpassed the fire quenching performance of foams blended with commercial ATH. Thus, satisfactory flame-retardancy properties were achieved.



Student: Jenny Greene

Student Status: Graduate

Major: Nursing

Title: Opioid Induced Hyperalgesia Education for Patients, Nurses, and Providers

Abstract:

This project evaluated the knowledge of the public, healthcare providers, and nurses regarding opioid induced hyperalgesia (OIH). OIH is an elevated pain response because of high dosage or chronic use of opioids. Opioids are a problem not only in the United States but throughout the world; addiction, constipation, and overdose are the most frequently mentioned consequences of opioids. Little is known about other consequences to the body caused by chronic or high dose opioid usage, such as OIH. This project sought to increase awareness and caution against the utilization of opioids by patients and their healthcare providers and nurses practice. Two healthcare providers and nurses' education sessions were held via Zoom meetings with the material presented based on results from a Facebook survey that was used to assess current knowledge. Pre- and post-session surveys were given to healthcare providers and nurses to evaluate their education and current and future practices. Upon evaluation of the data, it showed that over half the participants were unable to correctly define OIH, that the majority were nurse practitioners in the clinic, and back pain was the most frequent reason for opioids utilized in their practice, with Tramadol being the biggest culprit. Post-session surveys displayed a decrease in the number of healthcare providers and nurses that would utilize opioids for back pain.

Students: Jonghyun Choi, Taylor Wixson, and Ram K. Gupta

Student Status: Graduate

Major: Chemistry

Title: Pomegranate: An Eco-Friendly Source for Green Energy Storage Devices

Abstract:

With an increasing demand for energy and concerns about the environment, scientists are trying to find a better way to generate green energy and to efficiently store the generated energy. Biowaste could be an attractive source for the preparation of active materials for energy storing devices. In this project, a shell of pomegranate was used for the preparation of high surface area carbon for supercapacitor applications. The dry powder of a pomegranate was chemically activated using various ratios of pomegranate and activating agent to produce carbon with a range of different properties. The surface area of the pomegranate-based carbon was 40 m²/g, which improved to 1459, 1737, and 2189 m²/g upon chemical activation using, 1:1, 1:2, and 1:3 ratios of pomegranate: activating agent, respectively. The energy storage capacity was calculated using galvanostatic charge-discharge measurements, and the highest specific capacitance of 190 F/g at 1 A/g was observed for PG-2 (1:2 ratio of pomegranate: activating agent) activated pomegranate-based carbon. Using the electrode, the symmetric supercapacitor devices were fabricated utilizing various electrolytes (aqueous, organic, and ionic liquid electrolytes). From the Ragone curve, the highest energy and power density of [8.8 Wh kg⁻¹, 3,950 W kg⁻¹], [39 Wh kg⁻¹, 8,943 W kg⁻¹], and [68 Wh kg⁻¹, 11,316 W kg⁻¹] was obtained for aqueous, organic, and ionic liquid electrolytes, respectively. Our research suggests that pomegranate-based carbon could be an attractive material for the fabrication of energy storage devices.



Student: Kelsey Thompson

Student Status: Graduate

Major: Materials Science

Title: Synthesis of Nanostructured Transition Metal Oxides and Sulfides for Overall Water Splitting and Supercapacitors

Abstract:

In contemporary society, there are many different ways that energy is used in daily life. From applications that require a high energy density to long term storage in a stable manner the requirements for energy usage are diverse. Therefore, the greater the number of uses a designed material exhibits the more practical it may be for wide-scale manufacture. Two areas of particular interest for energy applications are fuel cells (to generate energy) and supercapacitors (to store energy). To provide cheaper and more durable alternatives for energy storage electrodes containing CoMoO_4 , NiMoO_4 , CoMoS_4 , and NiMoS_4 were synthesized. The electrodes were synthesized through a hydrothermal method using Ni-foam as the substrate then tested as electrocatalysts for water splitting and electrodes for supercapacitors. As an electrocatalyst for hydrogen evolution reaction, NiMoS_4 displayed the lowest overpotential of 148 mV with a Tafel slope of 159 mV/dec. On the other hand, CoMoS_4 showed the lowest overpotential of 189 mV with a Tafel slope of 78 mV/dec among all four samples for oxygen evolution reactions. In terms of energy storage, the CoMoO_4 had the highest specific capacitance of 2652 F/g at a current density of 0.5 A/g with an averaged charge retention of 91% and a Coulombic efficiency of 99% after 10,000 cycles.



Student: Kristen Anderson

Student Status: Graduate

Major: Nursing

Title: Disruptive Communication Among the Interdisciplinary Team: Gaining Insight and Providing Nurse Education

Abstract:

The purpose of this study is to identify what types of disruptive behavior nurses are experiencing, discuss outcomes of disruptive behavior, and educate healthcare providers and administrators of disruptive communication. Understanding the consequences of disruptive communication can help educators articulate the need for training in conflict management and therapeutic communication methods. It can also aid healthcare providers to be more conscious of their behavior in the professional setting. Seven research questions related to communication were developed and analyzed in this study. The author developed a pre-education survey that included demographics, multiple-choice questions, and open-ended questions to assess the nurses' knowledge and feelings regarding disruptive communication in a mixed-method, cross-sectional design to evaluate knowledge and hear the voice of the participant. The post-education questionnaire included multiple-choice questions, assessing the nurses' feelings toward addressing disruptive behavior. Statistical analysis was utilized to calculate the frequency, percent, and mean of quantitative data. This study contributes to nursing knowledge, supporting the need for positive communication techniques, revealing adverse outcomes from disruptive communication, and discussing the need for continuing education. Effective communication can contribute to the capstone of healthcare: patient safety and high-quality care. Therefore, continuing education, institutional policy, and legislative policy need to be implemented to improve communication among the interdisciplinary team.



Student: Kristi Harbit
Student Status: Graduate
Major: Nursing
Title: Provider Knowledge of Tickborne Diseases

Abstract:

Tickborne diseases have increased in incidence in recent years as well as new tickborne diseases have been discovered. These increasing numbers show the importance of well-educated health care providers to adequately diagnose and treat these diseases. The purpose of this DNP scholarly project study was to determine the effectiveness of an educational presentation for primary care providers over tickborne diseases in Kansas, Missouri, Oklahoma, and Arkansas. The educational presentation was given at a local nurse practitioner conference and knowledge was determined via a pre-test, post-test, and 6-week follow-up email. Few research articles are available over this subject and the articles that have been done are limited in their scope to Lyme disease and mostly endemic areas of Lyme disease. A total of 30 participants were at the conference and participated in the study. On average, participants scored 33.33 points higher on the post-test than on the pre-test which was a statistically significant difference. Due to the lack of responses to the six-week follow-up email, statistical analysis of that data was not possible. These findings from the pre and post-test indicate that education of tickborne diseases for healthcare providers is beneficial. Further studies over tickborne disease knowledge and treatment practices in Kansas, Missouri, Oklahoma, and Arkansas should be completed to gain further insight into current practices and should include multiple tick diseases.

Student: Luke Headings
Student Status: Graduate
Major: Biology
Title: Evaluating the avian and vegetative communities on strip-mined land in Cherokee and Crawford counties

Abstract:

The Mined Land Wildlife Areas (MLWAs) of Southeast Kansas represent a diverse patchwork of ecosystems in varying stage of succession, including grasslands, shrublands, and forests. The goal of our study is to assess the conservation value of strip-mined land for bird communities. During our 2020 pilot season, we conducted point counts and vegetation sampling at 67 locations in Crawford and Cherokee counties. A total of 74 bird species were detected, including fourteen species of greatest conservation need, as identified in the Kansas Wildlife Action Plan. We also located and monitored 48 nests from 8 species 11 of which fledged young. In the future, we will focus our nest searching efforts on Bell's vireos (*Vireo bellii*) because of its scarcity in the state of Kansas and its presence on the species of greatest conservation need list. Preliminary analyses indicate that mined land may support similar bird communities to those adjacent unmined areas. However, it remains unclear how exotic plant species that dominate some sites are affecting the bird community. Ongoing work will continue to evaluate the relationships between mined land vegetation and bird communities to inform habitat restoration on the MLWAs.



Student: Marlee Cares

Student Status: Graduate

Major: Nursing

Title: Implementation and Evaluation of the Quantification of Blood Loss and Postpartum Hemorrhage Education

Abstract:

Postpartum hemorrhage (PPH) is an obstetric emergency that can lead to maternal morbidity and mortality. The literature is consistent that numerous maternal deaths related to PPH are preventable. The significant contributors identified to maternal deaths from PPH include deficient education obstetrical nurses have on PPH, delayed recognition, and miscalculations of blood loss. After completing a literature review on the current PPH practice and determining the current method of estimation of blood loss (EBL) to be inaccurate, obstetric nurses at a rural, southeast Kansas hospital were educated on PPH to improve recognition and determine a cumulative blood loss more accurately by the method of quantification. This study utilized a one-group pretest-posttest design to determine the knowledge gained on PPH and the technique of quantifying blood loss (QBL) after an education lesson. A PPH cart was created and navigated to help the nurses calculate QBL and prevent delays in PPH management. The nurses completed a six-week postimplementation survey to determine how the education program affected their knowledge and skills regarding PPH, QBL, and the PPH cart. According to the findings, the study indicated that an education program over PPH improves PPH knowledge and skills to quantify blood loss. The results determined the PPH cart was beneficial in performing QBL and the management of PPH. In conclusion, the educational lesson and conversion from estimation to the quantification of blood loss could ultimately decrease maternal morbidity and mortality.

Student: Meghan Murray

Student Status: Graduate

Major: Nursing

Title: Assessing the Health Literacy Levels of Diabetic Patients Located in Rural Southeast Kansas

Abstract:

Data shows that limited health literacy is highly prevalent throughout the United States. This data has also found a correlative relationship between limited health literacy and poor health outcomes. An individual's health literacy level affects many areas of their health, including their ability to effectively manage chronic diseases, such as diabetes mellitus. Awareness of an individual's health literacy level allows for targeted interventions and a potential improvement for a patient's health outcomes. The Newest Vital Sign (NVS) is a validated screening tool that allows for the identification of a patient's likely health literacy level. The purpose of this Doctor of Nursing scholarly project was to identify the health literacy levels of pre, type one or type two diabetic patients attending the Diabetes Self-Management Education (DSME) classes led by the certified diabetic educator (CDE) of the Community Health Center of Southeast Kansas clinics (CHCSEK), through the utilization of the NVS screening tool. The surveyed population included diabetic individuals aged 18 and over who attended group DSME classes in December of 2020 at one rurally located CHCSEK clinic. Due to sample size, the project results were not statistically significant; however, it was concluded that there remains a continued need for health literacy level identification and diabetic education within the rurally located Southeast Kansas clinic community.



Student: Neeraj Duhan

Student Status: Graduate

Major: Technology

Title: How COVID-19 has impacted the admission rates of higher education in the Midwest of the United States?

Abstract:

The purpose of this study is to investigate how COVID-19 has impacted the admission rates of higher education in the Midwest of the United States. The study will be conducted under a qualitative methodology using a case study design. The study will explain how institutions have been affected by COVID-19 regarding students' retention rate, admission rate, revenues, funds, and personal challenges. The pandemic has been presented for more than a year now, and yet, there is no sign of ending. It has put up a lot of challenges for higher education institutions. The COVID-19 is causing the universities to cut down the courses because of fewer admission rates, restricted services, and operations, causing financial losses. Most of the institutions are worried about the requirement of the addition of faculty and cutting down the staff because of the fewer fundings. The collection of data will be completed by performing a semi-structured interview of the Case study framework. There will be ten participants (sample size of 10) participating in this study. It will include administrative assistants and faculty from a university in southeast Kansas because it has a student population of four Midwest states. A questionnaire of ten questions will be given to each participant to provide the required information. The questionnaire involves a mixture of questions, related to the admission rate, funds, and personal challenges faced during the pandemic period.

Students: Nilamben Panchal, Vedant Jain, Rebekah Elliott, Samantha Knoblauch, T. Banerjee, and Santimukul Santra

Student Status: Graduate

Major: Chemistry

Title: Detection of Food-Borne Pathogens Using Nanozyme Technology

Abstract:

The recurrent outbreak of E. coli necessitates the need of rapid and sensitive technology to detect bacteria in the food samples. E. coli O157:H7 is infectious at very low CFU counts (10-100 viable cells). Herein, we report a unique combination of magnetic and plasmonic properties in a single nanopatform, which have superior peroxidase-like activity. This new nanosensor platform, magneto-plasmonic nanosensor (MPnS), is composed of superparamagnetic iron oxide nanoparticles (IONPs) and gold nanoparticles (GNPs) and stabilized with polyacrylic acid polymer, providing surface -COOH functional groups. By using EDC/NHS bioconjugation chemistry, the surface of MPnS is decorated with E. coli O157:H7-specific antibodies. We compared the catalytic activities of MPnS with that of GNPs, IONPs and traditional HRP and calculated Michaelis-Menten kinetics, which showed highest catalytic activity for MPnS. The ELISA-like experiments were performed using MPnS to detect E. coli within 30 min with higher sensitivity. We extended this detection study using milk and spinach samples. Various spectrophotometric and colorimetric experimental results in the specific detection of E. coli will be detailed in this presentation.



Student: Niloofar Arasteh Nejad

Student Status: Graduate

Major: Chemistry

Title: Highly efficient thermal stability of bio-based rigid polyurethane foam via melamine and its derivatives as additive flame retardant

Abstract:

Bio-based rigid polyurethane foam was synthesized via the reaction of β -myrcene oil and 2-mercapethonal through UV catalyzed thiol-ene chemistry. Modern polyurethane industries have shown a growing interest in utilizing renewable materials because they have confirmed promising properties without any environmental issues. Polyurethane foam contains porous structures, which probably is the main reason for its flammability. Recently, halogen-free FRs have garnered significant attention, especially nitrogen-based additives to slow down and retard the burning rate or self-extinguish the flame. Melamine and its derivatives are the main organic nitrogen chemicals used as additive flame retardants and can be a good choice to be incorporated into the polyurethane foam due to the low toxicity with effective performance in preventing fire propagation. Melamine undergoes strongly endothermic decomposition and acts as a heat sink in a combustion event. Hence, it possesses a higher decomposition temperature and releases nonflammable gases along with forming a char layer on the foam's surface. Melamine, melamine cyanurate, and melamine phosphate were used as an additive flame retardant in bio-based rigid polyurethane and have been shown to decrease flammability without sacrificing the mechanical integrity of the foam. The neat foam was burnt for 40 s with 40% weight loss, however, the addition of melamine showed a shorter burning time and weight loss for 14 s and 2.5 wt.%, respectively. Melamine Cyanurate behaved producing a flickering fire that self-extinguished in 21 s with 4 wt. % weight loss. In comparison to pure melamine and melamine cyanurate, melamine phosphate showed a better thermal stability and extinguished the fire for 11 s with 3 wt.% weight loss. Therefore, ecofriendly melamine-based materials are capable of suppressing the flame within a short time with a minimum concentration of smoke and toxic gases. As a result, using eco-friendly materials such as myrcene and nitrogen-based FR offered a viable option to improve the physicomechanical and thermal stability of rigid polyurethane foam.



Student: Pankti Patel

Student Status: Graduate

Major: Technology

Title: How the Implementation of Construction Management Softwares affecting the Management Process of High-rise Buildings?

Abstract:

The study is to investigate the main benefits of using construction management softwares in the construction industry and which component of the project management system is affecting the most. Past decade is very crucial for the innovation in construction industry. This study will help the construction industry to acknowledge the importance of the construction management softwares to improve the management and performance of the system. Since the construction technology is growing fast and adopting complex structural and architectural design and heavy machineries, there are growing need of management software to ease and smooth the process not only for general contractor but starting from owner to architects, structural engineers, and sub-contractors. There are many softwares available to manage the construction process but still there is uptake of construction industry specific software products is very low. To fulfill the requirements of competitive market, companies need to give the extra ordinary work in budget and in fastest time possible. This study will motivate companies to use the construction management softwares specially for high-rise buildings. In addition, this study will provide the list of challenges that companies are still facing and could be improved by the software making companies.

Student: Pranay Kumar Reddy Akaram

Student Status: Graduate

Major: Industrial Technology

Title: How regular consumption of fast food impacts the health of the male population between the ages 21-30 in Pittsburg, Kansas, USA.

Abstract:

The purpose of this study is to investigate how eating fast food daily affects the health of people. This study is intended to show how health issues such as obesity, blood pressure, and cardiovascular problems are related to people's regular food habits. This study will be conducted under qualitative methodology and by case study design strategy. This investigation includes interviewing 15 to 20 people who eat fast food regularly in Pittsburg, Kansas. Food is the major source of energy for humans. It plays a significant role in both the physical and mental health of people. It is important to investigate how daily food habits impacts people's health. This study will investigate how regular consumption of fast food affects the health of the participants. The study results will benefit the general public in choosing their regular diet and which type of food they should avoid.



Student: Sagar Nagane

Student Status: Graduate

Major: Construction Management

Title: Quality management differences between the large scale and small scale companies

Abstract:

This qualitative study focuses on construction site quality control comparing large-scale construction companies' vs small-scale construction companies. Construction site quality control is the major topic in the field of construction. The data is collected in an interview form. The participants were quality managers from both large-scale and small-scale companies. The result shows that the large-scale companies have the up to date technologies on quality control. On the other hand, small-scale companies have not many up-to-date technologies due to the cost restriction. There is a significant difference in the employee's number at the construction site. Also, Large scale and small-scale construction companies have different methods on how they operate the quality control on construction sites.

Student: Tenzin Ingsel and Jonghyun Choi

Student Status: Graduate

Major: Chemistry

Title: Cost-effective solutions to energy storage system development

Abstract:

For a nation to move closer to clean energy uses in daily life, solar and wind energy must be stored in electrochemical energy systems. Renewable energy's intermittent nature calls for batteries and supercapacitors highly efficient in converting and storing energy. In this work, low-cost nanostructured metal oxides were obtained via a facile hydrothermal process for their applications in supercapacitor. Cobalt oxide was doped with iron; they have relatively similar atomic radii with similar electronegativity properties. Previous reports have mentioned the synergistic effect of Co and Fe in various electrochemical applications. This work studied samples obtained by changing the elemental compositions of iron-cobalt $\text{Fe}_x\text{Co}_{3-x}\text{O}_4$ with $x = 0, 0.2, 0.4, 0.6, 0.8,$ and 1 . It was observed that $\text{Fe}_{0.2}\text{Co}_{2.8}\text{O}_4$ showed the best performance in the capacitive test by delivering 3.17 F/cm^2 at a 2 mV/s scan rate. We speculate that a trend can be seen in which iron dopant amount largely governs the sample's electrochemical properties. Such techniques can be applied to optimize materials for cost-effective energy solutions.



Student: Trevor Harvey

Student Status: Graduate

Major: Nursing

Title: Educational Needs Regarding Concussion in Youth Athletes

Abstract:

Concussions are a major health concern for youth athletes. Parents and coaches of youth athletes are often tasked with monitoring, treating, and managing youth athletes who are suffering from a concussion. The purpose of this study was to increase education provided to parents and coaches of youth athletes regarding concussions, concussion symptoms, and concussion management. Parents and coaches (n=64) of youth athletes in grades seven through twelve participated in a pretest, educational opportunity, and posttest study design to determine if knowledge of concussions, concussion symptoms, and concussion management increased following an educational presentation. Participants were recruited via convenience sampling from local school districts and social media platforms. Participant knowledge was measured prior-to and following an educational presentation. The findings of the study indicated that parents and coaches had increased knowledge of concussions, concussion symptoms, and concussion management following the educational presentation. Specifically, misidentification of symptoms and identification of proper management strategies improved significantly following the educational presentation. Increasing education for parents and coaches of youth athletes will increase knowledge regarding concussions, concussion symptoms, and concussion management. Future studies should focus on symptom identification and proper management strategies of concussions.

Student: Truptiben Patel, Arth Patel, Zachary Shaw, Tuhina Banerjee, and Santimukul Santra

Student Status: Graduate

Major: Chemistry

Title: Activatable MR Prodrug for Targeted Delivery and Treatment of Cancer

Abstract:

In this study, a new multimodal theranostic tool is reported utilizing nanoceria delivery system conjugated with the ICAM1 antibody and a magnetic resonance (MR) probe as a prodrug with both MR and cytotoxic properties. The prodrug was synthesized from doxorubicin and phenyl-amine modified DTPA chelated with gadolinium utilizing dithiobis(succinimidyl propionate) (DSP) as a crosslinker. Nanoceria was synthesized from cerium oxide and polyacrylic acid using a water-based alkali precipitation technique. Doxorubicin and the synthesized prodrug were encapsulated separately within the nanoceria polymer matrix using a solvent diffusion method. The drug/prodrug-encapsulated nanoceria's carboxylated surface was functionalized with the ICAM1 antibody utilizing EDC/NHS chemistries and the resulting formulations were purified and characterized by DLS, zeta potential, UV/Vis, and MR. The efficacy of this platform was measured by treating MDA-MB-231 breast cancer (TNBC) cells and MCF-7 cells with the drug/prodrug-loaded, ICAM1-conjugated nanoceria and analyzing the results of the treatment. Results were evaluated by cytotoxicity assays (MTT), fluorescence microscopy, reactive oxygen species determination, and comet assays. In all, the results show the nanoceria platform is target-specific to TNBC, and the encapsulated prodrug is able to be activated releasing doxorubicin and initiating apoptosis in an in vivo breast cancer model.



Student: Yue Liu

Student Status: Graduate

Major: Technology

Title: Big data analysis on the relationship between personalizing advertisement volume and sales

Abstract:

The topic I want to focus on in my research proposal is big data. On the one hand, people's personal information is circulating on the Internet, and people are worried about privacy leakage. On the other hand, many mobile shopping and social networking apps record people's usage of the apps and collect data. We can see the effects of this is the way our online shopping product searches affect the kinds of advertisements that appear in our social networking and other sites. After a customer searches for a product of interest through a cell phone browser, many shopping apps will record this information and then constantly recommend items similar to what the customer has searched for. I once found a beautiful skirt on a shopping app, and I didn't buy it. And for at least five days afterward, that skirt I had searched for kept appearing like a ghost when I checked my mobile news and weather forecast apps. This situation can make customers believe that their personal information has been stolen and their privacy has been compromised. Online shopping companies are collecting shopping preferences from their customers, which helps them to better target their advertising, but not every customer would like to have their personal purchase information recorded.



Undergraduate: Category B

Business, Education, and
Humanities



Student: Braeden Silvers

Student Status: Undergraduate

Major: History

Title: The French Revolution: Peasants, Agrarian Communities, and other Causes

Abstract:

The paper seeks to generate a better understanding of the role played by agrarian communities in the French Revolution. This was determined by analyzing the arguments surrounding the causes of the French Revolution. A variety of sources were used to explore different arguments and interpretations of the French Revolution. According to the sources, there are a few different things that were found. One source covers the interpretation of the French Revolution and uses a variety of different viewpoints from other people to make its argument. Another talks about Feudalism being a large factor in the revolution, and many of the others focus on the peasantry and agrarian communities being the most important factor. The peasantry played a significant role in promoting the revolution. The problems surrounding the monarchy and the authoritativeness of the French government caused many issues, leading the peasants and agrarian communities to revolt. The peasants and agrarian communities contributed significantly to the occurrence of the French Revolution and the actions demonstrated by the upper class and monarchy led to the revolt.

Student: Brian Jones

Student Status: Undergraduate

Major: History

Title: M4 Medium (Sherman) Tank Debunking the Myth

Abstract:

This paper attempts to dispel many of the long-time rumor or myths about American Armor during the Second world War. The M4 Medium tank otherwise known as the Sherman was the leading tank used by the American and other allied armies during the Second world war. Seen as a leap forward for American tank design its reputation was soon to fall heavily due to combat losses against bigger heavier German armor. Men like Belton Cooper a tank mechanic during the war helped carry this negative reputation of the Sherman on into today. Others like amateur historian and former US Army tank officer Nicholas Moran have come to rethink this idea. This paper shows that despite its shortcomings that it was the best tank for the American forces, and that the many embraced myths about the tank are relatively untrue. This is done by giving a summary of its combat records, the strategy and tactics used and, comparing its physical layout such as fire power, armor and maneuverability in combat to its many contemporary tanks both axis and allied. Using first-hand accounts with other primary and secondary source material on the war record of the vehicle it is shown that many of the myths and soiled reputation of the M4 Sherman have been and are exaggerated. This does not however attempt to definitively say that the Sherman was the best tank of the war but that it was effective at its role.



Student: Daniel Davis
Student Status: Undergraduate
Major: History
Title: The Dreadnought

Abstract:

The dreadnought was a light and fast cruiser type ship that with its heavy guns and modern technology served to bring Britain into a new era of budgeted naval spending and sea superiority. Sir John Fischer, the man responsible for the development of the dreadnought, was named to the admiralty in 1904 and was tasked with making naval cuts that saved Britain from the impending financial and political crisis created by their growing Naval budget. As Fischer cut the naval budget, foreign naval threats grew and new technological developments were being adopted by these threats. As such Fischer was forced to create a new model of navy that would come in under budget as well as bringing Britain into a new era of naval warfare. The dreadnaught class battlecruiser was the answer to this conundrum created by prewar politics and finances. This paper will review in greater depth the needs of the British navy and government, and will prove that, the development of Dreadnought class ships was not only a military consideration/necessity but primarily a one driven by finance, politics and logistics.

Students: Hailey Horn, Kensie Plienplang, and Charissa Robertson
Student Status: Undergraduate
Major: Psychology
Title: The 504 Sit-In through a Social Psychological Lens

Abstract:

This research aims to describe the 504 Sit-In and provide an understanding of the event through the lens of social psychology. This demonstration was the most prolonged occupation of a federal building in the United States history (Carmel, 2020). The sit-in occurred due to Section 504 of the Rehabilitation Act of 1973 still not being implemented in 1977 (Carmel, 2020). Section 504 was designed to prevent discrimination or exclusion of any disabled person by any program that received federal funding (Carmel, 2020). After four years of lobbying, the American Coalition of Citizens with Disabilities decided that protests would be held on April 4th of 1977, if action was not taken to implement Section 504 (Carmel, 2020). The purpose of this research is to use social psychological concepts and theories to understand why the 504 Sit-In occurred and how this minority group was able to get not only Section 504 implemented but also how this event paved the way for future disability rights success. This research's concepts and theories to describe the 504 Sit-In are attitudes, system justification theory, transformational leadership, paternalistic prejudice, and minority influence. The occupation lasted a total of 28 days which ended with the implementation of Section 504 (Cone, n.d.). From these concepts, an understanding is developed of how the 504 Sit-In occurred, why it was so effective, and how it led to further success for disability rights.



Student: Hunter Garritano
Student Status: Undergraduate
Major: General Studies with an Emphasis in History
Title: How The View of the Vietnam War has changed with time

Abstract:

The Vietnam conflict was a brutal war fought between the United States helping the south Vietnamese against the north Vietnamese government with support from China and the Soviet Union. While the conflict was brutal, this was the first major conflict to be televised in the news, and it grew to have a very negative image from the American people. Protests surged during the conflict urging the U.S. Government to exit Vietnam and end the conflict. At the end of the conflict in April of 1975, we brought the soldiers deployed there home and they faced horrific conditions from the American people, often being abused verbally for their actions overseas. Since then, I believe the view of the Vietnam Conflict has changed dramatically to how we see it today. The stories and firsthand accounts of the soldiers coming home about what they faced brought to light a very different side of the conflict, not only the parts the media sent into the homes of Americans each night. This paper explains when and how the change in heart came from the American people regarding the war. Its view has changed from a terrible conflict and the soldiers committing atrocities every day, to a terrible conflict where the soldiers are just trying to make it back home and fighting for each other. These stories from the soldiers and the historians are key to changing the view of the Vietnam war to its current view.

Student: Jennifer Barnett
Student Status: Undergraduate
Major: History
Title: The Role of Espionage in the American Victory in the War for Independence

Abstract:

General George Washington's role as spymaster is rarely researched. Washington knew that the inferiority of the Continental Army to that of the British in terms of size, training, and resources, meant that Britain had the upper hand in the war. This paper seeks to demonstrate the importance of Washington's development of spy networks and his skill at deception as key factors in winning the war. The role of intelligence in the War for Independence is often overlooked by leading historians, such as John Ferling and Robert Middlekauff. Quinnus G. Caldwell and Robert Gates tend to agree that Washington's talent for deception was a key factor in aiding the war effort. Edmund R. Thompson argued that Washington's success in the war came from his direct handling and management of the Culper Spy Net. Alternatively, Raymond J. Faunt and Morton Pennypacker argue that the incorporation of patriotic civilians with military officers and their willingness to support Washington created opportunity for success, but merely assisted in the overall result. What seems certain among them, and the focus of this research, is without his own skills of deception, his masterful utilization of intelligence to divert the British, and his strict adherence to secrecy the spy network of the American Revolution provided the advantages needed to thwart one of the most impressive imperial regimes history has known.



Student: Joseph Harris

Student Status: Undergraduate

Major: History

Title: From Backbreaking to Beautiful: The Transition and Effects of the American West

Abstract:

This paper focuses on the mythical and romantic creation of the American West and its effects on the American society. The American West was a place that brought people opportunities and a chance at a fair life. For example, Cowboys used the American West as an opportunity to sell cattle to eastern markets. Homesteaders adventured into the American West to start new lives and build their families and fortunes through agriculture. However, both were exaggerated with accounts about the lifestyles and was turned into a pop culture phenomenon. Robert Athearn explains that the reputation of a Western American cowboy and farmer was tainted because of new exaggerated lifestyle that is portrayed. People began to look at the profession of a cowboy as a joke. As industrialization and urbanization of the East began to bleed into the American West and the opportunities for the wild life of the cowboy or building houses on the prairie began to fade. Athearn, Henry Nash Smith, Richard Slotkin and Patricia Limerick argue that as technology updated, old methods of agriculture and ranching become obsolete. The younger generation of the American West did not care to work on farms. They wanted to live in cities that had industrial opportunities. Cities eventually become monotonous to the younger generation and they wanted adventure but also wanted to keep the economic security that industrialization brought them. Adventure was given to them in exaggerated novels, films, and paintings that created a mythical image of the American West.

Student: Lauren Hucke

Student Status: Undergraduate

Major: Elementary Education

Title: Factors Affecting Second Language Acquisition

Abstract:

Second language acquisition refers to the process in which an individual learns and acquires a second language after their native language has been established. Each individual who acquires a second language develops their skills at different rates, depending on factors that influence their language learning. These factors include, but are not limited to, age of first exposure, formal language instruction, and access to a native speaker. The focus of this project is to identify the factors that influenced the language acquisition of two individuals who acquired English as a second language. The two subjects are interviewed and asked the same set of questions regarding their experiences as they learned English. Their responses are then compared to determine the factors that caused the differences in their English proficiency levels. As a result of this research, two variables are determined to be the most influential on the subjects' second language acquisition. Other factors that impacted their language proficiency are also identified and discussed.



Student: Myles Clark

Student Status: Undergraduate

Major: Economics

Title: Determinants of Population Growth U.S. Micropolitan Areas

Abstract:

In 2000, the U.S. Census Bureau officially recognized micropolitan areas as any area where a principal city of at least 5,000 residents is surrounded by rural communities. In these areas, residents enjoy both urban and rural amenities, and they have continued to expand throughout the decades. Prior researchers have investigated population growth determinants in these micropolitan areas, finding sector composition and amenity attractiveness to be relatively important determinants. This body of work seeks to better understand the relationship between population growth and a supposed key demographic, educated middle-aged individuals, as it compares to previously established determinants. The statistical software EViews was used to perform a Cross-Section Analysis of data collected by the U.S. Census Bureau on 550 micropolitan areas in the U.S. Ordinary Least Squares was used to construct an empirical model where the chosen variables are attributed to one of four areas: sector composition, amenity attractiveness, educational attainment, and various control variables. Numerous variables that accounted for sector composition and amenity attractiveness proved statistically significant in determining population growth. The educational attainment of individuals in micropolitan areas was also found to be statistically significant, but no significance was found in the age demographic of individuals living in micropolitan areas. Overall, this body of work supports the noted importance of sector composition and amenity attractiveness as determinants of population growth in micropolitan areas, and while there is some significance in the educational attainment, there is no evidence signifying any key demographic in U.S. micropolitan area population growth.

Student: Rigo Eljoenai Othniel Brou

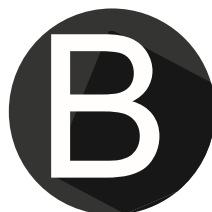
Student Status: Undergraduate

Major: Economics

Title: How Can Current and Future NBA Athletes Improve Their Performances and Have Great Careers?

Abstract:

One of the most controversial topics in sport is the notion of performance. Some athletes tend to have better careers and perform better. On the other hand, other athletes struggle either temporarily or consistently in their careers. Early research by Brent A. Evans (2018) has shown that older players in the National Basketball Association (NBA) perform better than younger players. What other variables affect the performance of an NBA player? By running a Panel regression ESLG of thirty random NBA players from 2009 to 2019, I join Brent A. Evans's findings by claiming that there is a positive relationship between the age and the performance of an NBA player. PPG (point per game) being the determinant of the performance in my research. In addition to the age having a positive relationship with the PPG of an NBA player, my results also demonstrate a positive relationship between the PPG of an NBA player and his defensive rebounds per game, field goal and free throw percentages per game, minutes played per game and turnover rate per game. On the other hand, I found that there is a negative relationship between the PPG of an NBA player and his assists per game, blocks per game, and personal fouls per game.



Student: Samuel Griffin

Student Status: Undergraduate

Major: History

Title: The First World War and the Philosophy of Warfare

Abstract:

This essay analyses the effect that the First World War had on how societies and militaries understood and viewed warfare. It frames World War I as a watershed moment for warfare philosophy and ideology, and argues that long-held myths and romanticized visions of war went to die on the battlefields of Europe, along with millions of soldiers. The initial patriotism and optimism of combatants were quickly replaced by horror, cynicism, and disillusionment. This change in attitude can be seen by comparing the pre-war doctrine of belligerent countries' politicians, generals, and officers to the attitudes of the soldiers and officers by the end of the war. A comparison between first and second World War mindsets is also revealing of the change after World War I, as it shows a stark contrast in the attitudes of those going off to war. This essay builds off the work of historians like John Mueller, who argues that World War I "served as a necessary catalyst for opinion change." This essay also argues that wartime rhetoric such as naming the conflict "the Great War" or "the war to end all wars" suggests that contemporaries understood that the conflict had changed warfare forever. Analysis of art, propaganda, and political rhetoric surrounding the war also reflects this change in society's opinions. Finally, the post-war optimism for peace and democracy, which resulted in the creation of the League of Nations, sets the First World War apart from previous wars and suggests a fundamentally changed attitude towards war.

Student: Tami Burt

Student Status: Undergraduate

Major: History

Title: Scotland's Witch-Hunts and the European Reformation

Abstract:

Between the sixteenth and eighteenth centuries, witch trials were commonplace throughout Europe. This paper focuses on Scotland where there were between 4,000 and 6,000 people tried as witches within the Scottish court systems, a much higher number than in any other nation of the British Isles. There are several theories as to why such as, changes in the social expectations and accepted behaviors brought upon by church doctrines, hardships from wars and famine, and a fear of the new sexual role that women began to portray at this time. Through the analysis of both secondary and primary sources, this paper argues that the Reformation is one of the leading causes for the witchcraft trials in Scotland and Europe. Furthermore, a combination of religious beliefs, economic frustrations, and new political upheavals within the realm of Scotland led to the higher rates of accused and executed witches in Scotland. This paper provides a better understanding of the causes and factors involved in the witch hunts in Scotland.



Graduate: Category B

Business, Education, and
Humanities



Student: Kaitlin Barnett

Student Status: Graduate

Major: Communication

Title: COVID-19 Health Information Seeking: Knowledge & Vested Interests in Midwest Populations

Abstract:

Emerging infectious disease communication research has roots in risk communication, crisis communication and health promotion literature. Today a combination of emerging infectious disease (EID) and re-emerging infectious disease (rEID) are occurring more frequently. This study examines health information seeking behaviors, COVID-related knowledge and attitudes in Midwest populations. Vested interest (VI) theory is used to understand individual attitudes toward preventative behaviors. Findings from this study add to our understandings of the social and cultural environment surrounding the early-stage U.S. COVID-19 global outbreak. Participants completed an online survey about coronavirus (COVID-19) which polled their knowledge, vested interests, and health information seeking (HIS) behaviors during the early stage of the EID outbreak that began circulating in the U.S. population in the Winter/Spring of 2020. A total of 222 respondents completed an online survey consisting of 67 questions. On average, 40% of the participants reported 'seeking, reading, and/or consuming information' about COVID-19 between 2-4 hours per day from interpersonal sources such as family members and friends, as well as subject matter experts. Results found individuals receiving information from schools 2-4 hours per day reported lower self-efficacy ($M=4.93$, $SD=1.41$) and lower personal susceptibility ($M=3.66$, $SD=1.21$) compared to those receiving no information from this source. Individuals receiving 4+ hours of information from social and digital platforms reported greater threat salience ($M=6.05$, $SD=1.25$) compared to others receiving less than 4-hours ($M=4.99$, $SD=1.72$) or no exposure ($M=4.43$, $SD=2.00$) through this medium.

Student: Latayzia Harris

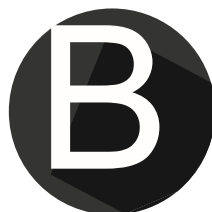
Student Status: Graduate

Major: History

Title: The Reign of Terror: Mission Failure

Abstract:

The Reign of Terror marks one of the bloodiest periods in recorded history. After a period of striving for a government for the people, the French were left to properly govern. The task at hand was complicated by the sheer paranoia that was fostered during the revolution. The threats of foreign invasion, of domestic uprising, and a thirst for justice only complicated matters. The Committee of Public Safety was meant to assuage these fears. It failed terribly. This essay deals with the downfall of the Committee of Public Safety of the burgeoning French Republic. In a bid to protect their new government, members of the committee used Madame Guillotine to solve their problems. This proved a fatal calculation that plummeted the new government down a path of self-destruction. The authors of the Republic became the very monsters that they had just fought so hard to defeat and the committee meant to solve France's problems became its largest one.



Student: Samuel Davis and Kyle Thompson

Student Status: Graduate

Major: History

Title: Revisiting the Spanish Influenza Pandemic of 1918-19

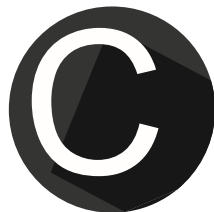
Abstract:

COVID-19 took the world by storm a year ago this March, and we are still feeling the effects of it. This paper seeks to revisit the Spanish Influenza pandemic of 1918 to see how people dealt with past pandemics and how people reacted to various policies and guidelines for health and safety, in order to bring a historical perspective to the current pandemic. The Spanish Influenza pandemic of 1918 was a major pandemic that offers considerable information and many parallels to what we are dealing with today. Furthermore, scholars like James Shidler and Howard Philips argue that the Spanish Flu has been unfairly forgotten by mainstream memory in favor of more romanticized historical events. In revisiting the Influenza Pandemic, looking at newspapers, various medical journals, and other well-known monographs on the subject this paper shows various similarities in the way people reacted to disease. The Spanish Flu, just like COVID today became a politicized and controversial topic that looked similar to what we see today in people fighting back against health and safety laws like mask wearing, social distancing, and mandatory quarantines.



Undergraduate: Category C

Creative Works



Student: Amanda Trout

Student Status: Undergraduate

Major: English

Title: Boxes of Self Expression: A Crown for Empty Spaces

Abstract:

"Boxes of Self Expression: A Crown for Empty Spaces" is a collection of fifteen interconnected sonnets based on the theme of emptiness in a variety of interpretations. The entire form is known as a "heroic crown of sonnets," a form which differs from the more traditional crown in that it has fifteen sonnets instead of seven and collects the first or last lines of the first fourteen sonnets to compose the fifteenth. Each sonnet connects to the next by ending and beginning lines in a system of repetition and repetition. The majority of the sonnets in this collection use a blank verse style, meaning each line is in iambic pentameter and there is no defined rhyme scheme. The exception to this is the first sonnet which takes a Shakespearean rhyme scheme. The focus of each sonnet varies greatly: some are persona poems while others are more true to the author's own experiences, some cast emptiness as tragedy while others find a way to praise it. Ultimately, these sonnets aim to champion emptiness in all of its forms, aim to be poem-boxes of expression crowning an idea and singing what it has been and what it might become.

Student: Stuart Zizzo

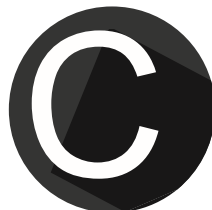
Student Status: Undergraduate

Major: Graphic Technologies

Title: Macro Tilt-Shift

Abstract:

Macro photography captures the unseen details in life up-close. These are shortsighted though due to the small focal plane that a macro lens creates. This can lead to only capturing a fragment of the unseen. The purpose for this poster is to provide a re-imagined system to this focal plane problem. To solve this issue, the tilt-shift camera rig will be utilized. The tilt-shift rig has the ability to manipulate the plane of focus by tilting the lens board, we can change the view and capture a fuller image with minimal fall off. This will be achieved by mounting the macro lens to the tilt-shift rig and mounting the whole system on a stack shot rail system to get focal slices down to the micrometer difference.



Undergraduate: Category D

Topical Literature Review



Student: Audrey LaVere
Student Status: Undergraduate
Major: Social Work
Title: Community Waste Management

Abstract:

Today, being human means producing vast amounts of waste; items that are not currently being put to use, whether it be the intended or creative use of the item. There are categories of waste, some more prevalent than others, some more harmful than others. Some examples of common waste include plastic, Styrofoam, pet feces, abandoned structures, uncared for compost, and many other material items; all of which can and do negatively contribute to overall environmental health. Analyzing the amounts and kinds of waste that humans produce is crucial to the survival of the Earth and all earthlings (living beings; plants, animals, bugs/insects). These destructive impacts cause many social, mental and physical health, environmental, and faith related struggles around the world; an action in Pittsburg, KS will impact other locals, the United States, other lands, and all the water. The good news is that while there are many details of this problem, there are also various mitigating factors; activists around the world are spreading awareness and providing opportunities for others to become involved in any of the above issues, or all of them, as they are all connected. With conscious behavioral changes of humans, the problems that present themselves today will continue progress in positive directions that benefit the overall environment for all earthlings.

Student: Falon Little and Rayna Bulot
Student Status: Undergraduate
Major: Nursing
Title: Use of Mental Health Literacy Courses in the Classroom

Abstract:

Mental illness and psychological distress are and have been experienced across the globe, regardless of gender, race, or class. Research has shown that implementing mental health literacy courses into secondary schooling may help all populations, but especially those who are affected heavily by mental illness and distress. Studies were conducted in two of the most impoverished countries before the US ran their own trials, showing that it is an efficient way to improve mental health even in the populations that appear to struggle the most. A trial conducted in Tanzania (where more than two-thirds of the population live beneath the international poverty line) replicated results from the same intervention previously used in Malawi. This intervention has been implemented in at least 15 other schools in the US, according to a meta-analysis reported by NCBI, with similar results. Their study focused on forming a mental health literacy (MHL) guide which their teachers would then use to educate students. The course consisted of six main objectives: recognition, knowledge about mental illness, knowledge of prevention and promotion of mental health, knowledge about help-seeking, mental illness stigma, help-seeking beliefs. Independent tests comparing the paired sample to the unpaired sample showed a decrease in teachers' and students' stigma, higher rates (over 75% of the sample of teachers) of positive help-seeking efficacy for themselves as well as their students, peers, family, and friends, and increased ability of teachers to identify at-risk students. In every trial conducted, the results showed significant increase in mental health literacy.



Student: Jayly Cook

Student Status: Undergraduate

Major: Nursing

Title: The Benefits of Using Regional Anesthesia via Nerve Blocks for Patients Prior to Surgery

Abstract:

Regional anesthesia via peripheral nerve blocks has been used for decades; however, the process has been improved by ultrasound guided technology since the 1990s. This has enhanced the precision and safety of injections creating a more effective administration method. Peripheral nerve blocks are used in joint replacement surgeries and joint/muscle injury surgeries to help reduce postoperative pain and need for opioids for pain management. The studies examined patients who received peripheral nerve blocks and patients who received general or spinal anesthesia and compared several factors postoperatively. The main focus was to compare postoperative pain and use of a patient-controlled anesthesia pump to administer opioid analgesics. The patients who received peripheral nerve blocks for lower extremity joint replacements experienced less postoperative pain and less need for opioids which resulted in higher patient satisfaction. Despite the research supporting the benefits of peripheral nerve blocks compared to general or spinal anesthesia, it was found that these blocks are underused in facilities today. Further research found that the underuse of these peripheral nerve blocks today is from a lack of education and understanding by both anesthesia staff and patient populations. To continue producing higher patient satisfaction, education on the administration and benefits of peripheral nerve blocks needs to be provided to anesthesia departments, so it can be passed onto patients who in turn can choose this type of anesthesia for their lower extremity joint replacement surgeries.



Student: Kaci Hultz and Mandy Peak

Student Status: Undergraduate

Major: Biology

Title: Safety and Efficacy of the BioNTech-Pfizer Covid-19 Vaccine

Abstract:

The World Health Organization declared COVID-19 a worldwide pandemic in early 2020 and SARS-CoV-2 infection has afflicted people worldwide. The advancements to control the spread in addition to saving millions of lives has resulted in the development of a two-dose regimen of BNT162b2 presents a 95% protection rate against COVID-19 in individuals of 16 years & older. This two-dose regimen has evidence of the safety and efficacy of two 30- μ g administered intramuscularly 21-days apart. Through the sponsorship of BioNTech as well as the design and conduction of the experimental trials of Pfizer, a total of 43,448 persons 16 years & older underwent randomized trials of receiving either the BNT162b2 vaccine or a standardized saline placebo. There are two primary end points that were monitored in the efficacy of BNT162b2 against confirmed COVID-19 with an onset of at least 7 days after the second dose in participants who had been without serologic or virologic evidence of the infection up to seven days after the second dose. The secondary primary end-point was efficacy in participants with as well as participants without evidence of prior infection. The data collected ended on October 9, 2020, with 37,706 participants. These participants had a median of at least 2 months of safety data available after the second dose and contributed to the main safety data set. The following results do demonstrate that COVID-19 can be prevented by immunization and provide proof that RNA-based vaccines are a reliable approach for protecting humans against infectious.

Student: Madison DeLissa

Student Status: Undergraduate

Major: Nursing

Title: Reducing Maternal Mortality in the United States: Preventing Postpartum Hemorrhage

Abstract:

Postpartum hemorrhage is one of the leading causes of maternal mortality in the world. It accounts for approximately twenty-five percent of global maternal deaths and for approximately twelve percent of the United States' maternal deaths (Evensen et al., 2017). The purpose of this research is to see if the incidence of postpartum hemorrhage is reduced when tranexamic acid is implemented alongside of active management of the third stage of labor. Tranexamic acid is an antifibrinolytic agent that has been effective in reducing blood loss in trauma patients, elective surgery, and menstrual blood loss. Tranexamic acid has been beneficial in reducing maternal mortality due to postpartum hemorrhage without any severe side effects. It is also inexpensive, simple to administer, and could easily be added to current protocols for preventing postpartum hemorrhage.



Student: Morgan Michael

Student Status: Undergraduate

Major: Nursing

Title: Cardiac Arrest in Pregnancy: The Impact on Mother and Fetus

Abstract:

Considering pregnancy, many aspects are predictable and planned. Prenatal vitamins, scheduled ultrasounds, feeling that first kick around 20 weeks, morning sickness, and much more. Even if it is a mother's first pregnancy, her doctors and nurses can explain what to be expecting with great accuracy from conception to delivery. Of course, there are many instances where the mother experiences an unexpected aspect of pregnancy; a fetus turned the wrong way, gestational diabetes, multiples, the need for cesarean delivery, and more. However, even with the unexpected events that can occur during the gestational period, most are very well researched, very well prepared for, and with proper medical care, pose little or no risk to the mother or fetus. One unplanned, unexpected event during pregnancy is maternal cardiac arrest. While cardiac arrest itself has a plethora of information and research, cardiac arrest in pregnant patients is less researched. Women of childbearing age are generally healthy, younger and are at low risk for cardiac arrest. The purpose of this research is to compile information from peer-reviewed scholarly articles on maternal cardiac arrest survival rates, perimortem cesarean delivery, and the effects of those two events on the fetus. With proper training, preparation, and quick thinking, there is potential for both maternal and fetal survival in the case of maternal cardiac arrest.



Graduate: Category D

Topical Literature Review



Student: Whitney Dickerson

Student Status: Graduate

Major: Nursing

Title: Understanding the Emotional and Treatment Impact of Recurrent Miscarriages for Women Living in Rural Medically Under-Served Areas

Abstract:

A qualitative study was completed using a series of interviews performed in the rural area of Southeast Kansas regarding miscarriage history and the women's experiences. Locating women to interview was done through social media, women were chosen who had a series of three or more miscarriages. The study examined access to fertility care in rural communities and the impact of access on women's options regarding their health care. Semi-structured interviews guided by one open-ended question was used to explore the views, experiences, and beliefs of the participants. It was a common finding that guilt and self-blame often occurred after a miscarriage but it was noted that many women had good support systems. Most of the women interviewed had difficulty obtaining progesterone after having a positive pregnancy test.



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