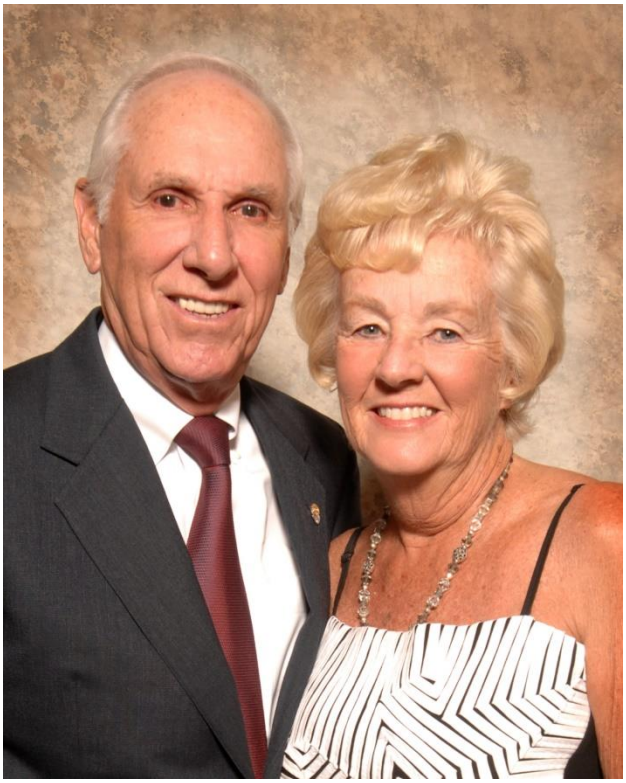
SCHOLAR DAY

2026

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 21, 2026. 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: Trapped by Neutrophils: Casting a NET to Halt Breast Cancer Metastasis

PRESENTER(S): Claire Fried

DEPARTMENT: Biochemistry

Abstract: Current cancer therapies are effective against primary tumors and have improved clinical outcomes, but are limited by toxicity, recurrence, and poor specificity toward metastatic processes. Growing evidence highlights the tumor microenvironment as a key component in cancer progression. Neutrophils, powerful regulators of innate immunity, eliminate pathogens through phagocytosis, enzymatic degradation, and oxidative bursts. Upon activation, they can undergo a specialized form of cell death known as NETosis where they release web-like structures of chromatin and antimicrobial proteins called neutrophil extracellular traps (NETs) that entangle microbes and can potentially interact with tumor cells. This study examined whether neutrophil generated NETs could slow tumor cell metastasis in vitro. Using breast cancer cells (MDA MB-231) and neutrophils (CRL HL60 1964 Clone 15), cancer cell migration was studied using scratch assays. Neutrophil generated NETs were applied to the scratched plates and cancer cell migration was measured as a gap closure width. NETs produced a dose-dependent decrease in closure (0 ng = 100% ± 0%, 5,000 ng = 7% ± 5%, 10,000 ng = 3% ± 0%, and 20,000 ng = 4% ± 1%). Similarly, live neutrophils stimulated with bacterial lysate applied at increasing ratios in the scratch assays produced similarly reduced gap closures (1:1 = 100% ± 0%, 5:1 = 4% ± 3%, and 10:1 = 5% ± 3%), compared to 100% ± 0% for cancer cells alone. These results highlight an underexplored role of NETs as potential inhibitors of metastasis. By leveraging naturally occurring immune cells, this approach provides a novel, targeted, and less toxic strategy to limit metastatic progression in breast cancer.

TITLE: Ohio Gratings Welding Fixture Table for Industrial Grating Frame Assembly

PRESENTER(S): Nick Schrickel, Anthony Gentile, & Trent Taflan

DEPARTMENT: Mechanical Engineering

Abstract: This project was done with Ohio Gratings, Inc. (OGI) in Canton, Ohio, who specialize in making gratings for industrial applications and fabricating frames to hold these gratings. These gratings and frames are used in places like walkways, drainage covers, and ventilation. The goal of this project is to design a welding fixture which will be used to assemble one of OGI's grating frames in a repeatable and efficient process. A frame is used as a base structure for many gratings. The design is completed using computer aided design software and FEA (finite element analysis) to ensure the design is safe and meets Occupational Safety and Health Administration regulations. Through research of other welding fixtures and their components as well as using the clients' input for certain design choices, a table and base were designed to support the load of the frame and efficiently fabricate the frame. This research helped with the final design of the fixture and tests done on the fixture. The design uses an electric motor to rotate the table and pneumatic clamps to affix the pieces of the frame during fabrication. Once the design of the welding fixture is fabricated, tests will be done to ensure that the table does not deflect more than the allowable limits when under a load. A test on the efficiency of the fabrication process will also be conducted. This will show OGI that our design will save them both time and money for when this frame needs to be made.

TITLE: Effects of Mindfulness Practices on Physical Performance, Team Cohesion, and Mental Wellbeing

PRESENTER(S): MacKenzie Davis, Isabelle Parr, Kayla Stewart, Emma Ackermann, & Casey Wachhaus

DEPARTMENT: Psychology

Abstract: In this study, we plan to investigate the effects of mindfulness meditation on physical performance, mental well-being, and team cohesion among collegiate track and field athletes who experience high levels of physical and psychological stress from the demands of training, competition, and academics.

PRESSER HALL

TITLE: Machine Learning in Mineralogy

PRESENTER(S): Owen Bucheger

DEPARTMENT: Data Science & Analytics

Abstract: The internal structure of a mineral determines many of its most important properties, including how it breaks, how it interacts with light, and how it can be used in technology and industry. However, identifying that structure usually requires expensive laboratory equipment and specialized testing. Could a more affordable and accessible set of measurements encapsulate these same trends? This project explores whether machine learning can help make that possible. In this presentation, I will discuss how computer algorithms can be trained to recognize patterns in large collections of data. By analyzing thousands of known minerals and their measurable characteristics, such as hardness, density, and optical behavior, the model learns relationships between these observable traits and the mineral's underlying crystal system. Rather than relying on direct testing, the approach uses pattern recognition to generate predictions and evaluate how accurate those predictions can be. The findings suggest that crystal structure is strongly connected to these physical and optical properties, and that these relationships can be learned by a machine learning model. While this method does not replace advanced laboratory techniques, it demonstrates the potential for a faster, lower-cost screening tool that could guide further testing and expand access to structural analysis in mineral research.

TITLE: An AI-Based Method for the Detection of Food and Financial Insecurity in Electronic Health Records

PRESENTER(S): Emily Owens

DEPARTMENT: Computer Science

Abstract: Food insecurity and financial insecurity are important non-medical drivers of health (NMDOH) that significantly influence patient outcomes. However, these factors are rarely captured in structured fields within electronic health records (EHRs), often appearing solely in clinicians' narrative notes. Conducted in conjunction with Vanderbilt University's School of Medicine and the Vanderbilt University Medical Center, this study evaluates the use of natural language processing (NLP), a form of artificial intelligence (AI) that analyzes language, in identifying these social determinants of health within unstructured clinical text. Using over 40,000 de-identified clinical notes from two large EHRs, we applied an AI language model, known as a transformer, to identify additional expressions commonly associated with food and financial insecurity. The identified expressions were incorporated into a retrieval algorithm designed to detect patients whose clinical narratives suggest undocumented food or financial insecurity. The NLP model successfully identified contextually related phrases such as "low food access," "food scarcity," and "financial distress," which were integrated into an existing expert-developed vocabulary used to detect NMDOH. Expanding the query with these context-sensitive expressions improved the system's performance, increasing the area under the precision–recall curve (AUPRC), a common measure of retrieval accuracy, from 0.42 to 0.61 for food insecurity and from 0.88 to 0.96 for financial insecurity. These findings demonstrate that NLP-driven query expansion can substantially improve the identification of NMDOH within clinical data. Improved detection of NMDOH supports clinical research, strengthens population health analyses, and informs future intervention efforts aimed at addressing health equity and social determinants of health.

TITLE: What Happens Next?: The Serial Narrative as a Social Catalyst, as Seen Through Stranger Things

PRESENTER(S): Cecilia Zucchero

DEPARTMENT: English

Abstract: Television is at the center of many lives today, providing story, information, escape, and so on. With the rise in streaming in the last decade, binge culture has noticeably taken hold of our attention economies—our ability to stay engaged—barring us from participating in social practices with peers, or fans. Serialization has been a prominent delivery method of storytelling since its rise in the Victorian era with Charles Dickens, continuing on to many television series to this day, as they drop one episode per week. The gapping, the time between these installments/episodes, as I will discuss through research and applicable examples of modern television, allow for an increase in socialization, opening the door for community, connection, discussion, and so on. Using Stranger Things (2016-2025) as a main example, I will elaborate upon how serialized stories breed engagement, particularly within fandom, leading to a strengthened ability to speculate, discuss, dissect, and empathize. This research implies a need for deeper analysis of delivery methods of television and story, especially in an effort to maintain engagement, attention, and an audience.

GIESE 114

TITLE: Hubbell IR Camera Testing System Design

PRESENTER(S): Jack Davis, Dan Foltz, & Ahmed Alzoubi

DEPARTMENT: Computer Engineering

Abstract: Infrared (IR) cameras allow people to see heat that is normally invisible to the human eye. This project explores how infrared imaging can be used to detect temperature differences in real time and convert them into useful visual data. Infrared radiation is a type of electromagnetic energy emitted by all objects based on their temperature. While humans cannot see infrared radiation, specialized sensors can measure it and translate the information into images that show warmer and cooler areas. In this project, an infrared camera sensor was integrated with a programmable hardware platform to capture thermal data and display it in a visual format on a computer interface. The system reads temperature values from the IR sensor and processes the data to create a thermal image where different colors represent different temperatures. This allows users to easily identify heat patterns and temperature changes in their surroundings. The research focused on designing a system capable of collecting, processing, and displaying infrared data efficiently. Testing involved capturing temperature variations from different objects and environments to evaluate the accuracy and responsiveness of the system. The results demonstrate that infrared sensing can provide valuable information about heat distribution and environmental conditions. Infrared imaging has many practical applications, including building energy inspection, electrical system monitoring, medical diagnostics, and search-and-rescue operations. By developing an accessible infrared imaging system, this project highlights how thermal sensing technology can help people better understand and monitor the world around them.

TITLE: Women's Suffrage: Seneca Falls Convention and its Effect on Modern Feminism

PRESENTER(S): Bre Pittman

DEPARTMENT: History

Abstract: The Seneca Falls Convention of 1848 marked a foundational moment in the history of the women's rights movement in the United States. This presentation examines the origins, goals, and key figures of the convention, with particular emphasis on the "Declaration of Sentiments" and its challenge to entrenched legal, political, and social inequalities. By situating Seneca Falls within the broader context of nineteenth-century reform movements, this presentation highlights how early feminist activism laid the groundwork for future struggles for gender equality. The presentation then traces the lasting influence of the convention on modern feminism, connecting its core demands, such as suffrage, legal autonomy, and equal opportunity to contemporary feminist movements and ongoing debates surrounding gender equity. Through historical analysis and modern stories, this presentation demonstrates how the ideas articulated at Seneca Falls continue to shape feminist thought, activism, and policy today, reinforcing the convention's relevance in understanding both the progress achieved and the challenges that remain.

TITLE: Putting Life into Years: Early Implementation of Palliative Care in Pediatric Oncology Patients

PRESENTER(S): Cassie Hooper

DEPARTMENT: Nursing

Abstract: Palliative care, which focuses on symptom management and quality of life, is a largely accepted practice for adults with cancer and is often integrated early into treatment, but for children, it is often underutilized. Even though children face unique challenges due to different types of cancer and their developmental stages, I was interested in how palliative care could still benefit or even be tailored to pediatric patients with cancer. This evidence-based project to satisfy the honors in the major undergraduate nursing requirements answered the PICOT question: In pediatric cancer patients, how does early implementation of palliative care affect quality of life within the course of treatment? Eleven articles published from 2019 to 2023 were analyzed, including systematic reviews, single qualitative studies, and case-control studies. Two pediatric oncology registered nurses were also interviewed to gain insight into the real-life implications of palliative care in this population. The results showed significant improvements in pain, as well as other physical and mental health symptoms. Due to increased use of opioids, there was an increase in fatigue. Palliative care also decreased hospital and critical care admissions, and increased deaths at home versus the hospital. These results suggest that palliative care can offer benefits and enhance quality of life, even for patients who are not terminally ill.

GIESE 187

TITLE: DRUID: Reconstructing Data from Scatter and Line Plots with An Automated Machine Learning and Computer Vision Pipeline

PRESENTER(S): Texas Doehring

DEPARTMENT: Data Science & Analytics

Abstract: Scientists use scatter charts and line charts to portray their data in publications and presentations. While some authors may include their datasets in their papers or published work, many do not, and this results in the reader having no way to access the data portrayed in these plots. Scientists may turn to artificial intelligence agents (AIs) to reconstruct the original data from the chart. Many freely available AIs and MLMs struggle with this task, requiring many more inputs or requests to extract the wanted information, and are expensive both in terms of resources and computational hours. DRUID, or Data Reconstruction Using Image Dissection, is our attempt at this issue. DRUID uses optical character recognition, straight line detection, image contour analysis, and other classical and artificial intelligence algorithms to reconstruct the original data from just an image of a line plot or a scatter plot.

TITLE: Analyzing the Linguistic Impact of French on Niger's Diplomatic Relations with Other African Countries

PRESENTER(S): Joel Greenly

DEPARTMENT: International Affairs & Diplomacy

Abstract: This study looks at the diplomatic history of Niger over the past 30 years to determine if there is a statistical difference between its relations with Francophone and non-Francophone states. Based on previous studies that indicate the inherent biases humans have towards their native language, the difficulty in perfect interpretation, and the need for accurate and quick communication for effective diplomacy, this study hypothesizes that there will be a statistically significant difference in diplomatic relations between Francophone and non-Francophone states. Using trade date, military conflict data, and treaties and agreements between Niger and other African states, this study analyzes their relevance to diplomatic relations and develops an index to rank all African states diplomatic relations with Niger. While this study found that Niger has very good diplomatic relations with Francophone West African states, this study did not find that there was any significant difference between Francophone and non-Francophone states in other parts of Africa. Instead, the data suggests that proximity to Niger is the most important factor for good diplomatic relations with the state. There is not enough data to conclude if French has any significant impact on Niger’s relations with other West African states. Further research can be done in other parts of the world to test if language has any detectable impact on diplomatic relations elsewhere.

TITLE: A Study of Friendship and the Collegiate Experience.

PRESENTER(S): Nev Laubscher, Nina Marcoguiseppe, Morgan Cooney, LaDea Waderker, & Elizabeth Higginbotham

DEPARTMENT: Psychology

Abstract: The purpose of this study is to investigate relationships between friendship quality, campus involvement, and residential status, and GPA, college well-being, and general wellbeing. We plan to recruit approximately 100 undergraduate students varying in sex, gender, age, and residential status on campus to complete an online survey regarding their friendships and collegiate experience. Our research design was correlational and quasi-experimental. The online questionnaire includes measures of demographics, college students' subjective wellbeing, friendship quality, GPA, and overall wellbeing. We hope to find that there is a significant positive correlation between friendship quality and grade point average, overall wellbeing, and campus involvement. We also hope to find that those living on campus will have higher friendship quality, college well-being, general well-being, and GPA, than those not living on campus. If our findings confirm our hypotheses, we will be able to conclude that students who have higher-quality friendships will also have higher GPAs and overall wellbeing. The hypothesis will be supported because having high quality friends can make it easier to stay motivated, handle stress, and keep up with schoolwork. We will also be able to conclude that students who reside on campus will have higher quality friendships, college well-being, general well-being, and GPAs, than those not living on campus.

SESSION B: 9:45 AM – 10:45 AM

BRACY 06

TITLE: Comparison of Medical Treatment in Spanish-speaking Countries versus The United States

PRESENTER(S): Mae Pawlikowski

DEPARTMENT: Spanish

Abstract: Medical treatment is something that no individual will go their life without encountering. What people don't always think about are the differences in medical treatment around the world. In my research I took a deep dive into the specific differences in medical treatment in the United States and many of the Spanish-speaking countries. The methods I used throughout my research were analyzing medical journals, healthcare articles, and case studies. The research included differences in the finances, types of treatments, most prevalent illnesses treated in each country, and education requirements to become a healthcare practitioner. In my research I also focused on how the language barrier can pose potential threats and lead to malpractice suits. It was expected that treatment would be more developed in the United States than in the other countries, and that finances would be incredibly different. In fact, there are huge differences in the prices of simple procedures, for example the cost of having a baby. Through my research I found real life stories of people explaining their experiences with miscommunication occurring from language barriers, which leads to life-altering medical errors forever effecting their lives. Further implication of my research consists of more effective use of translators to prevent medical errors, as well as broadening knowledge of how different treatment can be in different places around the world.

TITLE: AI in Higher Education: Exploring Students' Use, Perceptions, and Attitudes of AI

PRESENTER(S): Sam Jordan, Tori DeMeyer, Emma Packard, Elizabeth Vincent, Lilyanna Ryan, & Zoe Stout

DEPARTMENT: Psychology

Abstract: In today's world, AI is quickly entering higher education. Therefore, in this study, we investigated how students' use and attitudes about generative AI were associated with their perceived self-efficacy, creativity, and focus. We recruited 100 participants to complete the survey by word of mouth, an online SONA platform, student email, and flyers on campus. Participants were adult University of Mount Union students and could take the survey regardless of GenAI usage experience. The self-directed online survey on Survey Monkey took about 15 minutes to complete and included measures of students' use of AI, their attitudes towards it, and their perceptions about their creativity, focus, and self-efficacy to find associations for data analysis. We found that two thirds of college students have used Generative AI, and of those two thirds, half had a positive attitude towards AI and its usefulness. Two thirds of college students used Generative AI to create or edit writing assignments, and half of the students mistrusted the answers AI generated for them. Positive attitudes towards Generative AI had a significant positive correlation with perceived usefulness; as well as perceived creativity, self-efficacy, and focus levels reported were negatively correlated with frequent AI use. Based on these findings, we conclude that overusing Generative AI in higher education could be a factor in students' lower performance in critical thinking tasks that require self-efficacy, creativity, and focus, and thus should be carefully monitored before implementing. Students should be aware of their AI usage and attitudes that may influence their performance.

TITLE: Safety and Efficacy of Various Anesthetics in the Brittle Star, Ophioderma brevispinum

PRESENTER(S): Colton Hanlon

DEPARTMENT: Biology

Abstract: Brittle stars can regenerate the entirety of their body's tissues, and they do it faster than all the members of the phylum Echinodermata—the same group that includes starfish and sea cucumbers (Mashanov et al., 2022). Due to this capacity, these marine invertebrates offer unique insights into regenerative biology, making them increasingly relevant for comparative and biomedical research (Mashanov et al., 2022). However, ethical concerns prompt the use of anesthetics in limb-removal experiments, and current protocols lack sufficient data. This gap can cause unnecessary suffering and compromise outcomes, necessitating evidence-based anesthetic protocols for brittle stars. The goal of this project is to determine the optimal type and dosing of common anesthetics used in aquatic research, some of which have never been applied to brittle stars. Using an anesthetic experiment on sea cucumbers as a template (Carter et al., 2024), this research will explore the effectiveness of five anesthetic agents: MS-222 (tricaine methanesulfonate), benzocaine, magnesium chloride ($MgCl_2$), clove oil (eugenol), and 2-Phenoxyethanol. Effectiveness will be measured by three tests developed over months of behavioral analysis—including a timed flip-over test, a feeding test, and an oxygen consumption test conducted in a sealed Petri dish. This research will contribute to improved ethical treatment and reduced stress responses in brittle stars in future studies. Given that brittle stars are model research organisms, these findings could improve experimental outcomes across a broad range of fields, including regenerative medicine.

BRACY 04

TITLE: Metallus Quench Cover

PRESENTER(S): Lucie Doubet, Aidan Schroeder, & Caleb Miller

DEPARTMENT: Mechanical Engineering

Abstract: Quenching is an important step in steel heat treatment in which metal parts are rapidly cooled in water to achieve specific mechanical properties. At the Gambrinus Steel Plant operated by Metallus in Canton, Ohio, this process is performed using an Automated Quench and Temper Line. The existing quench machine utilizes covers to contain water and steam during operation. However, the covers are heavy and are prone to corrosion, which makes removal and reinstallation difficult. This increases maintenance downtime along with safety risks. This project focuses on redesigning the quench covers to improve efficiency, safety, ease of use, and decrease the weight while maintaining compliance with the Below-the-Hook lifting standards and ensuring the quench water is contained properly.

To accomplish this, a pin-and-slot mechanism is used that allows the covers to be guided smoothly into position. Computer-aided design modeling and engineering analysis were used to evaluate structural integrity, weight, and load conditions. The new design allows a single operator to install or remove the covers. This reduces physical strain on the workers and maintenance downtime. Overall, the pin-and-slot quench cover design provides a safer, more efficient, and less stressful solution while maintaining safety requirements.

TITLE: The Great Migration: The Vast Umbrella of Jim Crow Laws in Regard to African American Subjugation

PRESENTER(S): Zach Doerschuk

DEPARTMENT: History

Abstract: Jim Crow Laws had a detrimental and massive impact on African Americans' well-being during the 19th and 20th centuries. They dominated every aspect of African Americans' lives and were inescapable in terms of their deplorable effects. Thus, when we refer to any event which affected African Americans during these time periods, it is imperative we consider the reach and influence of Jim Crow Laws. This includes the Great Migration. Historians point to a multitude of causes when discussing the Great Migration such as racial violence in the south, a lack of economic opportunities, and of course, Jim Crow Laws. However, each one of these causes has causes of their own which need to be further explained. When examining the vast number of Great Migration causes, Jim Crow Laws can be attributed to each and every one of them. In other words, Jim Crow Laws were the root of the poisonous tree when it comes to the Great Migration. This presentation is a comprehensive analysis of previous historians' works regarding the Great Migration and its causes (historiography) and then uses historians' work to convey the argument that Jim Crow Laws are essentially the one and only cause of the Great Migration.

TITLE: The Sound of Understanding: Music's Effect on Reading Comprehension

PRESENTER(S): Shannon Masa, Ava Powers, Bryanna Butler, Delayne DiSanza, Emilee Siebenthal, & Kayleigh Terrell

DEPARTMENT: Psychology

Abstract: The effects of music on academic performance has been a topic of controversy for many researchers, and we wanted to investigate how background music affects college students' performance. For this study, we investigated the effects of different background music environments on individual's cognitive performance and reading comprehension. We recruited a group of 18 to 22-year-old undergraduate students at the University of Mount Union through email and word of mouth to complete a series of short reading comprehension exams under different background music environments. With six total exams and three total music environments (non-lyrical music, lyrical music, and silence), each participant completed two exams under each music environment over a period of about an hour and half. Our results showed a significant difference between individuals' performance under the lyrical music environment and the silent music environment. Results also showed a non-significant difference between performance under the non-lyrical music environment and the silent environment. Based on these findings, we conclude that reading comprehension ability is unaffected when individuals listen to non-lyrical music while engaging in cognitive reading tasks, and that individual's reading comprehension ability is significantly negatively affected when listening to lyrical music.

GALLAHER: 122

TITLE: What factors lead young White men to White nationalism?

PRESENTER(S): Andrew Gillis

DEPARTMENT: National Security & Foreign Intelligence

Abstract: White nationalism in the United States has grown through a long history of racial ideology, social tension, and digital expansion, but its modern strength relies heavily on the vulnerabilities of young White men who feel isolated, insecure with their masculinity, or disconnected. These emotional and social pressures, when also combined with rapid political polarization and online extremist networks, create a pathway to radicalization that is far more personal and psychological than purely ideological in nature. As a result, the threat today is both decentralized and deeply embedded in the digital and social lives of young people. This paper proposes four proactive policies: school-based prevention programs, platform accountability through data transparency agreements, community mental health hubs, and a National Center coordinating prevention efforts. Although federal legislation, civil rights organizations, and community advocacy have made meaningful efforts to curb White nationalist activity, most current policies are reactive rather than preventive. Real long-term progress requires addressing the psychological and social conditions that extremist groups exploit, including mental health struggles, lack of belonging, and fragile identity formation. By focusing on these underlying causes rather than only the consequences of extremist violence, society can better prevent radicalization and reduce the influence of White nationalist movements on future generations.

TITLE: Financial Literacy Education Best Practices

PRESENTER(S): Ashlin Morris

DEPARTMENT: Primary Education

Abstract: Financial literacy education has become increasingly important as students prepare to navigate complex financial decisions in adulthood. In response to this need, the state of Ohio has implemented updated learning standards and graduation requirements that emphasize financial literacy instruction in K–12 education. These standards focus on essential concepts such as budgeting, saving, credit and debt, investing, and responsible financial decision-making. This research examines best practices for implementing financial literacy instruction aligned with Ohio's updated standards. Through analysis of state policy documents and existing educational research, this study identifies instructional strategies that effectively support student understanding of financial concepts. Key best practices include integrating financial literacy across subject areas, using real-world and project-based learning experiences, incorporating interactive tools and simulations, and providing scaffolded instruction that builds financial knowledge over time. Additionally, the research considers the importance of teacher preparation and curriculum design in ensuring successful implementation of the standards. Overall, this study highlights the role of structured, engaging financial literacy education in preparing students to make informed financial decisions and promoting long-term financial well-being.

TITLE: Artificial Intelligence and Human Relationships: Identifying Relational Risks, Benefits, and Impacts Across Personal and Professional Contexts

PRESENTER(S): Skye Hoover

DEPARTMENT: Psychology

Abstract: Artificial Intelligence (AI) is quickly growing in technological advancement, popularity, and societal integration. This rapid growth raises questions about its influence on interpersonal and professional lives alike. To examine these implications, I chose to investigate how the integration and advancement of AI may impact society across three main domains: support and advice for existing relationships, usage within the professional therapeutic environment, and as a substitute for close relationships. I looked at existing research examining AI usage within interpersonal relationships to create conclusions within these contexts. I hypothesize that the research will show benefits like short-term social fulfillment, more accessible relational and personal advice, and a confidential outlet for topics that may be culturally unapproachable in typical conversation. However, these AI programs are often commercialized, still new in development, and lacking in human capabilities like understanding nonverbal behaviors cultural aspects and emotional reciprocity and depth. By identifying the benefits and harms of integrating it into our interpersonal and professional lives, we can make more informed decisions about the way that AI advances and becomes part of our society. Some limitations of the study include the shallow pool of research regarding the role of AI in marital, familial, and personal contexts.

GALLAHER 226

TITLE: A Microbial Rivalry: Investigating Co-Infection and Competition between Wolbachia and Borrelia burdorferi in Ixodes scapularis at the Huston-Brumbaugh Nature Center

PRESENTER(S): Emily Krizner

DEPARTMENT: Biology

Abstract: Ixodes scapularis, more commonly referred to as the black-legged tick, is a species of arachnid micro predators in North America. Ixodes scapularis can transmit various bacterial and parasitic pathogens to mammalian hosts, the most prevalent being Borrelia burgdorferi- the causative agent of Lyme disease (LD). As climate change brings warmer temperatures, tick species are better equipped to survive in endemic areas for longer periods of time, leading to an uptick in LD cases, which is characterized as one of the fastest growing infectious diseases in the continental United States. In addition to various parasitic bacteria, Ixodes ticks also can serve as a host for the endosymbiotic Wolbachia spp. bacteria. When infected with Wolbachia spp., Aedes mosquitos are unable to transmit viruses such as chikungunya, dengue and Zika to human hosts. This discovery has thrust Wolbachia into the spotlight of infectious disease research, though there is little information on the impact of Wolbachia on the spread of bacterial pathogens, such as B. burgdorferi. This project aims to identify the presence or absence of B. burgdorferi and Wolbachia spp. in the Huston-Brumbaugh Nature Center in Minerva, Ohio. Additionally, a correlation, between Wolbachia and B. burgdorferi infections was sought out. Ixodes ticks collected from leaf litter at this location underwent DNA extraction, nested and standard PCR and DNA visualization to determine whether they were infected with either bacterium.

TITLE: Sports Gambling & Men

PRESENTER(S): Floyd Jones Jr., Alex Divitto, Jeremiah I Tillman, & Matthew Dorsey

DEPARTMENT: Media

Abstract: Our topic is focused on the correlation between sports gambling and men. We are examining why men are more likely to participate in sports gambling and how it's so popular in the male group. Sports media is usually aimed at men through ads, TV shows, and social events that highlight competition and taking risks. Many men see betting as a fun way to enjoy sports more or to prove they know a lot about them. By looking at our topic, we want to know more about how society, culture, and feelings affect gambling habits, and how it can impact men's money, mental health, and relationships.

TITLE: The Effects of Smelling Salts on Power Output in Division III Athletes

PRESENTER(S): Thomas Butt & Connor Adelman

DEPARTMENT: Exercise Science

Abstract: This study was grounded in the increased use of ammonia inhalants (commonly known as smelling salts) among athletes, particularly in strength and power-based sports such as powerlifting and contact sports (Bender & Popkin, 2024). Despite their popularity, there is limited empirical evidence supporting their effectiveness for performance enhancement. Most existing research has focused on maximal strength, with findings indicating no significant improvement (Richmond et al.; Vigil et al., 2018). Other studies that assessed power output have produced inconsistent results, with some reporting significant improvements (Bartolomei et al., 2018; Rogers et al., 2023) and others showing no measurable change (Perry et al., 2016). The purpose of this study was to further examine the efficacy of smelling salts on power output during the back squat, drop jump, and sprint in NCAA Division III athletes. Seventeen Division III athletes (10 men, 7 women) were recruited. Testing occurred over three weeks, with each week devoted to a specific performance test. In randomized order, each subject completed testing with and without smelling salts, with sessions separated by 48 hours. Week one assessed back squat performance at 75% of 1-rep max (heaviest squat they can do), measuring bar speed (m/s). Week two evaluated drop jump performance, recording reactive strength index (how quickly and powerfully they can jump upon landing). Week three measured 30-m sprint performance, with times recorded at 10 m and 30 m. Data collection was not complete at the time of abstract submission.

SESSION C: 3:00 – 4:00

OAK HALL 203

TITLE: Language, Faith, and Conflict: An Overview of Peacebuilding and Religion in the Basque Country

PRESENTER(S): Emily Krizner

DEPARTMENT: Peacebuilding & Social Justice

Abstract: The Basque region of northern Spain is an excellent example of how linguistic imperialism and cultural suppression can shape religious expression, community identity and peacebuilding practices. For centuries, the Basque language, culture and religion were persecuted and suppressed by government policies, most notably under the dictatorship of Francisco Franco. The restrictions imposed by the Franco significantly hindered linguistic and cultural expression for decades. Given the role that native languages and cultural backgrounds play in religion and community identity, the prohibition of the Basque language greatly impacted religious practices. This project combines knowledge and experience from a study abroad session in the Basque country with literature from a plethora of interdisciplinary fields. It will provide an overview of the history of religion in the Basque Country, delving into the transition from Basque paganism to a predominantly Catholic society. It will also discuss how longstanding cultural and linguistic suppression, coupled with violent conflict, can affect theological perspectives and practices. Furthermore, this presentation analyzes the role of linguistic, cultural and theological identity in promoting peace and how the revitalization of the Basque language in recent years has influenced peace practices in the region. This presentation takes a widely interdisciplinary approach to cultural conflict and explores the importance of linguistic identity on religious traditions and peacebuilding.

TITLE: Living the Mission: How Mount Union's Founding Story Continues to Light the Way

PRESENTER(S): Emily Denney & Julia Zamarelli

DEPARTMENT: Interdisciplinary Humanities

Abstract: In 1846, six students met with the university's founder, Orville Nelson Hartshorn, in a third-floor room of a carding mill for their first day of class in his "Select School". Since then, the University of Mount Union has continued to redefine higher education. The institution's early identity was shaped by Hartshorn's belief that education should be accessible to a diverse population. From the beginning, Mount Union emphasized affordability, coeducation, and an educational model that balanced professional preparation with a broader liberal education. Over nearly two centuries, however, institutional change has made it increasingly difficult for the campus community to maintain a shared understanding of the university's original vision. Revisiting Mount Union's historical foundation helps clarify how its identity developed and how Hartshorn's vision continues to shape the university today. As student researchers under a faculty-directed grant project, we examined the published histories of the University of Mount Union to identify themes related to mission and institutional identity. Drawing on these sources, we developed a presentation outlining Mount Union's original mission. Within, we examine how these founding principles shaped the university's growth and how it may continue to do so. This project contributes to a larger NetVUE-funded initiative aimed at reclaiming Mount Union's institutional identity through a living archive hosted on the Mount Union Library website. This archive will include interviews, documents, and historical analysis from students, faculty, alumni, and local community members, providing a resource that connects Mount Union's past with its present and future mission.

TITLE: Transparent: Psychology of glass children

PRESENTER(S): Tori Demeyer

DEPARTMENT: Psychology

Abstract: Have you ever felt invisible? The siblings of children with special needs often feel like their needs are less important than those of everyone else, rendering them transparent. These "glass children" are often overlooked both in everyday life and in research, with their siblings' needs being prioritized. Past research has demonstrated that there are copious negative mental health outcomes to being overlooked in this way. This analytical project compiled and summarized data about the siblings of children with special needs to better understand their situations as a whole and find possible psychological interventions and prevention methods. Future implications of this analysis include targeted therapeutic interventions in adulthood and education for parents about the importance of a more even attention split. Limitations of this analysis include a shortage of research on "glass children's" adult lives, how they are uniquely impacted by bullying, and specific dynamics between siblings.

OAK HALL 206

TITLE: Adapting Asian American History into Social Studies Curriculum

PRESENTER(S): Abby Reagan

DEPARTMENT: Primary Education

Abstract: This project examines the importance of incorporating Asian American and Pacific Islander (AAPI) history into PK–12 curricula across the United States. Through a review of existing curriculum standards, scholarly research, and classroom resources, I analyzed how often AAPI contributions are included and identified gaps in representation. I found that AAPI history is frequently limited or excluded, which prevents students from fully understanding global history and the diverse experiences that shaped the United States. I also explored examples of meaningful integration, such as including AAPI voices in lessons on immigration, civil rights, and cultural exchange. This work is important because inclusive curricula help students develop a more accurate understanding of history and foster respect for diverse perspectives. Highlighting AAPI contributions ensures all students see themselves represented and prepares learners to participate in an increasingly interconnected world.

TITLE: Effects of Low Intensity Acute Exercise on Working Memory

PRESENTER(S): Evan Wengerter, Mathias Broyles, Michael Lally, Sarah Thomas, & Nick Kobylinski

DEPARTMENT: Psychology

Abstract: In this study we will investigate the effect of low intensity physical activity on working memory. We will recruit 40 participants (20 females and 20 males) from the University of Mount Union to complete an in-person lab experiment. Students will be aged 18-24 and may be athletes or non-athletes. The study will use a between subject experimental design with 40 participants who are assigned to either a low intensity exercise group or a seated control group. Participants will complete the Rey Auditory Verbal Learning Test before and after a 20 min intervention consisting of either low intensity treadmill walking (30-39% HRR) or a seated online chess game. We predict that there will be differences in working memory performance between participants who engage in low intensity exercise and those in the control condition. Specifically, participants in the low intensity exercise group are expected to demonstrate improved posttest performance on the Rey Auditory Verbal Learning Test compared to the control group suggesting that acute low intensity exercise may have a positive influence on working memory. If the findings confirm our hypotheses, we can conclude that working memory can be impacted through engaging in a low intensity physical activity intervention.

TITLE: Baja Off-Road Racing Vehicle Front Suspension Redesign

PRESENTER(S): Michael Schiciano, Carson Burns, Luka Dedic, & Steven Wright

DEPARTMENT: Mechanical Engineering

Abstract: The Raider Racing Club has existed at the University of Mount Union since 2014. The club participates in the Baja Student Design Competition, an event run by SAE International, where the club builds or improves upon a previous car each year. The goal is for undergraduate and graduate engineering students to develop their engineering design skills through the design, testing, and manufacturing of an all-terrain vehicle. All vehicles must be powered by the same unmodified engine, and a strict set of design requirements must be followed to ensure the safety and equality of all vehicles. The vehicles compete in a variety of static and dynamic competitions, including rock crawling, acceleration, handling, and endurance racing. The goal of the Baja Suspension Capstone team is to design a new suspension system for the current Mount Union Baja car, enabling it to compete in endurance and dynamic events alongside the top teams in Baja SAE. The project involved designing the new suspension system with the use of 3D modeling software; fabricating the new suspension system using shop equipment; and analyzing the performance of the suspension system using FEA (Finite Element Analysis) to verify the strength of the components versus various impact conditions, turning radius, and suspension range of motion. Testing was conducted by performing a turning radius test and a suspension travel test to verify the turning radius, travel distance, and toe angle change characteristics.

T & H 201

TITLE: Structural Weld Integrity Test

PRESENTER(S): Jacob Jarrett, Connor Capel, Braedon Kennedy, and Aidan Green

DEPARTMENT: Mechanical Engineering

Abstract: Guided bend testing is a hands-on technique used to test the strength and quality of welded metals. This technique involves bending a small sample of welded metal, known as a coupon, until cracks form, allowing the user to determine the safety and integrity of a weld. Before this project, the University of Mount Union did not have the equipment to conduct this test, slowing students' learning and the assessment of weld quality. A guided bend tester was designed and constructed by our team using the engineering design process. We researched existing machines, developed design requirements, conceptualized and compared various designs, and selected a final design compatible with an existing hydraulic press. The machine uses rollers and a bending tool to apply force to the welded samples while maintaining proper alignment. The design follows industry standards from the American Welding Society and the American Society of Mechanical Engineers to ensure accurate and repeatable test results. Prototyping and computer simulation were employed to test the design for strength, safety, and functionality. Further testing for coupon alignment and time of test is upcoming. The projected cost of the system is significantly lower than commercial alternatives priced between $2,000 and $15,000. The machine enhances learning and provides an affordable means for reliable weld testing.

TITLE: ClarifAI: Reimagining Artificial Intelligence in Higher Education

PRESENTER(S): Emily Owens

DEPARTMENT: Artificial Intelligence

Abstract: Artificial intelligence (AI) is everywhere in education. Yet, most existing tools emphasize rapid answer delivery over true learning. This focus creates two significant challenges: first, it often enables students to bypass reasoning and reflection, contributing to academic dishonesty and shallow student engagement; second, it often produces generic, context-blind answers that are misaligned with course content. We introduce ClarifAI, an AI-mediated learning environment designed to address these challenges. ClarifAI takes a different approach. Through student-led interactions, ClarifAI emphasizes course-relevant guidance, demands active engagement, and cultivates critical reasoning. Uploading course specific materials also grounds ClarifAI's responses in an instructional context, helping ensure that its guidance remains aligned with course objectives and scope. Additionally, voice-enabled interactions and preliminary accessibility features ensure that ClarifAI supports diverse learning styles and needs, making engagement inclusive and flexible. ClarifAI illustrates a prototype for responsible AI integration in education, emphasizing learning over production. By aligning its feedback with course-specific content and requiring student engagement, ClarifAI mitigates risks of academic dishonesty while supporting self-directed learning. Early prototype testing demonstrates its potential to encourage problem-solving, offering a concrete example of AI that amplifies cognitive engagement and preserves learner agency. As AI becomes inseparable from the future of education, ClarifAI highlights that the central challenge is not whether AI should be used, but how it can be deliberately designed to strengthen the learning process. This session will conclude with a short showcase of ClarifAI's current prototype capabilities.

TITLE: Characterizing Catalysts: Computational Insights into Metal Hydrides Through Badger's Rule

PRESENTER(S): Landon Shaffer

DEPARTMENT: Chemistry

Abstract: Metal hydrides are critical catalysts enabling highly selective chemical transformations in the synthesis of pharmaceuticals, agrochemicals, and other complex materials. As target molecules grow more complex, catalyst performance must improve, which depends fundamentally on the metal-hydrogen bond. Badger's rule, established in 1934, provides a robust tool as it correlates a diatomic molecule's equilibrium bond length with its stretching frequency, which is readily measured experimentally while bond length is not. Extended to polyatomic systems such as metal hydrides, this rule bridges simple, experimental measurements to deeper structural insight. Modern computational chemistry, specifically Density Functional Theory (DFT), was used in this study to predict bond energies and stretching frequencies for two classes of metal hydrides. The molecular features influencing each complex's adherence to Badger's Rule were systematically analyzed via Python. Preliminary results indicate that ligand configuration — specifically whether a rigid pincer structure is formed — significantly influences metal-hydrogen bond properties and adherence to Badger's Rule. Such findings reveal how the molecular environment surrounding the metal controls these properties, which can guide the rational design of future catalysts.

T & H 230

TITLE: Hidden in Plain Sound: Using Phase to Encode and Decode Audio and Visual Signals

PRESENTER(S): Connor Good

DEPARTMENT: Physics

Abstract: For any wave-based signal – light, sound, and even waves in water – there are three main components of the wave. The amplitude, which describes the overall "intensity" of the wave, the frequency, which describes how fast those waves occur one after the other, and phase, which describes the initial "offset" of the wave. Phase is often treated as a secondary feature of these signals, yet it can preserve and conceal far more structural information than expected. This project investigates whether phase can serve as an effective channel for encoding, decoding, and manipulating both audio and visual signals while maintaining the recognizable identity of the original source. Using Fourier-based representations, images and audio waveforms are decomposed into magnitude and phase components, allowing hidden information to be embedded through phase modifications. Reconstruction quality is then evaluated to determine how much secondary information can be introduced before the host signal visibly or audibly degrades. By comparing the effects of phase and amplitude quantization and perturbation, this work explores which component contributes more strongly to perceptual structure and recoverability. The project also examines how these effects differ between one-dimensional audio signals and two-dimensional images, highlighting how signal dimensionality changes the role of phase in preserving meaningful content. The goal of this work is to better understand phase not only as a mathematical property of Fourier transforms, but as a potential medium for layered signal encoding.

TITLE: Effects of Childhood Trauma on Adult Relationships, Mental Health Outcomes, and Financial Decisions

PRESENTER(S): Rachael Frank, T.J. Leyman, & Jessica Leyman

DEPARTMENT: Psychology

Abstract: Childhood trauma is significant public health concern, research shows adverse childhood experiences are linked to higher rates of anxiety, depression, relationship difficulties, and long-term financial instability in adulthood. Individuals with four or more adverse childhood experiences are at greater risk for mental health disorders and poorer life outcomes. The study investigated how childhood trauma relates to adult relationships, mental health outcomes, and financial stability. We recruited undergraduate and graduate students from the University of Mount Union aged 18 or older to complete an anonymous online survey. Participants were recruited through QR codes on campus, an Introduction to Psychology class, and word of mouth. Participants included males, females, and individuals of other gender identities. The survey included standardized measures of adverse childhood experiences, social support, financial well-being, and anxiety and depression. Participants completed measures through SurveyMonkey, an online survey platform. We expect higher levels of childhood trauma will be associated with lower financial stability and greater symptoms of anxiety and depression. The survey also examined the quality of participants romantic and peer relationships, the cumulative number and types of adverse childhood experiences reported, and how higher levels of childhood adversity were associated with greater mental health symptoms and lower perceived financial stability. Overall, the study aims to better understand how early childhood experiences shape multiple areas of adult functioning.

SCHOLAR Day Poster Presentations

1:30 – 2:45

Peterson Fieldhouse

UNDERGRADUATE PRESENTATIONS

TITLE: Performing Homemade Instruments

PRESENTER(S): Thomas Terziu, Janaan Alihassan, Connie Boller, Kaitlyn Bondoni, Lindsey Bregar, Carson Burns, Jeriah Davis, Luka Dedic, Austin Gantz, Blake Howard, Alexa Kadilak, Braedon Kennedy, Emma Labbe, Tanner Lebo, Elizabeth McCune, Becca Moorhead, Kylie Nolan, Elena Pesut, Madeline Ross, Nick Schrickel, Kailyn Schwall, Josie Smith, & Steven Wright

DEPARTMENT: Physics

Abstract: The course Science, Sound and Music examines the science of sound, music and acoustics, exploring ideas including how sound is produced and perceived, the creation and interpretation of music, the influence of room design on its acoustics and how musical instruments work. Throughout the semester, students explore these concepts from a scientific and aesthetic perspective integrating their own personal experiences with ideas from several disciplines including physics, music, and psychology. The final project for the course brings it all together, with each student designing, building and performing a musical instrument. This public performance will be the first and last time for this ensemble and these instruments. The performance will occur at 2:15 PM during the poster session in Peterson Field House. Feel free to ask the students about their instruments following the performance.

TITLE: The effects of backwards walking at different inclines on general knee health

PRESENTER(S): Evan Wengerter, Logan Shields, & Cooper Blaire

DEPARTMENT: Exercise Science

Abstract: Chronic knee pain affects millions of adults and is a leading cause of mobility limitations and knee replacement surgery. This study examined whether walking backward on a treadmill at three different inclines could improve knee health. Fourteen adults with chronic knee pain completed a four-week program of backward walking three times per week at either 0%, 7.5%, or 15% incline. Researchers measured pain using a visual analog scale (a 10-centimeter line representing pain intensity), knee range of motion (how far the knee can bend), knee extension velocity (how fast the knee can straighten), and acute and chronic knee circumference as an indicator of inflammation. We hypothesized that backward walking, specifically at higher inclines, would reduce pain and improve knee function. Findings suggest that incline-based backward walking may be a simple, low-cost rehabilitation strategy to improve strength, mobility, and comfort in adults with chronic knee discomfort, extending beyond previously studied clinical populations.

TITLE: Utilizing Elementary Machine Learning Algorithms to Predict Precipitation

PRESENTER(S): Braxton Riddick

DEPARTMENT: Computer Science

Abstract: In this project, I designed and utilized a machine learning algorithm, which is a fancy term for a computer algorithm that's capable of dynamically processing data, to predict precipitation 24 hours in advance. I began this project with the hopes that my research would spearhead efforts to provide the public with more accurate weather assessments. That end, I believe, was achieved, as the algorithm that I created had achieved an 80% accuracy. It did so after a rigorous process of analyzing data, combining columns of data in the hopes of providing more refined accuracy, picking columns of data to use in the fitting process, and tuning the constraints of the model (also known as hyperparameters).

TITLE: Impact that Cognitive Behavioral Therapy Has on Suicidal Ideation in Adolescents

PRESENTER(S): Lauren Martin, Hannah Byerly, & Lauren Haynie

DEPARTMENT: Nursing

Abstract: The Impact that Cognitive Behavioral Therapy has on suicidal ideation in adolescents" is a critical area of mental health research, as up to 24% of youth ages 12–17 report experiencing suicidal thoughts. Cognitive Behavioral Therapy (CBT) is an evidence-based intervention designed to reduce depressive symptoms by strengthening coping strategies and emotional regulation skills. This literature review synthesized current research to determine CBT's effectiveness in decreasing suicidal ideation among adolescents. Database searches of PubMed, PsycINFO, and CINAHL yielded 157 articles, with 13 meeting inclusion criteria after critical appraisal. Findings consistently demonstrated statistically significant reductions in suicidal ideation, self-harm behaviors, and depressive symptoms, along with improvements in quality of life and social functioning. Limitations included small sample sizes and attrition warranting further evaluation. Overall, evidence supports integrating CBT into clinical practice while emphasizing the need for larger, more generalizable studies.

TITLE: Child/Adolescent Neurodiversity: An ADHD Review

PRESENTER(S): Emma Packard

DEPARTMENT: Psychology

Abstract: In today's world, neurodiversity is becoming increasingly prevalent in many different settings. Adults and even children are becoming more aware of and educated about mental health and getting help when they need it. One common and often sensationalized disorder children struggle with is ADHD. Attention Deficient/Hyperactivity Disorder is often misunderstood or misrepresented in today's media and can significantly disrupt children's lives. The stigma surrounding mental health can also cause people with ADHD to be under diagnosed and regularly mistreated. Through analysis of academic journals and a child psychopathology textbook, my research synthesized the current information on ADHD and shows ways to help children get the diagnosis and treatment they need. This presentation aims to discuss the history and recent literature on ADHD, its diagnosis process and journey, how it may impact children and adolescents in their school and social lives, and what modern treatment might look like for such individuals. The implications of this research point towards a need for greater awareness and education about children with ADHD for parents and educators, perhaps through the social movement of neurodiversity, to create a healthier, more informed, and open-minded world.

TITLE: Investigating Poly(lactic-co-glycolide)-Gelatin Scaffold for Treating Diabetic Foot Ulcers

PRESENTER(S): Jillian Rymer, Amelia Francisco, & Rodolfo Porlles Lopez

DEPARTMENT: Biomedical Engineering

Abstract: Diabetes is the seventh leading cause of death in the United States. Within diabetics, 4–10% develop foot ulcers, which are lesions caused by tissue breakdown and may result in infection. To address this, our proposed solution is a biomaterial dressing consisting of PLGA microspheres that provide mechanical support, while a gelatin scaffold promotes cell migration. First, we will develop a 3D-printed material incorporating PLGA microspheres and gelatin to support cell migration. Next, we will investigate the mechanical properties of the PLGA-gelatin scaffold under physiological conditions. Lastly, we will evaluate the biocompatibility and tissue regeneration potential of the scaffold. The overall goal of this research is to develop a PLGA-gelatin scaffold to help heal diabetic foot ulcers.

TITLE: Effects of Menstrual Cycle Phase and Oral Contraceptive Use on Anaerobic Power During Margaria-Kalamen and Vertical Jump Tests

PRESENTER(S): Rachel Riccillo, Celia Damiani, & Nina Veldt

DEPARTMENT: Exercise Science

Abstract: The menstrual cycle has become an increasingly studied topic due to its potential influence on athletic performance. Estrogen and progesterone fluctuate throughout the cycle which may influence performance. This study is grounded in research suggesting hormonal shifts across the menstrual cycle may affect anaerobic performance by influencing muscle function, metabolism, power and fatigue (Burrows and Peters 2007, Mattu et al. 2020, Rechichi et al 2009, Solli et al 2020). The purpose of this study was to examine the effects of menstrual cycle phase and oral contraceptive use on anaerobic power, assessed through the Margaria–Kalamen and vertical jump tests, with cycle phases verified by ovulation testing and Stardust app tracking. Researchers still lack clear guidance on whether cycle phase or oral contraceptive status changes anaerobic power outcomes used in performance testing and program evaluation. Twenty-four females, aged 18-23 years, taking and not taking oral contraceptives elected to join the study. Each participant was tested a total of four times non-consecutively. Those on oral contraceptives were tested twice during their active pill days and twice during their placebo pill days, while those not on oral contraceptives were tested twice during their follicular phase and twice during their luteal phase. On the days of testing, participants completed the Margaria-Kalamen step test, a Vertical jump test, and Menstrual Symptom Questionnaire. Data collection was not completed at the time of abstract submission.

TITLE: Predicting Outcomes Based off of Running Activities

PRESENTER(S): Abigail Miller

DEPARTMENT: Data Science & Analytics

Abstract: Exercise apps such as Strava record detailed data about workouts, including distance, speed, elevation gain, time, achievements, and “kudos” (likes). This project analyzed 1,090 cycling rides from a single athlete to explore what drives performance and engagement. I used machine-learning models—computer programs that learn patterns from data—to answer three questions. First, a neural network (a brain-inspired model made of interconnected “neurons”) tested whether distance, moving time, and elevation could predict kudos. The model showed limited predictive accuracy, indicating these variables alone were not sufficient to reliably estimate engagement. Second, a decision tree (a step-by-step classification model) predicted whether a ride’s top speed was above or below average with 85.4% accuracy. Finally, I used correlation analysis, a statistical method that measures the strength and direction of relationships between numerical variables, to examine how total distance and total elevation gain relate to achievement count (badges earned).

TITLE: Human Influence on Mammal Distribution at Huston-Brumbaugh Nature Center

PRESENTER(S): Olivia Smith

DEPARTMENT: Environmental Science

Abstract: Camera trapping is a noninvasive method widely used to monitor wildlife populations and assess biodiversity. This study evaluated the influence of human disturbance on mammal distribution by comparing a restricted research reserve with publicly accessible areas at the Huston–Brumbaugh Nature Center (HBNC). Conducted in collaboration with the SNAPSHOT USA program, in which HBNC has participated for six years, this project contributes to a long-term mammal monitoring dataset. Thirteen trail cameras were deployed from late August to early November, with seven placed in the research reserve and six in public-use areas. Images were uploaded to Wildlife Insights for species identification, and data was analyzed using Bray–Curtis non-metric multidimensional scaling (NMDS) to compare community composition between site types and across the 2020 and 2025 datasets. Results indicate clear differences in mammal community composition between public and restricted areas, suggesting that human presence influences species distribution. Predator–prey dynamics also contributed to variation in mammal assemblages across sites. This study demonstrates the value of camera trapping for long-term wildlife monitoring and highlights the role of human disturbance in shaping mammal community structure.

TITLE: Applying the FRESH method to Improve Bioprinting Outcomes

PRESENTER(S): Harrison Rothschild & Davit Zardiashvili

DEPARTMENT: Biomedical Engineering

Abstract: Bioprinting is a promising technique for making patient specific medical solutions, however it is limited to printing small and simple geometries. Often, the bottom layers of the print will collapse before the print can be completed. To address this, a technique known as Freeform Reversible Embedding of Suspended Hydrogels (FRESH) was used to provide stability to prints. The alginate bioink, a polymer derived from algae, hardens its structure when it contacts calcium chloride in a process known as cross-linking. To create the hydrogel, a 4% calcium chloride solution was suspended in a gelatin slurry to create a Bingham plastic in which it will act solid at rest, creating a solid foundation, but when the 3D printing nozzle applies a shear stress to the hydrogel, it acts as a liquid, allowing for the alginate to freely extrude. This method yielded great success, allowing for multilayered complex prints to be fabricated.

TITLE: Influence of Real-Time Apple Watch Metrics on Exercise Performance in Out-of-Season Collegiate Athletes

PRESENTER(S): Abby Calaway & Jordin Kauffman

DEPARTMENT: Exercise Science

Abstract: This study examined whether visibility of Apple Watch metrics influences exercise intensity during high-intensity cycling in out-of-season NCAA Division III collegiate athletes. Athletes (ages 18–22) completed two cycling high-intensity interval training (HIIT) sessions in a randomized, within-subject crossover design, meaning each athlete completed both conditions: one with Apple Watch metrics (heart rate and calories burned) visible and one with the metrics covered. Heart rate, power, revolutions per minute (RPM), and rating of perceived exertion (RPE) on a 6–20 scale measuring perceived effort were recorded. Power and RPM were measured using a cycle ergometer, and heart rate was measured using a Polar chest strap monitor for accuracy. Paired samples t-tests compared performance between the two conditions to determine whether viewing Apple Watch metrics influences motivation and exercise intensity, informing coaches, athletic trainers, and athletes about the role of wearable technology in training.

TITLE: Nostalgias Impact on Hollywood and Legacy Movies

PRESENTER(S): Cooper James Reed, Jakob Rusher, & Dakota Albertoni

DEPARTMENT: Media

Abstract: Using research conducted by the authors, as well as secondary research, this paper will analyze the effects of nostalgia and audience's reaction to it. These sequels, reboots, and remakes continue to make a great amount of money at the box office even with mixed audience reaction. Hollywood wouldn't make these films if they did not believe there to be a want for them, even as these films are seen and then quickly forgotten. How much does this surplus of brand recognition harm the success or even creation of original films? How much do audiences feel personally responsible for the influx of sequels? If these reliances on nostalgia continue, how long before audiences stop turning in all together?

TITLE: PCR Detection of Carbapenem Resistance Genes in the Environment

PRESENTER(S): Kenzlie Stafford

DEPARTMENT: Biology

Abstract: Carbapenem antibiotics are effective against both Gram-positive and Gram-negative bacteria and are used for a wide range of bacterial infections because of their versatility. Carbapenem-resistant Enterobacteriaceae (CRE) gene prevalence has been linked to agricultural environments. The genes selected for this study were bla-KPC, bla-NDM, bla-SME, and bla-SHV, which were commonly identified in published literature. These genes code for independent enzymes that break down beta lactam rings in cell wall inhibiting antibiotics. It was predicted that all four CRE genes would be present within the pooled soil samples from the Huston-Brumbaugh Nature Center Barnyard. Gene presence was analyzed using polymerase chain reaction (PCR), utilizing the 16s rRNA eubacteria gene as a positive control. The DNA was pooled in triplicates and analyzed using end point PCR and gel electrophoresis, followed by quantitative polymerase chain reaction (qPCR) to confirm results. bla-KPC was present in each pooled sample aside from samples 13-15 on gel electrophoresis analysis, however, qPCR showed small traces of the gene in those samples. bla-NDM and bla-SHV were both present in each sample as confirmed by both PCR and qPCR. bla-SME was not present in any of the samples, which was again consistent across PCR and qPCR data, making 75% of the tested samples positive for CRE genes.

TITLE: The Effects of Sprint and Plyometric Training on Division III Distance Runners

PRESENTER(S): Jake Parkhurst & Thurston Shaw

DEPARTMENT: Exercise Science

Abstract: Historically, sprint and plyometric training have been absent from traditional distance running periodization, with previous programing maintaining a focalized interest on long slow distance running. Prior research has found that plyometric and sprint training that compliments distance running significantly improves race performance results, anaerobic capacity, and peak power output in competitive distance runners (Ando et al., 2024, Baumann et al., 2012, and Ramirez et al., 2014). This study aimed to examine the effects of such training on a population neglected in the literature. It was hypothesized that 4 male and 4 female Division III distance runners who underwent a six-week treatment consisting of one sprint and one plyometric training session a week would improve peak relative power, sprint, and 5,000m race performance. At the time of writing this abstract, data collection was not completed. Limitations include the number of eligible participants, the duration of the study, and the treatment frequency.

TITLE: In insured adults aged 45–75 who are due for colorectal cancer screening, does a population-based mailed fecal immunochemical test (FIT) outreach program with reminder follow-ups, compared to usual care, increase colorectal cancer screening completion rates within 24 months?

PRESENTER(S): Sydney Cooper

DEPARTMENT: Nursing

Abstract: Colorectal cancer (CRC) is one of the leading causes of cancer-related death in the United States, yet many eligible adults do not complete recommended screening. National guidelines from the U.S. Preventive Services Task Force and the American Cancer Society recommend routine screening for adults aged 45–75. This evidence-based practice project evaluates whether mailing a fecal immunochemical test (FIT), a simple at-home stool test that detects hidden blood that may indicate colorectal cancer, can increase screening rates. Eligible insured patients overdue for screening will receive an opt-in postcard inviting them to request a mailed FIT kit, followed by reminder phone calls and mailed notices until completion. Screening rates will be tracked through the electronic medical record over 24 months and compared with the clinic's current 60% completion rate. The project aims to increase screening to 80% to meet the national standards. Improving access to convenient screening may promote earlier cancer detection and improve population health outcomes.

TITLE: The Effects of Audible Stimulus on Bench Press Performance

PRESENTER(S): Nathaniel Woerther & Ryan Romito

DEPARTMENT: Exercise Science

Abstract: The purpose of the study is to examine the effects of different audible stimuli on bench press performance, including self-selected music (SSM), motivational podcasts, and no music. Bench press performance will be measured by repetitions completed and concentric velocity (speed of the lifting phase) for each set at 80% of the subject's 1RM (maximum weight lifted once). This study aims to determine whether motivational podcasts provide similar or greater ergogenic effects compared to SSM and no music by examining physiological and psychological responses. SSM has been shown to enhance bench press performance through increased motivation and arousal (Ballmann et al., 2020; Bozzato et al., 2025). By including motivational podcasts, this study explores an understudied area of audible stimuli and their potential role as ergogenic aids (external stimulus that enhances physical and psychological performance) in resistance training. At the time of submission, data collection had not been completed.

TITLE: From Innovation to Access: Lobbying and Inequity in Global Vaccine Distribution

PRESENTER(S): Emily Krizner

DEPARTMENT: Peacebuilding & Social Justice

Abstract: This research explores the influence and importance of lobbying, activism and advocacy in addressing inequities in global vaccine development and distribution. The COVID-19 pandemic exacerbated the need for rapid vaccine and drug development processes, as well as equitable global access to these resources. Lobbying by the pharmaceutical industry is used to secure funds for vaccine research, promote distribution of their patented products and increase revenue. Pharmaceutical companies often see greater profits, while the inaccessibility of their products burdens the public. Furthermore, lobbying by pharmaceutical companies has, in part, led to a 'vaccine apartheid,' where wealthier nations can stockpile vaccines, leading to distributive injustices in smaller, underdeveloped countries. As a result of these inequities, grassroots lobbyists and public health advocates have played an essential part in representing the needs of the general public, influencing lawmakers and promoting equitable access and distribution.

TITLE: Effects of Music Duration During Warm-Up on Anaerobic Performance in a 30-Second Wingate Test

PRESENTER(S): Steven Utter & Dante Collier

DEPARTMENT: Exercise Science

Abstract: This study examined whether the timing of listening to music during a warm-up affects short-term, high-intensity exercise performance. Twenty-two physically active college students completed a 30-second Wingate test, a cycling sprint used to measure anaerobic power (the body's ability to produce energy quickly without oxygen). Participants completed five testing sessions under different music conditions: no music, music 20 minutes before the test, 10 minutes before, 5 minutes before, or during the test itself. During each session, researchers measured peak power, mean power, fatigue, heart rate, and perceived effort. The study compared these conditions to determine whether the timing of music exposure influences anaerobic performance. Understanding how music timing affects performance may help athletes, coaches, and physically active individuals use music more strategically during warm-ups and training.

TITLE: How the New Markets Tax Credit Can Help Address Historic Injustices of Redlining

PRESENTER(S): Brady Lang

DEPARTMENT: Accounting & Finance

Abstract: In the 1930s, the Home Owners Loan Corporation (HOLC) drew maps for over 200 cities to document the riskiness of lending in neighborhoods. Factors used to develop risk profiles included the race, ethnicity, and immigrant status of neighborhoods. Minority communities were assessed as inherently risky, and thus capital was restricted or limited in these areas, leading to economic inequality. The effects of this documentation are today known as the "redlining" of minority communities, locking them out of capital investment that would have allowed them greater economic opportunity comparative to communities inhabited by primarily white nonimmigrants. I compared current New Markets Tax Credit (NMTC) tracts with the neighborhoods deemed to be "undesirable for investment" by the HOLC, and then, via progress reports from both government committees and community institutions, evaluated the effectiveness of the NMTC in attracting investment in areas historically overlooked (due to redlining) by institutional investors.

TITLE: Investigating the Impact of Reaction Time Training on Exit Velocity in Division III Collegiate Softball Players

PRESENTER(S): Kaitlyn Culver & Abbie Gayner

DEPARTMENT: Exercise Science

Abstract: Female collegiate softball athletes are underrepresented in sports science research, and training strategies develop from baseball despite differences in pitching distance, delivery, and hitting demands (Cunningham et al., 2004; Bordelon et al., 2023). Because hitters have approximately 440 milliseconds to recognize and react to a pitch, reaction time (RT) is critical in batting performance (DeCouto, 2019; Nieuwenhuys, 2008). This study examines whether reaction time training improves exit velocity in NCAA Division III softball players. Thirteen Mount Union athletes were randomly assigned to an experimental or control group during a six-week preseason intervention. The experimental group completed reaction time drills twice weekly alongside practice. Exit velocity and RT were assessed at pre- and post-training using a hitting tee with a Rapasodo sensor, pitching machine, and computerized Go/No-Go and Stroop test. Athletes completing RT training are expected to demonstrate faster reaction times and increased exit velocity, supporting the integration of cognitive training into softball hitting development.

TITLE: Enhancing Anticancer Treatments of Curcumin Through Liposome Encapsulation in Triple Negative Breast Cancer

PRESENTER(S): Lukea Pitinii

DEPARTMENT: Biochemistry

Abstract: Cancer rates have exponentially increased in recent years and continue to afflict millions of individuals worldwide. Current treatments often fail to effectively eliminate tumor sites, especially with Triple Negative Breast Cancer (TNBC), propelling further research and studies into improved therapeutic approaches. Curcumin, derived from the spice, turmeric, induces death in TNBC by increasing oxidative stress, damaging mitochondria, and blocking vital survival pathways such as NF-κB and PI3K/Akt pathways. However, curcumin's medicinal efficacy is significantly hampered due to its low water solubility, rapid metabolism, and chemical instability. The objective of this study specifically aimed to determine an ideal encapsulation method for curcumin that could be used on TNBC to induce the greatest amount of apoptosis. Lecithin liposome nanoparticles were selected due to their biocompatibility and ability to increase potency. Curcumin was encapsulated within lecithin liposomes utilizing thin-film hydration techniques and extrusion with 400 nm polycarbonate membranes. MDA-MB-231 cells were treated with curcumin liposomes, incubated, and counted for cell proliferation with a hemocytometer after 24 and 48 hours. Cells treated with 0.02 M and 0.002 M generally showed significantly decreased cell proliferation after 24 and 48 hours. Two different types of liposomes were then created to test for encapsulation optimization, in which Liposome A-type was created by adding curcumin during film preparation and Liposome B-type was created by adding curcumin during rehydration with DMSO. Purification of liposomes was performed to isolate the liposomes from the unencapsulated free curcumin, then used to treated MDA-MB-231 cells for 24 hours. While the pure samples showed no significant difference from the impure samples, pure liposomes did show a significant decrease in cell proliferation, suggesting that the lipids themselves could provide anticancer properties.

TITLE: The Effects of Beta-Alanine on Body Composition and Anaerobic Performance in NCAA Division 3 Wrestlers During a Competitive Season

PRESENTER(S): Riley Kneeland & James Scanlon

DEPARTMENT: Exercise Science

Abstract: Collegiate wrestlers must repeatedly perform high-intensity efforts while maintaining strict weight-class requirements throughout the competitive season. Many athletes regularly practice rapid weight loss to compete in their intended weight class, which can negatively impact strength, power, recovery, and body composition. At the same time, many commonly used performance supplements are restricted under National Collegiate Athletic Association (NCAA) guidelines. Because of these limitations, identifying safe and legal supplements that may support performance is important for this population. β-alanine is a dietary supplement that increases muscle carnosine levels, which helps buffer hydrogen ion buildup during intense exercise and may delay fatigue. This study examined the effects of six weeks of β-alanine supplementation (4.25 g/day) on anaerobic performance and body composition in 20 NCAA Division III wrestlers using a single-blind, placebo-controlled design. Results from Wingate cycling, countermovement jump testing, and body composition assessments will help determine whether β-alanine can support performance during a demanding collegiate wrestling season.

TITLE: The Effects of Vitamin B and Boron on Aerobic Endurance Performance During the Menses Phase of the Menstrual Cycle in Division III Collegiate Athletes.

PRESENTER(S): Alaina Krajewski & Kaylynn Thomas

DEPARTMENT: Exercise Science

Abstract: This study investigates whether vitamin B-complex and boron supplementation can reduce negative menstrual symptoms and improve endurance performance in Division III collegiate athletes. Participants completed baseline assessments including height, weight, menstrual symptom severity, resting heart rate (HR), heart rate variability (HRV), and resting blood lactate. Following a standardized 10-minute warm-up, athletes reported their rate of perceived exertion (RPE) and then performed a 1.5-mile maximal-effort run. Post-run, lactate was collected immediately, HR recovery was recorded each minute for 10 minutes, and a second RPE rating was obtained. Subjects also completed a questionnaire assessing exercise enjoyment. Data collection is ongoing and will evaluate whether supplementation influences exercise performance, physiological stress, and perceived exertion during the menses phase. By testing a natural, nutrient-based approach to symptom management, this research aims to support healthier strategies that enhance performance and well-being in female athletes during an understudied phase of the menstrual cycle.

TITLE: Optimizing Brachial Artery Occlusion for Maximum Hand Grip Strength

PRESENTER(S): Natalie Maiorana

DEPARTMENT: Biology

Abstract: Blood flow restriction (BFR) training is an exercise technique in which blood flow to an extremity is partially restricted during exercise using a cuff or band. Previous studies have shown improvements in handgrip strength utilizing BFR training at nearly 100% complete blood flow occlusion (Fernandes et al., 2020). Research on specific occlusion pressures for BFR training is limited. This study compares different occlusion pressures during BFR training in the brachial artery to determine the optimal percentage of occlusion to improve hand grip strength and blood flow. This study aims to establish BFR training guidelines to benefit healthy and compromised populations. Ten healthy participants, ages 18-22, from the University of Mount Union Women's Volleyball team, were recruited to participate in a four-week training protocol consisting of hand grip exercises performed twice weekly. Participants were randomly assigned to either a near-complete occlusion group (80%) or a partial occlusion group (40-60%). Hand grip strength was assessed using a digital hand dynamometer and brachial artery blood flow was measured via ultrasound. Data collection was ongoing at the time of abstract submission.

TITLE: Simulated Pb-Pb Collisions Classification

PRESENTER(S): Thomas Terziu & Ava Powers

DEPARTMENT: Physics & Data Science

Abstract: The JET-ML dataset is a simulated lead–lead collision dataset created as a benchmark for machine-learning applications in high-energy physics. It is specifically designed for predicting constants that depend on how well relativistic energy is conserved. Using machine learning techniques in Python, we can create a convolutional neural network that can classify these constants based on the 32x32 pixel intensity signature of the collision. This analysis offers a powerful foundation for integrating modern machine learning into experimental physics.

TITLE: Dream Big, Sleep Safe

PRESENTER(S): Lexie Glaser

DEPARTMENT: Public Relations

Abstract: While one baby is able to Dream Big overnight, two are still dying from preventable sleep-related causes. Together, we can prevent these tragedies through education and provide infants with a Sleep Safe environment.

TITLE: Effects of the Submerged Macrophyte Ceratophyllum demersum on Different Phytoplankton Populations in Co-Habitation Environments

PRESENTER(S): Nick Anna

DEPARTMENT: Biology

Abstract: Harmful algal blooms (HABs) are caused by nutrient runoff and pose one of the largest threats to aquatic habitats, leading to dead zones and biodiversity loss. Determining effective mitigation strategies requires understanding how different algal species respond to potential treatments. In this study, three algal species were grown in controlled laboratory conditions and exposed to the submerged plant, Ceratophyllum demersum, which has been shown to inhibit growth in some algal species. Algal abundance was determined using in vivo chlorophyll-a absorbance as a substitute for biomass. Results from the study indicated that the cyanobacteria Microcystis aeruginosa was significantly inhibited by C. demersum ($p < 0.001$), while other algal species were not inhibited significantly. Additionally, C. demersum biomass grew significantly ($p < 0.001$), with an average increase of 0.5g. These results suggest that C. demersum could be a potential mitigation strategy for Microcystis algal blooms but may not effectively limit other species.

GRADUATE STUDENT PRESENTATIONS

TITLE: Progestin-only vs Combined Hormonal Contraceptives: Is There a Better Option in Terms of Breast Cancer Risk?

PRESENTER(S): Taylor Cox

DEPARTMENT: Physician Assistant Studies

Abstract: What if I told you that while reducing your risk of pregnancy, you could also be increasing your risk of breast cancer? Counterintuitive, right? Hormonal contraceptives such as 'the pill' are common among women in the United States. This systematic review of literature aimed to determine whether the use of progestin-only instead of combined (estrogen and progestin) contraceptives would be favorable in terms of breast cancer risk, and whether risk depends on delivery type (oral, injection, or implant). In multiple cohort and case-controlled studies, it was concluded that both progestin-only and combined forms influence breast cancer risk with a slight increased risk for those taking them. The risk was slightly higher with progestin-only pills but for both types, the risk diminished after discontinuation. Protective effects for other cancers (endometrial and ovarian) were also seen with both types. These findings can aid prescribers and women who are considering their options, especially when factors, such as genetics, further elevate cancer risk.

TITLE: Beyond the Final Whistle: Repetitive Head Trauma and Its Relationship to Alzheimer's Disease

PRESENTER(S): Callie Cunningham

DEPARTMENT: Physician Assistant Studies

Abstract: When the stadium lights dim and the crowd goes home, what lingering effects remain within the brains of former football players? The postmortem diagnosis of advanced chronic traumatic encephalopathy (CTE) in former National Football League player Aaron Hernandez intensified public and scientific concern regarding repetitive head impacts. Unlike Alzheimer's disease (AD), CTE cannot currently be diagnosed during life. This systematic review identified high-quality publications in PubMed and related databases that evaluate blood-based biomarkers, including phosphorylated tau, and brain imaging techniques to assess overlap between CTE and Alzheimer pathology. Growing evidence indicates that CTE demonstrates unique inflammatory and tau signatures distinct from AD. A combined biomarker and imaging strategy may ultimately transform diagnosis from postmortem confirmation to clinical reality. Understanding whether shared biologic markers can clarify, distinguish, or guide future treatment strategies remains a critical question. The answers may reshape how clinicians evaluate and protect athletes long before symptoms become irreversible. The urgency to identify answers grows with every season played.

TITLE: Childhood Obesity: Identifying the Key Elements of Effective School-Based Interventions

PRESENTER(S): Jasmine Arnold

DEPARTMENT: Physician Assistant Studies

Abstract: Why do some school-based obesity programs succeed in significantly lowering body mass index (BMI) while others fail to produce a measurable change? The difference may be attributable to various aspects of an intervention such as modality, duration, and parental involvement. With childhood obesity reaching epidemic proportions globally, schools have become important targets for applying obesity prevention efforts. While schools are undoubtedly critical for intervention, resources are limited so identifying features most strongly associated with success is necessary to design sustainable, high-impact protocols. This systematic review seeks to investigate the qualities of school-based programs that lead to greater reductions in BMI. The study analyzed the results of several systematic reviews and meta-analyses aimed at assessing obesity prevention interventions in school-aged children. Results suggest that future school-based interventions should prioritize physical activity as a foundational element, while ensuring that multi-component programs integrate dietary support to maximize efficacy and prevent obesity-related complications.

TITLE: Rethinking the Treatment of Alcohol Use Disorder: The Emerging Role of Psilocybin-assisted Therapy

PRESENTER(S): Ezekiel Vanarsdalen

DEPARTMENT: Physician Assistant Studies

Abstract: Alcohol use disorder (AUD) can be described as the inability to stop or control alcohol consumption despite significant negative social, occupational, or health consequences. The National Institute on Alcohol Abuse reports that AUD affects 29.5-30 million people annually in the United States. Conventional behavior therapies are offered for those who need help, but statistics show that roughly 50-80% of the individuals relapse within the first year. These daunting statistics have paved the way for new research on the use of psilocybin (the compound found in “magic mushrooms”) in conjunction with psychotherapy for the treatment of AUD. Studies suggest psilocybin can promote neuroplasticity, the brain's way to build/develop new neuronal networks. This systematic review of literature compiles the findings of published studies on the efficacy of psilocybin psychotherapy for AUD. Findings include reduced relapse rates, decreased heavy drinking, and the promotion of abstinence. Though this is a new area of research, psilocybin holds promise for the many millions struggling with addiction.

TITLE: Osteomyoplastic Amputation Versus Conventional Transtibial Amputation: Effects on Residual Limb Pain and Functional Prosthetic Use

PRESENTER(S): Corder Houk

DEPARTMENT: Physician Assistant Studies

Abstract: Lower-limb amputation often results in chronic residual limb pain and difficulty with prosthetic use, greatly limiting patient quality of life. The osteomyoplastic (Ertl) procedure is a technique that creates a distal tibiofibular bone bridge, intended to improve limb stability and pain management compared with the conventional transtibial amputation. This systematic review of literature evaluates the Ertl procedure and whether it demonstrates improved patient outcomes. Studies reviewed were comparative cohort reports, multicenter analyses, and biomechanical investigations, with outcomes including pain scores, prosthetic tolerance, and functional ambulation. Notably, evidence suggests the Ertl procedure may enhance limb stability and loading capacity, with potential reductions in pain, yet requires longer operation times and a lengthier process for patient selection. This study is directly relevant to lower-limb amputees following combat service, motor vehicle collisions, and other trauma. Overall, these findings illustrate the need to clarify functional and analgesic benefits of the osteomyoplastic amputation, to potentially guide surgical decision-making and optimize long-term outcomes for amputees.

TITLE: Rethinking Cartilage Injuries in Athletes: The Potential of Stem Cell Regeneration

PRESENTER(S): Allison Spears

DEPARTMENT: Physician Assistant Studies

Abstract: In a split second, an awkward landing or sudden pivot can sideline an athlete for months or even end a career. For competitive athletes, knee cartilage injuries not only threaten performance but also the opportunity to return to the sport they love. Unlike most tissues, cartilage has very limited capacity for self-repair, making these injuries particularly difficult to treat. Traditional cartilage repair techniques can relieve symptoms but often fail to restore durable cartilage capable of supporting high-level athletic performance. This systematic review of literature investigates whether early use of mesenchymal stem cell-based cartilage transplantation improves cartilage regeneration and return-to-sport outcomes in athletes with large, full-thickness cartilage defects of the knee. Results of published systematic reviews, clinical outcome studies, and randomized trials were reviewed and synthesized to evaluate cartilage repair quality and functional outcomes. Research suggests advancing regenerative cartilage therapies may help athletes recover more fully while reducing long-term joint degeneration.

TITLE: Should Lower Suspicion Mean Delayed Diagnosis? Improving Timely Diagnosis of Breast Cancer in Women Under the Age of 40

PRESENTER(S): Hayley Koon

DEPARTMENT: Physician Assistant Studies

Abstract: "You're too young to have breast cancer" might be meant as a comfort to young women seeing a healthcare provider for a concerning breast lump. However, for women under the age of 40, this assumption on the part of the clinician and/or on the part of the patient may contribute to a delay in the eventual diagnosis of breast cancer. Although less common in this age group, breast cancer in younger women is often more aggressive and not detected until later stages of disease, meaning worse outcomes. This systematic review examines whether a diagnostic delay exists in women younger than 40 and seeks to identify the social, economic, and clinical factors that contribute to any potential delay. Medical literature databases were searched using the terms: diagnostic delay, young women, breast cancer. Results were compiled with the goal of determining ways to remedy this situation to ensure timely evaluations and appropriate diagnostic approaches for women within this population.

TITLE: Total Disc Replacement Compared With Lumbar Fusion for Single-Level Lumbar Degenerative Disc Disease

PRESENTER(S): Elisa Nigro

DEPARTMENT: Physician Assistant Studies

Abstract: Lumbar degenerative disc disease is when cushioning pads between the bones in the lower spine wear out and break down. This can cause significant back pain and dysfunction. When conservative therapies like physical therapy, medications, and spinal injections fail, surgical intervention is considered. Lumbar fusion has traditionally been the standard surgical approach. However, by eliminating motion at the affected levels, biomechanics may be altered and future degeneration may be accelerated, creating a particular challenge for younger individuals. Total disc replacement (TDR) was developed as a motion-preserving alternative, yet its long-term effectiveness remains debated. This systematic review examined whether TDR improves long- term functional outcomes and reduces reoperation rates compared to lumbar fusion in adults aged 18 to 45 with single-level symptomatic disease. Published randomized controlled trials and meta-analyses were collected and reviewed with a focus on pain, disability, satisfaction, and complications. Evidence suggests TDR provides comparable or improved outcomes with lower reoperation rates, giving hope for long-lasting quality of life improvements.

TITLE: The Period of PURPLE Crying: A Prevention Strategy for Abusive Head Trauma

PRESENTER(S): Danielle Bisesi

DEPARTMENT: Physician Assistant Studies

Abstract: Abusive head trauma (AHT) is a leading cause of morbidity and mortality in infants younger than 1 year of age. Inconsolable crying is a common trigger of caregiver frustration and a major precipitating factor of AHT. Limited knowledge of normal infant crying patterns and ineffective coping strategies may increase the risk of harmful responses, highlighting the need for early caregiver education. The Period of PURPLE Crying is a prevention program designed to improve caregiver understanding of infant crying with the goal of reducing the incidence of AHT. A systematic review of literature identified randomized controlled trials and observational studies conducted to evaluate its effectiveness. These studies consistently demonstrated improved caregiver knowledge, increased likelihood of walking away during inconsolable crying, and greater sharing of coping strategies. Implementation was also associated with decreased nurse advice line calls related to crying, although reductions in AHT rates remain unclear. These findings support the implementation of the PURPLE program to improve infant safety and reduce preventable injury.

TITLE: Reaching for Relief: Comparing Outcomes for Corticosteroid Versus Platelet-Rich Plasma Injections in the Treatment of Rotator Cuff Tendinopathy

PRESENTER(S): Taylor Hays

DEPARTMENT: Physician Assistant Studies

Abstract: For many individuals with rotator cuff injuries (RCIs), simple acts such as brushing hair or reaching into cabinets can cause debilitating shoulder pain. This pain from tiny tears and/or inflammation, called tendinopathy, can significantly interfere with everyday activities and diminish quality of life. Despite trying physical therapy, rest, and ibuprofen, many patients struggle with persistent pain and limited shoulder function. Injections are a common option before advancing to invasive surgical interventions. While corticosteroid injections previously served as the standard of care, platelet-rich plasma (PRP) injections have recently emerged as another potential option. PRP uses a concentration of your own blood proteins to repair damaged tissue. Which injection therapy is superior in managing pain and restoring function for those with RCIs? A systematic review of literature was conducted revealing that PRP injections statistically outperform corticosteroid injections in long-term recovery and pain management in RCIs. These results offer an exciting, vital alternative for patients who have failed traditional management of chronic shoulder tendinopathy.

TITLE: Efficacy of Supplemental Screening Modalities for Malignancy Detection in Patients with Heterogeneously or Extremely Dense Breast Tissue

PRESENTER(S): Katelyn Hanchin

DEPARTMENT: Physician Assistant Studies

Abstract: For the millions of women living with dense, fibroglandular breast tissue (a determination made by a radiologist when evaluating mammogram findings), a 'clear/normal' mammogram may provide a false sense of security, as traditional 2D mammography can miss potentially life-threatening malignancies. This is significant, given that women with dense breasts face a 3.89-fold increased risk of developing breast cancer when compared to those without dense breast tissue. A systematic review analyzed existing medical literature found in PubMed, MEDLINE, and Embase databases to explore cancer detection rates and patient acceptance of supplemental screening modalities, including digital breast tomosynthesis, ultrasound, and MRI. Findings indicate that breast MRI is the most sensitive supplemental screening tool, detecting an additional 1.52 cancers per 1,000 screenings missed by traditional 2D mammography alone. Despite this, health experts do not agree on how best to screen women with dense breasts. This research suggests it is time to revisit protocols to ensure unique needs are met with adequate detection plans.