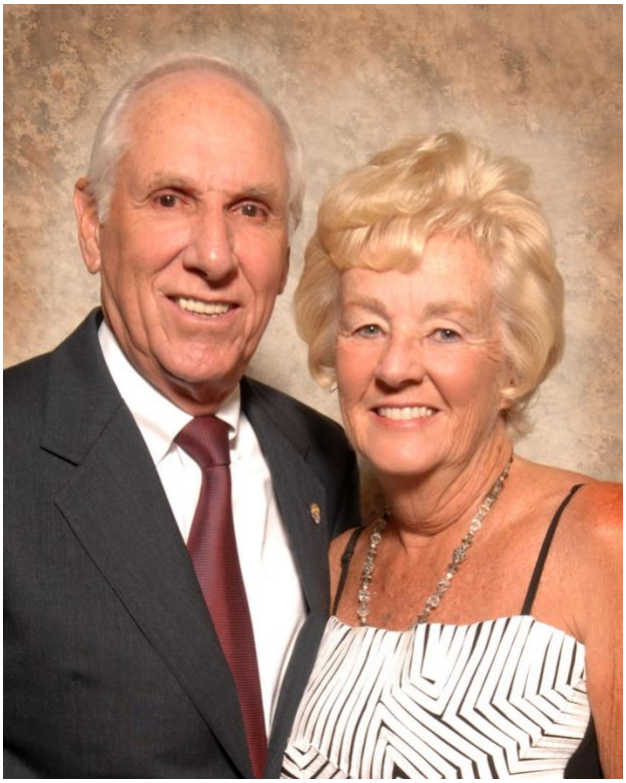
SCHOLAR DAY

2025

The SCHOLAR Day Story



SCHOLAR Day is Mount Union's ***Student Celebration Honoring Our Latest Academic Research***. Students and faculty set aside an entire day to learn from students on our campus who have completed outstanding research projects. This event is celebrated by our students, faculty, staff, administrators, alumni, and the greater community. SCHOLAR Day will be held on Tuesday, April 22, 2025. Student presentations at SCHOLAR Day fall into two categories, formal and poster presentations.

SCHOLAR Day has been generously supported since its inception through a charitable gift from George ’58 and Sally (Shrake ’59) Stradley of Hartville, OH. The Stradleys, whose generous support of SCHOLAR Day has contributed to its overwhelming success, have once again decided to make academic excellence at Mount Union a priority through their gift. George is retired as president of Beifuss & Stradley, Inc. and is a trustee emeritus of Mount Union. He has been providing leadership as a member of the Board since 1982. During their student days on campus, George was a member of the Alpha Tau Omega fraternity and president of his senior class. Sally was a member of the Delta Delta Delta sorority and a writer for The Dynamo.

SCHOLAR Day Formal Presentations

(in the order of the day)

SESSION A: 8:30 AM – 9:30 AM

GIESE 107

TITLE: Effects of Acute Caffeine Supplementation on Strength in Luteal and Follicular Phases of the Menstrual Cycle

PRESENTER(S): Madi Bidinger, Alexis Caugherty and Catie Meehan

DEPARTMENT: Exercise Science

Abstract: The interest in female strength performance has increased in recent years. Additionally, caffeine has been shown to enhance numerous aspects of sport performance, but more importantly, it has been shown to improve total work done in strength training sessions and improved power production (O'Donnell et al. 2016, Giráldez-Costas et al. 2021, Goldstein et al., Montalvo-Alonso et al. 2024, Norum et al. 2020). In the field of Exercise Science, there is limited research that combines these two factors; therefore, this project provides a more inclusive approach to women's health and fitness. The purpose of this study is to examine the relationship between strength performance and the menstrual cycle, while also exploring how caffeine influences strength in this context. Ten recreationally active females between the ages of 18-22 were recruited for research, though eight completed the study in its entirety. The subjects began with familiarization testing to establish a baseline number for one repetition maximum strength (1RM). After the baseline data was collected subjects informed the researchers of the first day of their menstrual period (day 1). Subjects were scheduled for testing during two points throughout the menstrual cycle, the follicular phase (days 11-12), and the luteal phase (days 20-22). On testing day subjects received a capsule containing either caffeine or a placebo (maltodextrin) and completed a 1RM test for barbell bench press and squat. Testing was repeated the following month at the start of the next menstrual period. Data collection was not complete at the time of abstract submission.

TITLE: Physiological Impacts of Mindfulness on Induced Stress.

PRESENTER(S): Belle Cope, Ava Breton, Erika Fogarty, Alexis Bricker, Belle Cope, Dee Mauzy and Haley Koon

DEPARTMENT: Psychology

Abstract: In this study we investigated the effects of mindfulness on heart rate, heart rate variability, and induced stress among participants. We recruited __ participants (__ females and __ males) to complete an in-person study. All participants are over the age of 18 and undergraduate students at the University of Mount Union. The survey included measures of heart rate, heart rate variability, and stress levels as dependent variables, while mindfulness was measured as the independent variable. The TSST by Kirschbaum et al., (1993) was used to conduct stress-induced tasks, but modified to fit our study. We found that with guided mindfulness, there was a decrease in heart rate and an increase in heart rate variability when presented with stress induced tasks. Without guided mindfulness there was an increase in heart rate and a decrease in heart rate variability when presented with stress induced tasks. We concluded that with mindfulness when induced to stress heart rate decreased, while heart rate variation increased. Without mindfulness, heart rate increased while heart rate variability decreased.

TITLE: Tuning into American Politics: The Evolution of Conservative Dominance in Talk Radio

PRESENTER(S): Emily Denney

DEPARTMENT: History

Abstract: Originally developed during a period marked by a rapid growth in broadcasting, radio quickly became a cornerstone of American media, influencing social norms and political conversations. The significance of my research lies in understanding how radio blurred the lines between the public and private spheres, fostering a direct line of communication between the government and the public that many political figures took advantage of. This study explored the evolution of talk radio in the United States, focusing on the transition from a platform for diverse viewpoints to one of a predominantly conservative nature. By analyzing the historical, cultural, and regulatory factors that shaped this transformation, this project sought to understand why radio became such a bastion for conservative thought. Drawing on a range of academic sources and the work of radio hosts such as Rush Limbaugh, I found that conservative pundits and lawmakers were more proactive than their liberal counterparts in leveraging talk radio to advance their agendas, with figures such as Limbaugh playing a significant role in blending the world of politics with entertainment. In an era marked by increasing polarization, it is important to understand how the media landscape has developed over time. Future work could explore the connection between talk radio and contemporary media, such as podcasts, examining their continued influence on public opinion and political participation.

GIESE 114

TITLE: CELLINK 3D-Printing Alginate Biomaterials with Living Cells for Burn Wound Healing

PRESENTER(S): Emily Borroni, Brianna Schutz and Samantha Skerbec

DEPARTMENT: Biomedical Engineering

Abstract: Burn injuries, particularly severe thermal, chemical, and electrical burns, pose a major healthcare challenge due to their high risk of infection, complications, and mortality. Current treatments such as skin grafts have limitations with availability if an autograph is not used, prompting interest in advanced biomaterial approaches such as 3D bioprinting for skin regeneration. This study explored using 3D bio-printed alginate scaffolds for burn wound healing. Alginate, a natural polysaccharide, provides biocompatibility, moisture retention, and support for tissue regeneration. The CELLINK BIO X bioprinter was used to print alginate scaffolds pre-seeded with MG-63 cells. The scaffolds were crosslinked with calcium chloride to improve the mechanical properties of the construct. Initial experiments for 5% w/v alginate established that printer settings of 60 kPa and 9 mm/s were sufficient for creating scaffolds of acceptable height and with consistent geometric patterns. After establishing baseline parameters, alginate was mixed homogeneously with cell culture media, and MG-63 cells were printed to determine if scaffolds contained viable cells. Combining living cells with a scaffold may facilitate better integration with host tissue to support faster severe burn healing.

TITLE: Triunfa en el Mundo con Arte: Un Plan de Estudios Succeed in the World with Art: A Curriculum

PRESENTER(S): Shawna Gordon

DEPARTMENT: Spanish World Language

Abstract: Succeed in the World with Art: A Curriculum is a supplementary educational booklet designed to teach first and second grade Spanish speaking students' various academic disciplines through the application of art centered lessons. To promote well-rounded and accessible education, this booklet strives to meet the needs of young visual and tactile learners through unique subject-related activities. 14 lessons covering four areas (math, science, language, and history) were developed through literary reviews and inspired by my personal experiences as a Program Director for a tutoring service targeting educationally under-performing areas. My continued education in the Spanish language and Art has inspired me to develop this booklet as a demonstration to learning can be fun, no matter what language you speak.

TITLE: Hush Little Baby: The Effects of Play Therapy in School-Aged Hospitalized Children

PRESENTER(S) Erin Piczer

DEPARTMENT: Nursing

Abstract: Hospitalization increases anxiety in all patients, but anxiety due to hospitalization in children can have lasting effects. Due to the child's limited cognitive development, they are unable to express anxiety, and often express this feeling as aggression, withdrawal, or regression. In 2012, 5.9 million children in the United States were hospitalized (Lerwick, 2016). The literature shows that this increase of anxiety during hospitalization increases the risk of medical trauma, perceived pain, and has been shown to delay developmental processes in the affected child (Godino-Iáñez et al, 2020). The lack of age-appropriate treatment within hospitals has detrimental effects not only on the nurse-patient relationship, but with future compliance with healthcare. Upon an analysis of the literature and internal evidence within a pediatric hospital, play therapy has been shown to improve psychological and physiological outcomes of hospitalized children while facilitating trust with the patients and families. This presentation utilizes an analysis of play therapy in hospitalized children through a multi-factor evidence synthesis to present a recommendation, implementation and evaluation plan for an evidence-based practice project to improve nursing care of pediatric patients.

GIESE 109

TITLE: The Impacts and Implications of Outdoor Learning on Science Education

PRESENTER(S): Reagan Kole

DEPARTMENT: Biology

Abstract: Nationally, modern-day classrooms are ever changing. Whether this is because of educational tools, student body sizes, or learning techniques, there is no question that education is evolving and the way content is taught needs to adapt. Over the past several years, there has been a decline in student attention span, participation and attendance in schools around the nation particularly in science content areas (Steidtmann et al, 2023). Outdoor education has often been used as fun activities during breaks or was implemented if there was time at the end of the school year. However, this study was designed to highlight the benefits that outdoor education offers in improving attention span, retention of content and understanding. An initial online survey was sent to all science educators in Stark County that asked about content area, subjects taught, teaching strategies used, outdoor education use, and if there was interest in participating in the study. Educators were provided with materials along with pre-and post-tests that students would take before and after the lab to document growth. The data suggests that outdoor education not only increased test scores overall, but increased engagement, participation, and attention spans of students. Further research could be conducted to investigate why participation decreased and investigate other methods of improving attention and participation. Limitations include the number of participants and the region the study was conducted in.

TITLE: Politics and Public Health: The Influence of Lobbying on Vaccine Development and Women's Representation in Clinical Research

PRESENTER(S): Emily Krizner

DEPARTMENT: Peacebuilding and Social Justice

Abstract: The uptick in novel pathogen emergences in recent decades has thrust infectious disease research into the spotlight and exacerbated the need for rapid and effective vaccine development processes. This has also highlighted the importance and necessity of diverse representation in clinical and vaccine trials. Women have historically been, and continue to be underrepresented in research, leading to discrepancies in knowledge of the impacts of infectious diseases and their respective vaccines on women's health. Lobbying by pharmaceutical industries and of the federal government is used for clinical research to allocate funds, advance research and promote treatment and drug distribution. Lobbying has also proven efficient in the creation of nonprofit organizations in favor of women's health and increasing representation in research studies, which in turn leads to a better quality of care. The focus of this research was how political lobbying can be used to finance vaccine development and subsequent clinical trials, as well as how lobbying can advance and promote equitable representation within these trials. This analysis was conducted using information from published literature, including, but not limited to, government sources, scientific journals and nonprofit organizations. Through this research, it was determined that lobbying efforts exist interdependently with clinical trials and vaccine development. Lobbying has and will continue to be a driving factor in the advancement of vaccine development and trials. Furthermore, lobbying by women's health groups has served as a driving mechanism for research into conditions that predominantly impact women and has increased representation of women in vaccine trials.

TITLE: The Effect of Animal Assisted Activities on Perceived Stress in University Students

PRESENTER(S): Elizabeth Davidson, Heather Bishop, June Penney, Kayli Riddick and Sage Warner

DEPARTMENT: Psychology

Abstract: Stress in college students has become a significant issue in recent years. Drop-in visits with therapy dogs have been shown to be effective for lowering stress short term, but it has never been tested on how it affects test performance. If interactions with therapy dogs are shown to lower test anxiety and improve test performance, more colleges may begin to implement wider access to therapy dogs full time. This would provide students with regular therapy dog access, which could help reduce stress in the long term. This study sought to expand on prior research by studying the effect of interacting with therapy dogs on exam stress. We will attempt to provide more evidence that animal assisted activities can be an excellent resource for college students. In this study, we plan to investigate the effect of animal assisted interactions in the form of interacting with therapy dogs on perceived stress, anxiety, and test performance. Participants will complete the pre-intervention measures, then either interact with dogs or wait in a separate room for 15 minutes before both groups complete a general knowledge test. We hypothesize that animal assisted interactions with therapy dogs will decrease anxiety and stress. We also hypothesize that animal assisted interactions will increase test scores in comparison to participants who did not interact with dogs. If these hypotheses are confirmed, we will conclude that animal assisted interactions before tests or exams can lower anxiety and stress and improve test scores in students.

CHORAL HALL

TITLE: "I Will Survive": Combatting Antibiotic Resistance Through the Synthesis of a Bacteria-Derived Natural Product

PRESENTER(S): Alaina Metzler

DEPARTMENT: Chemistry

Abstract: Antibiotics are widely used to treat disease and infections caused by bacteria, but overuse and misuse has led to antibiotic resistance. This resistance is a top global health threat that could become deadlier than cancer by 2050. One solution is inhibiting processes that bacteria use to become antibiotic resistant. For example, methicillin-resistant Staphylococcus aureus (MRSA), a leading cause of hospital-acquired infections, has shown resistance to the antibiotic Fosfomycin, the treatment for urinary tract infections. MRSA utilizes enzymes – enablers of biochemical reactions – to confer resistance through a molecule known as Bacillithiol (BSH), which breaks apart Fosfomycin. To combat this, research efforts have focused on preventing the production of BSH. However, BSH is not the only molecule of this type. Others, including N-methyl bacillithiol, are hypothesized to play a similar role to BSH.

To verify this hypothesis, N-methyl-bacillithiol is being chemically synthesized and will be characterized to confirm its biological role. The production of N-methyl-bacillithiol requires a series of eight chemical reactions, five of which have been completed. After each reaction, the product was purified to isolate the desired molecule using column chromatography (a technique which separates substances based on unique structural characteristics). The identity and purity were then confirmed using Nuclear Magnetic Resonance Spectroscopy (a technique which shows the connectivity of atoms in a molecule). Future research will yield N-methyl-bacillithiol and verify the role it plays in antibiotic resistance. This will aid in determining how to cease production of this molecule, combat antibiotic resistance, and help reduce projected public health threats.

TITLE: Wax Coated Paper Sheet Dispenser

PRESENTER(S): Skyra Brown, Collaine Tupa and Kevin Zurbrugg

DEPARTMENT: Mechanical Engineering

Abstract: Wax coated paper sheets are used across many food industry related fields including meat, food service, and baked goods. In the food service industry, they are used for wrapping sandwiches, burgers, and other items, maintaining temperatures and preventing leaks. Additionally, wax coated sheets are used in the meat and dairy industry for packaging, enhancing shelf life and food safety. Their versatility extends to confectionery where they protect chocolates and candies. Overall, wax paper sheets contribute to improved food quality and convenience, making them an asset in food packaging and storage solutions. Interlocked sheets of this paper are supplied to numerous customers by Central Coated Products of Alliance, Ohio. This project designs a fully mechanical wax paper dispenser for Central Coated Products, aiming for efficiency, cost-effectiveness, and adjustability in the food service industry. By eliminating manual cutting and folding, the dispenser streamlines production. The compact design accommodates a wax paper roll and allows adjustable sheet lengths. It supports wall and counter mounting using 3M Command Strips or screws. The fully mechanical system ensures easy loading and dispensing with minimal effort. Performance testing of the design includes a Length Accuracy Assessment to ensure precise sheet dispensing and Ease-of-Use Assessments, through user surveys, for roll replacement and dispensing efficiency. Statistical analysis verifies consistency, ensuring the dispenser meets quality standards and design requirements. These evaluations help refine functionality, maintain reliability, and optimize user experience.

TITLE: Native Americans History for all grade levels

PRESENTER(S): Bre Pittman and Andreea Dager

DEPARTMENT: Education

Abstract: This presentation will show the importance of teaching Native American history in every grade level. The earliest people who have inhabited our land are an essential part of American history, and they should be introduced no matter the student's age. Our presentation will cover the positives of teaching cross-cultural lessons and give examples of great resources for teachers to use inside their classroom to teach about Native American culture. We will share video examples for higher level lessons that have deeper cultural meanings. We have also included a handout to go into more depth and supply more scholarly sources that informed our research. Come learn the importance of including Native cultures within lesson plans to amplify voices for cross-cultural learning.

GIESE 180

TITLE: Effects of Respite Care on Perceived Stress and Anxiety, Sleep Quality, and Coping Strategies for Parents of Children with Developmental Disabilities.

PRESENTER(S): Hannah Glover, Ella Hoffman, Erin Barnby, Erin Malysa, Mia Marciano and Leah Vinton

DEPARTMENT: Psychology

Abstract: Families who have a child with a developmental disability experience constant caregiving demands, which may impact perceived stress and anxiety levels, overall family environment, sleep quality, and how one copes. Our research examines how respite care services affect perceived stress and anxiety, sleep quality, and coping strategies for parents of children with developmental disabilities (DD). The participants included in this study are the parents and or guardians of children who have a developmental disability and participate in a respite care program called Keeping Families Together (KFT). Participants are asked to complete a series of surveys before and after their child participates in the respite program. The surveys measure sleep quality, perceived stress and anxiety, and coping strategies. We expect that with the implementation of the respite care program, there will be a significant decrease in overall perceived stress and anxiety, there will be an increase in the amount of sleep and overall sleep quality, and improvements in participants' coping strategies. In sum, we expect that short term respite care will lower levels of parental stress and contribute to a better overall quality of life and better coping strategies for parents. This research is significant because it will enhance the knowledge about the needs of families caring for children with developmental disabilities.

TITLE: Blood Flow Restriction Training and Quadriceps Atrophy After Anterior Cruciate Ligament Reconstruction: A Systematic Review

PRESENTER(S): Emma Crawford

DEPARTMENT: Physician Assistant Studies

Abstract: The anterior cruciate ligament (ACL) is the most torn ligament in the body with at least 175,000 reconstructions performed yearly according to Yale Medicine. A barrier to returning to function after surgery is quadriceps atrophy which often occurs in the post-operative phase because patients must avoid bearing weight on the operative leg to allow healing. Blood flow restriction training (BFR) has been proposed as a possible intervention to combat this lack of use and subsequent weakening. BFR uses a pneumatic cuff to reduce venous return from a limb while maintaining arterial flow to the limb. When low-load exercise is performed during BFR, muscles are stimulated as if exercising against heavy loads. This systematic review was conducted to evaluate whether BFR after ACL reconstruction is safe and effective in reducing quadriceps atrophy. High-quality studies published since 2015 were collected from various medical databases. Careful review of available literature suggests that BFR after ACL reconstruction has the potential to improve surgical outcomes.

TITLE: 3D-Printed UV-Crosslinked PEGDA/FN Hydrogels for Diabetic Foot Ulcer Healing

PRESENTER(S): Annika Stankowski, Alyssa Wilson and Alexis Murphy

DEPARTMENT: Biomedical Engineering

Abstract: Diabetic foot ulcers (DFUs) are a debilitating consequence of diabetes and are recognized as the leading cause of non-traumatic lower-extremity amputation worldwide. These chronic wounds result from neuropathy, arterial disease, and abnormal foot pressure patterns, which obstruct the natural healing process. Hydrogels are promising wound dressings due to their ability to support biological functions. However, their poor mechanical properties limit their effectiveness, especially in load bearing situations such as DFUs. To address this, poly(ethylene glycol) diacrylate (PEGDA), a widely used hydrogel biomaterial, is combined with fibronectin (FN), a naturally occurring protein that facilitates cell adhesion. These combination PEGDA/FN hydrogels will be 3D-printed, which allows for patient-specific customization, and UV-crosslinked to improve mechanical strength. The resulting scaffolds will be tested for biocompatibility. This research aims to optimize biological and mechanical properties of hydrogels, allowing them to serve as a substrate for tissue regrowth and healing, thus advancing their potential as a treatment for DFUs.

SESSION B: 9:45 AM – 10:45 AM

BRACY 02

TITLE: The Effects of Mindfulness on Stress and Burnout Amongst College Students

PRESENTER(S): Hailey Haywood, Gabby Finelli, Will Heeney, Hunter Miday, Heaven Bartell and Ali Hudik

DEPARTMENT: Psychology

Abstract: Those who have a higher pressure to succeed tend to have a variety of outside factors that increase stress and burnout. College students make up a large portion of this group due to the high levels of stress during this time as well as their involvement in activities such as employment and extracurriculars. Researchers have examined the relationship between stress and burnout amongst college students in an attempt to find resources to help reduce the negative impact the two have on college students. In this study, we are investigating the effects of mindfulness activities on stress and burnout among college students. Our participants include men and women who are over the age of 18 and students at the University of Mount Union in Alliance, Ohio. All participants complete surveys that measure stress, burnout, and mindful attention awareness at the beginning and end of a 14-day period. However, during the 14-day period half of the participants practice mindfulness using the Medito app for 10 minutes a day. We predict that stress and burnout will decrease, while mindfulness will increase, in those who practiced meditation after 14 days. These findings can help support campus-wide programs that promote the use of mindful meditation to decrease the amount of stress and burnout experienced by college students.

TITLE: Democratization in Japan

PRESENTER(S): Elora Gatts

DEPARTMENT: Japanese World Language

Abstract: As one of few Asian countries deemed a full democracy in the 2023 Democracy Index (Our World in Data 2023), scholars often point to Japan as the most successful of the third-wave states in this region to undertake democratization after World War II. What factors have facilitated this shift from authoritarian government, as well as the apparent stability of Japanese democracy in the modern era? Employing extant theories of democratization and confronting their potential shortcomings when applied to non-Western examples, this paper will examine the development of democracy in Japan. To facilitate this, I have built a case study of Japan, with a view toward the three major sources of democratization identified by scholars, including the exploration of historical linkages to democratic governance, economic modernization and growth, and the role of political culture in the development of the modern state. Political culture, or how the shared values, beliefs, and attitudes of the public impact its perception of the legitimacy of the government, will be measured by coding and interpreting polling data on societal norms.

TITLE: Wolbachia at the Huston-Brumbaugh Nature Center: A Survey of Infected Insects

PRESENTER(S): Emily Krizner

DEPARTMENT: Biology

Abstract: Today, the prevalence of mosquito-borne illnesses, such as Zika virus and Dengue, is increasing exponentially worldwide. The uptick in insect-vectored diseases has heightened the need for effective and accessible treatments and prevention measures. Warmer temperatures, changing weather patterns and increased human-environment interactions are all contributing factors in the rise of these types of illnesses. The most environmentally effective way to combat these illnesses is to target mosquito populations without eliminating them completely, which is where the Wolbachia bacterium comes into play. Wolbachia is a type of bacteria that naturally infects more than 50% of insects. Wolbachia is able to harmlessly alter the reproductive processes of mosquitoes causing Wolbachia-infected mosquitoes to be unable to transmit illnesses to human hosts, making it an ideal candidate for widespread prevention measures. The objective of this study was to test insects collected from the Huston-Brumbaugh Nature Center (HBNC) for the Wolbachia bacterium. Selected insects were identified by their genus and species (if possible) and underwent subsequent DNA extraction, preparation and thermal cycling methods. The DNA samples were then analyzed using gel electrophoresis to determine the presence, or absence, of the Wolbachia bacterium. The presence of the Wolbachia bacterium was confirmed in multiple insects from the HBNC and was not limited to any certain species. The scientific relevance of Wolbachia was also analyzed through peer-reviewed literature.

BRACY 04

TITLE: Metallus Rolling Mill Hot Saw Wear Insert

PRESENTER(S): Mason McCarty, Cody Lumby, Ryan Tomblin and Brett Baldus

DEPARTMENT: Mechanical Engineering

Abstract: Metallus is a steel mill that produces high quality steel and steel components for their customers. Metallus has given the task to innovate the current design of the hot saw at their Faircrest Steel Plant. The existing design experiences significant wear when the saw blade encounters the cutting surface, resulting in a costly and labor-intensive replacement and/or rebuild of the entire assembly. Our goal is to engineer a solution that minimizes downtime and operational costs while maintaining the functionality of the hot saw. The proposed design will include a consumable insert that can be replaced in-field, allowing for quick repairs without the need to disassemble and remove the entire assembly. Key design constraints include compatibility with the current dimensions, mounting with the current design, ability to handle product diameters ranging from 6-16 inches, and resistance to temperatures ranging from 1,600-1,700 degrees Fahrenheit. Through collaboration with the Metallus Rolling Mill, Engineers, and Fabrication Shop, the project includes 3-D modeling, drafting, print reading, material selection, fabrication processes, and installation processes, all aimed to achieve 40% or more cost reduction for a single wear plate. This trajectory is aimed towards cost savings but also enhances operational efficiency by creating a design that is easily replaceable. This is measured by the time and ease of installation through surveys combined with data collection on wear rates of the insert. By prioritizing maintainability and reliability in the design, we anticipate improvement in the longevity and functionality of the hot saw.

TITLE: Barriers to Transgender Patients Seeking Healthcare

PRESENTER(S): Elizabeth Vincent

DEPARTMENT: Gender & Sexuality Studies

Abstract: Forty-two percent of clinicians have not received any education about transgender healthcare during medical training (Yip et. al., 2024, p.1). Seventy-four percent of clinicians do not feel comfortable prescribing gender-affirming hormone therapy because of a lack of training (Yip et. al., 2024, p. 1). This creates a huge issue for both doctors and transgender patients. The purpose of this research is to learn from transgender and non-binary individuals and healthcare providers ways in which to improve this experience in healthcare. In this interest, the research questions are as follows. RQ1: What are the barriers to transgender and non-binary people that prevent them from getting adequate healthcare? RQ2: What are the obstacles that healthcare providers face, institutional or personal, that prevent them from adequately caring for transgender and non-binary individuals? To understand the issues from a first-hand perspective, 10–20-minute interviews will be conducted. Five transgender or non-binary students from the University of Mount Union will be interviewed. They must be at least 18 years of age and must have sought out care in the past 12 months. Five Ohio and Pennsylvania healthcare professionals (medical doctors and physician assistants) will also be interviewed. Interviews will be analyzed using thematic analysis to answer the research questions.

TITLE: A Study of Political Patterns in College Students

PRESENTER(S): Jackson Kerscher, Tobey Dick, Lucas Fields, Mason Esterline, Evan Chessey and Ammar Keswani

DEPARTMENT: Psychology

Abstract: In this study, we will investigate variables associated with the political attitudes of college-aged individuals. We plan to recruit 100 participants from the University of Mount Union to complete an online survey through SurveyMonkey. The survey will include measures of perceived stress, political attitudes, social media usage, family communication, religiosity, and political identity. We will also collect information on sex, gender, age, and voting behavior in the 2024 Presidential Election. We expect to find that there will be a significant positive correlation between the amount of political information you consume on social media and if you voted in the 2024 election, there will also be a significant positive correlation between the type of political information you consume on social media and who you voted for in the 2024 election, a significant positive correlation between religiosity and political views, a significant positive correlation between liberal political views and perceived stress. We also expect there will be a significant negative correlation between conservative political views and perceived stress, a significant positive correlation between religious beliefs and who you voted for in the 2024 election, a significant positive correlation between your beliefs on current events and who you voted for in the 2024 election, and a significant negative correlation between communicative family types and perceived stress. The findings of this research will give new insights into the underrepresented college age population and their political participation. These conclusions will be relevant in understanding college students' political decision making and the factors that affect them.

BRACY 06

TITLE: The Impact of Unknown Loads on Upper and Lower Body Maximal Strength and State-Trait Anxiety in Resistance-Trained Men

PRESENTER(S): Joe Drsek, Nolan McNeal and Jake Miller

DEPARTMENT: Exercise Science

Abstract: Resistance training is a form of exercise that has risen in popularity as people have become more health conscious. People train for different goals; however, many people focus on strength when picking their goals. With the goal of strength, people want to see the weight on the bar increase as much as possible as fast as possible. Previous studies have investigated upper body strength with unknown loads and have found varied results; however, none have looked at lower body maximal strength or anxiety with unknown loads. The study aims to find a new method to potentially increase maximum strength in both the upper and lower body and bar speed and decrease the rate of perceived exertion (RPE) and state anxiety. Twelve resistance-trained males maximally lifted four sessions with two sessions for bench press and two days for back squat, each lift will have an unknown and a known session. When hiding the weight, curtains were used in the front and the sides of the weight rack. The side curtains would be moved out of the way during the attempt and the side of the barbell was covered with cardboard cutouts to limit the view of the weight. Weight lifted was determined based on a designed protocol and the subject's estimated one rep max from a separate session. State anxiety was collected before each attempt and RPE, weight lifted, and average velocity after each attempt. Data collection not completed at the time of submission.

TITLE: A Novel Approach to Asphalt Durability: Leveraging Recycled PET for UV and Solvent Resistance

PRESENTER(S): Landon Shaffer

DEPARTMENT: Chemistry

Abstract: Asphalt emulsions are widely used in paving, sealing, and roofing. However, degradation from UV rays and nonpolar solvents (e.g., kerosene, diesel, gasoline) remains a challenge. While products resistant to either UV or solvents exist, none provide protection against both. Polyethylene terephthalate (PET), a widely recycled plastic, enhances asphalt durability and solvent resistance but has been difficult to incorporate into polymer-modified emulsions (PMEs). Recent advancements in patented technology have enabled the conversion of waste PET into a durable asphalt modifier. This modifier uniquely recycles PET through chemical reaction, enabling seamless integration into asphalt mixtures. Novel UV and solvent resistant asphalt emulsions have been produced utilizing this modifier in addition to other polymers. Initial formulations have proven to be chemically stable according to preliminary sieve tests, which assess particle distribution and emulsion stability. UV microscopy analysis has further confirmed uniform dispersion of the PET modifier within the emulsion. Drawdowns of the product soaked in kerosene have demonstrated excellent solvent resistance, indicating strong performance under fuel exposure. Ongoing research aims to refine additive concentrations to balance performance with cost-effectiveness, ensuring commercial viability. This product would be ideally used as a sealer or coat for areas exposed to large amounts of sun and solvents such as gas stations, tarmacs, and roofs. By enhancing durability and sustainability, this innovation offers a promising solution for extending the lifespan of asphalt surfaces in high-exposure environments.

TITLE: Evaluating Hormonal Contraception and Stroke Risk: A Focus on Women Experiencing Migraine with Aura

PRESENTER(S): Anna Drossos

DEPARTMENT: Physician Assistant Studies

Abstract: The use of hormonal contraception (HC) is incredibly common in women of reproductive age, yet often misunderstood and worrisome due to a limited understanding of its potential complications. According to the National Center for Health Statistics, migraines affect women at a higher rate during reproductive years and affect 20% of females. The American Heart Association states that migraines with aura, sensory disturbances occurring before or during a migraine, seem to be an independent risk factor for ischemic stroke. HC may further increase stroke risk for these women by increasing the likelihood of blood clots. This systematic review involved an extensive search of medical literature databases to determine if HC is safe for those experiencing migraine with aura. Current research is contradictory, with some studies suggesting progestin-only contraceptives are safer and others suggesting low-dose estrogen is preferred if doses stay under 35 micrograms. Overall, the literature urges avoidance of high-dose estrogen, though all studies stress the need for further research.

TITLE: Simulation of an MRI

PRESENTER(S): Annika Stankowski

DEPARTMENT: Physics

Abstract: Magnetic Resonance Imaging (MRI) is a medical imaging technique that generates detailed pictures of the inside of the body. To generate an MRI, strong magnetic fields cause protons in a patient's body to emit radio waves. Since the radio wave frequency is influenced by the strength of the magnetic field, a field that changes strength across the body allows the radio waves to be mapped to a specific location in the body. In addition, a stronger radio wave corresponds to denser matter and differentiates, for example, bone from tissue. This research simulates the complete MRI process, from stimulation of radio waves, through detection of the radio waves, to the creation of images from the waves. Applications that will be discussed include locating a tumor and reconstructing a two-dimensional matter density map to demonstrate how an MRI produces images of internal structures. Overall, this project highlights the intersection of mathematics, computer science, physics, and biomedical engineering in MRI technology. It provides insight into the fundamental principles behind this powerful imaging technique and contributes to a deeper understanding of the processes necessary to enhance image resolution and reduce scan times.

TITLE: Effects of Audio in Horror Video Games on Physiological and Psychological Measures

PRESENTER(S): Eden Kesler, Emilee Styranec, Matthew Korver, Saamia Wanzo and Olivia Tolivar

DEPARTMENT: Psychology

Abstract: In this study, we are investigating the impact of audio on perceived stress, anxiety, and physiological responses, heart rate and electrodermal activity, when playing horror video games. We plan to recruit 20 participants (females and males) to participate in an in-person experiment through the SONA research participant management system. Participants are expected to report moderate to high frequency of game play. The self-report dependent measures are the Perceived Stress Questionnaire (PSQ) and the state portion of the State Trait Anxiety Inventory (STAI), completed by the participant prior to and after playing the video game. Subjects will also be baseline tested for heart rate (HR) and electrodermal activity (EDA) prior to playing the game. The videogame Outlast will be played by participants for 30 minutes. They will be assigned to either the audio or no audio group. We expect to find differences between the independent variable groups in heart rate (HR), electrodermal activity (EDA), perceived stress, and anxiety. We expect that the use of audio will increase HR, EDA, perceived stress, and anxiety in comparison to those playing without audio. Based on these findings, we will be able to conclude that audio in video games causes an increase in heart rate (HR), electrodermal activity (EDA), perceived stress, and anxiety. Future implications of this research include implementation of audio in the video game design process for creating an immersive and impactful experience for its users.

TITLE: Mobile Hydraulic Press

PRESENTER(S): Nicholas Presutto, Noah Cannon, Joey Valeri and Gabriel Ortiz

DEPARTMENT: Mechanical Engineering

Abstract: The goal of the project is to design and construct a 20-ton hydraulic press for use in the School of Engineering. Various clubs such as Raider Racing, Raider Robotics, and other engineering clubs utilize the School of Engineering to create or manipulate parts relevant to the club. The School of Engineering contains various equipment and tools to ensure students will be able to work on all the projects necessary. The following presentation goes in-depth on key components of the project, these include but are not limited to problem scope, background information, components, state-of-the-art technologies, design requirements, challenges with design, and lastly our final design and construction plans. The background of our presentation goes into the purpose of the press's construction, which is to create a 20-ton hand actuated and mobile hydraulic press that could be used for multiple purposes, such as press fitting bearings, axle fittings, and any other press fitting that would need to be done. This would have a wide range of uses for clubs and class applications. We will design it to be modular and able to have electrical implementation to the press. The press will also undergo performance testing such as ensuring the center of gravity allows for the press to be stable and a test to see how many pumps of the actuator is needed for a certain tonnage to be reached. The hydraulic press and performance testing will be completed by April 2025.

GALLAHER 226

TITLE: Variation of ADAR Editing in Male and Female Parkinson's Patients

PRESENTER(S): Morgan Klein, Jovana Sekulic, Mikayla Dallacheisa and Joy Beach

DEPARTMENT: Biology

Abstract: Parkinson's Disease (PD) is a common neurodegenerative disease that is characterized by a resting tremor, but PD can cause both motor and nonmotor symptoms (Lill, 2016). Since PD is multifactorial and only a fraction of PD cases can be associated to gene variants, changes in RNA editing could play a role in PD development by altering the outcome of gene expression (Mercer et al., 2023). RNA editing, specifically by Adenosine Deaminases Acting on RNA (ADARs), has been associated with the development of Huntington's Disease and Alzheimer's Disease (Pozdyshev et al., 2021). In an analysis of RNA sequencing data from the Parkinson's Progressive Markers Initiative, comparisons were made in overall editing patterns and consequences of editing between various patient populations. While data collection is incomplete at the time of submission, preliminary data suggests that there are significant differences through Chi-square analysis in RNA editing patterns between PD males and females as compared to healthy controls and between PD subgroups and healthy controls taking common medications used in PD treatment, such as levodopa and carbidopa, those who experienced acid reflux symptoms, and patients diagnosed with hypertension. As sampling groups were small, further study is needed to explore the relationship between ADAR editing patterns and PD physiology, which could ultimately provide insight into the mechanisms that lead to PD symptoms, diagnosis, and progression.

TITLE: Zap Away the Pain: Who Benefits Most from Spinal Cord Stimulation for Chronic Pain and What Are the Risks of this Treatment?

PRESENTER(S): Nicole Lawson

DEPARTMENT: Physician Assistant Studies

Abstract: With an increasing prevalence of opioid addiction and overdose due to widespread use of narcotics in the treatment of pain, many patients are facing a choice between the risk of addiction versus chronic suffering and loss of function. As a result, exciting alternative treatment options such as spinal cord stimulation (SCS) are gaining attention. SCS involves surgically implanted electrodes sending electrical signals to the spinal cord to 'zap away' pain. This systematic review of literature, primarily sourced from PubMed, targeted high-quality studies on SCS published in the last decade. Research shows that SCS alleviates pain, enhances quality of life, and decreases disability. This effective, opioid-free option offers a promising alternative for patients and healthcare providers. Additionally, this research explores emerging novel devices currently in clinical trials that use SCS as a launching point for more superficial products that could increase accessibility, reduce costs, and minimize the surgical risks associated with SCS, thereby expanding its potential as a mainstream treatment advancement.

TITLE: Stress, Coping Strategies, and Competition Level on Athletes' Ratings of Performances, Injuries and Well-being

PRESENTER(S): Emma Moy, Aiden Cange, Edson Edmond, Marisa Fellin, Madelyn Garske, Caitlyn Gatta, Dozie Okpala, Alanna Woodworth and Vinny Zeren

DEPARTMENT: Psychology

Abstract: In this study, we are investigating the associations between stress, coping strategies, and competition level and the athletes' ratings of their performance, injuries, and well-being. We plan to recruit 150 male and female student athletes to complete an online survey. Participants will be prompted to complete four surveys: the COPE Inventory (Carver,2013), the Student Stress Scale (Feldt, 2003), the Well-being Scale (Lui & Fernando, 2018), and the RETSQ-Sport Scale (Gnacinski et al., 2021). Before completing these surveys, they will be asked to sign an informed consent form, and then a debriefing statement will be presented following the conclusion of the surveys.The surveys include measures of coping strategies, perceived stress, overall well-being, and athletes' recovery and stress. We expect to find negative correlations between stress and coping, injury and performance, performance and stress, coping and injuries, and well-being. We expect positive correlations between stress and injury, well-being and performance, well-being and coping, and coping and performance. As for competition level, starters are expected to exhibit higher perceived stress and more injuries. If the findings confirm our expectations, they will help athletic trainers, coaches, and athletes prevent future injuries and implement effective coping strategies into their training. We expect our results will present the relationship between stress and performance. This will allow coaches and athletes the ability to recognize stress levels and their overall well-being. In the end, our study will support athletes and allow them to make the connection between their psychological and physical health as well as how these factors affect their performance.

SESSION C: 3:15 – 3:55

OAK HALL 203

TITLE: Impact of Carbohydrate Gel Intake on 10k Performance of Recreational Runners

PRESENTER(S): Isabelle Puleo, Michaela Davis and Aidan Schaffer

DEPARTMENT: Exercise Science

Abstract: Carbohydrate intake has been shown to be beneficial for performance across cycling, team sports, and running. However, there is limited research on the use of a commercially available carbohydrate gel, especially for distances as short as the 10k or among recreational runners. Determining if there is an effect of a commercially available carbohydrate gel on the 10km performance of recreational runners can give an understanding to which distances carbohydrate gels are beneficial to consume at, as well as if they would be beneficial for recreational runners to consume at the 10k distance. In addition, there is a lack of studies that used a commercially available carbohydrate gel, rather, they measured a specific amount per subject. Purpose: The purpose of this study is to determine the impact of a commercially available carbohydrate gel on 10k performance of recreational runners. Methods: Twelve recreationally active runners performed two 10k time trials two weeks apart while consuming either a popular carbohydrate gel or a placebo gel 10mins before the trial and at the 5k point. Blood glucose was measured for each participant upon arrival for testing, just before starting, and at the conclusion of each 10k. Measurements taken include the three blood glucose measurements, performance times, and a pre and post gastrointestinal (GI) questionnaire. Results: No results were available at the time of submission.

TITLE: Advancing Atomic Modeling: Integration of Computational Clusters & Neural Network Techniques

PRESENTER(S): Leonel Sanchez Torres

DEPARTMENT: Physics

Abstract: Gaining knowledge about multi-electron atomic structures will increase the understanding of atoms' behavior in terms of its electronic structure and potential for chemical bonding. This data is derived by solving the Schrödinger equation for a system with multiple electrons, considering electron-electron repulsion and the shielding effect. The multiconfiguration Dirac-Hartree-Fock (MCDHF) method is an approach implemented to solve the Schrödinger equation. There are several software packets such as GRASP (General Relativistic Atomic Structure Package) that are specifically designed for MCDHF calculations. For multi-electron structures the number of iterations needed increase to hundreds million terms for the multiple configurations which increase the computational requirements to perform the calculations. Our study aims to develop a deep learning methodology, by implementing a neural network (NN) to reduce the memory and time requirements when performing calculations for large systems without hindering the accuracy of the calculations. The NN's task is to preselect and manage the most relevant configurations out of large basis sets selecting the configurations based on a weight scale from previous atomic structure calculations.

OAK HALL 206

TITLE: The Effects of Aggression on Social Interactions of Northeast Ohio Feeder Birds

PRESENTER(S): Sage Warner

DEPARTMENT: Biology

Abstract: Aggressive behavior in birds is known to influence many aspects of how birds interact with their environment and other species. Studying bird behavior, particularly aggression, has taught us how aggression influences aspects like foraging, settlement, and territorial behavior. The interest of this research is how aggression affects social hierarchies in birds, specifically if increased aggression is linked with invasive species' dominance over native species. This will be done by performing naturalistic observations of Northeast Ohio feeder birds at the Huston-Brumbaugh Nature Center. One feeder will be monitored for one hour a day for 8 non-consecutive days, and a video camera will be used to monitor bird interactions. Bird interaction will be scored based on types of aggressive behavior as defined from relevant literature and totals will be created to rank birds in order from most to least aggressive. Rankings will also be used to compare the number of aggressive interactions between native and non-native species. These rankings will be used to create a social hierarchy of feeder birds based on aggression. It is predicted that invasive species and larger species, such as House Finches or Blue Jays, will be the most aggressive. Whereas, native or smaller birds, such as Goldfinches, are predicted to be less aggressive. This research can be applied to invasive species control to better understand the behaviors of certain invasive birds to help prevent their spread and domination over other native species.

TITLE: Free Your Mind Support Group

PRESENTER(S): Mason Wilkson, Chloe Orzo, Karissa Speedy, Alexa Harvey, Calena Peake and Mikayla Dallacheisa

DEPARTMENT: Psychology

Abstract: In this study, we investigated the effectiveness of support groups to see if they aid in perceived stress, depression, anxiety, loneliness, and fear within the geriatric population of Alliance, Ohio. We recruited 5 participants (5 females) to voluntarily join a support group, hosted by senior psychology research leaders, using posted flyers throughout the local community. Participants consisted of Alliance, Ohio community members that fell within the geriatric population; aged 65 and older. The study included measures of perceived stress, depression, anxiety, loneliness, and fear that were calculated using five questionnaires; Hospital Anxiety and Depression Scale (HADS); Social Support Measure (SSM); Perceived Stress Scale (PSS); Death and Anxiety Questionnaire (DAQ); and UCLA (University of California, Los Angeles) Loneliness Scale Version 3 (UCLA LS V3). Questionnaires were provided to participants pre- and post-support group exposure. We found that there was a significant (negative/positive) correlation between participation within a support group and the decrease in perceived stress, depression, anxiety, loneliness, and fear. Based on these findings, we believe that support groups will be effective in aiding the geriatric population with age-associated feelings of perceived stress, depression, anxiety, loneliness, and fear.

T & H 201

TITLE: Live Parasites as Medicine: Is Helminth Immunotherapy a Safe and Effective Treatment for Multiple Sclerosis?

PRESENTER(S): Chessie Misja

DEPARTMENT: Physician Assistant Studies

Abstract: Imagine if a parasite, usually seen as a threat, could help treat multiple sclerosis (MS). MS, a chronic autoimmune disease that damages the brain and spinal cord, leaves patients with devastating symptoms like weakness, muscle spasms, and disability. While there is no cure for MS, there are treatments that reduce exacerbations of the disease. However sometimes these drugs come with unwanted side effects or are ineffective. As a result, researchers are trying unconventional approaches, such as helminth therapy. This is the placement of parasitic worms, thought to help regulate the immune system, making it less reactive to the body and potentially attenuating MS symptoms. A systematic review of literature was conducted to evaluate clinical trials on helminth therapy published within the last ten years to determine the effectiveness of the treatment in MS patients. Amazingly, evidence suggests that this treatment can be safe and effective, but unfortunately due to small samples sizes, no definitive conclusion can be made yet. More research is needed to determine if this mind-bending innovation could be the future for the debilitating disease of MS.

TITLE: Policy Proposal for Counterterrorism Strategy: U.S. Efforts to Prevent the Reconstitution of Al Qaeda in Afghanistan

PRESENTER(S): Kate Kueter

DEPARTMENT: National Security and Intelligence Analysis

Abstract: The Middle East, and particularly Afghanistan, has long been a critical theater for U.S. counterterrorism and national security efforts. Since the September 11, 2001 attacks, Afghanistan has been a focal point in the U.S. fight against terrorism, with the Taliban's current control of the country and its alliance with Al Qaeda presenting significant security challenges. The failure of past U.S. policies to address the Taliban-Al Qaeda relationship has left the U.S. vulnerable to the resurgence of terrorist organizations in the region. This project explores the historical context of U.S.-Afghanistan relations, assesses the impact of past counterterrorism strategies, and proposes a new policy approach. The suggested strategy focuses on leveraging U.S. influence to engage with the Taliban, aiming to restrict Al Qaeda's access to Afghan territory in exchange for conditional support. This approach seeks to prevent the reestablishment of Al Qaeda's safe haven in Afghanistan, stabilize the region, and safeguard U.S. national security without the extensive use of military force. By shifting towards pragmatic engagement, the U.S. can promote counterterrorism objectives while navigating the complex political dynamics of Taliban controlled Afghanistan.