



SCHOLAR Day Posters Program Information 2021

Poster 1

Colin Schaly	Civil Engineering	Dr. Xi Wang
Tucker Cope	Civil Engineering	
Connor Johnson	Civil Engineering	
Eric Ostrowski	Civil Engineering	
Ryan Schwarzwald	Civil Engineering	

"Sustainable Erosion Control System"

For this Project Capstone Team A, was asked by the Huston-Brumbaugh Nature Center (HBNC) to design a sustainable erosion control system for the farm field adjacent to their parking lot. The HBNC has recently renovated its main parking lot with pavement which contributes a significant amount of runoff to the field during moderate to heavy rain events. This additional runoff has caused significant soil erosion and sedimentation in the farm field in and in the downstream tributary. The runoff has also proven to be overwhelming for the existing drainage system which constitutes the need for this project. The task of our team is to develop and design an erosion control system that will combat the effects of erosion, but also create wetland habitats. The final design that our team developed uses a series of three dams to control the erosion and create the wetland habitats that the HNBC desires.

Poster 2

Emily Becker	Environmental Science	Dr. Chris Stanton
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"Survey of Emerging Beech Leaf Disease at the Huston-Brumbaugh Nature Center "

This survey aimed to identify the potential presence of the emerging tree disease known as Beech Leaf Disease (BLD) within the properties of the Huston-Brumbaugh Nature Center in Stark and Columbiana counties, Ohio. Beech trees on the main property, North Woods, and Research Reserve of the nature center were examined on foot and noted for the leaf banding, canopy loss, and eventual death caused by the disease. Results were reported in the Tree Health Survey app maintained by the USDA and the Cleveland Metroparks. This survey revealed that beech leaf disease has spread further than previously thought within the nature center's main property and trees showing early signs of the disease were found in both the North Woods and the Research Reserve. The diseased trees in the Research Reserve were the first documented case of beech leaf disease in Columbiana county and was confirmed by the Ohio Division of Forestry.

Poster 3

Teresa Woerther Graphic Design and Marketing Prof. Lisa Parnell

"As Time Passed: A four-part zine collection"

There are many questions and worries that art students face when they begin to approach life after school. It's difficult to find an artistic voice, and with that a career that can reflect artistic passion. These concerns and realizations are what were used as inspiration for the collection, As Time Passed.

As Time Passed is a 4-part collection of zines – or short, self-published magazines – telling various life stories. All the stories in this collection take place while attending the University of Mount Union, and deal with some lessons and struggles that were faced on the journey of becoming a professional designer.

Poster 4

Lauren Stewart Nursing Prof. Karen Towne

"The effects of delayed cord clamping in premature infants: A review of the literature for evidence-based practice"

The placenta provides oxygen and nutrients to the neonate through umbilical cord blood; when cut, placental transfusion ends. The earlier the cord is clamped, the less transfusion the infant receives. This literature review for evidence-based practice aimed to answer the PICOT question: In premature infants, does delayed cord clamping (>30 sec) compared to early cord clamping improve prognosis? A brief literature review demonstrated a full placental transfusion can be obtained by delayed cord clamping (DCC), returning up to 30% of a newborn's blood volume and 50% of their red blood cell volume. Further, DCC increased hematocrit levels, lowered the need for a blood transfusion, and decreased mortality, all which provide more benefit than harm to the infant. The implications of this evidence-based intervention to nursing and midwifery are discussed.

Poster 5

Carson Davis Civil Engineering Dr. Xi Wang

Evan Eifert Civil Engineering

Cody Fitzwater Civil Engineering

Claudia Harris Civil Engineering

Ryan Westrick Civil Engineering

Corey White Civil Engineering

"Timber Bridge Design for the Huston-Brumbaugh Nature Center"

The Huston-Brumbaugh Nature Center (HBNC) is home to many pedestrian trails. The HBNC staff has requested the design and construction of two bridges to replace two existing bridges within the south-western area of the HBNC, improving on both the stability and safety of the existing bridges. There is a sharp turn from one of the bridges to the trail which limits the HBNC's 4-foot utility vehicle's maneuverability in the area. Based on these problems, design requirements were created as goals for design.

The replacement bridges were designed through the engineering design process. Different types of timber bridges were researched. Three concepts of bridge placements and components were analyzed based on the client's needs and budget. A final concept was decided upon and calculations and software analysis were used to confirm both bridges would support designated loads safely. Both bridges will be constructed and tested with design requirements.

Poster 6

Cody DeBos

Nursing

Prof. Karen Towne and Dr. Timothy Meyers

"Using virtual reality (VR) to reduce perceived pain during venipuncture in children: A review of the literature for evidence-based practice"

In children, pain associated with venipuncture can be traumatic and lead to secondary problems like fear, anxiety, and decreased compliance with future procedures, making venipuncture-associated pain management a priority intervention. A brief literature review was conducted to determine if virtual reality (VR) should be recommended as a non-pharmacological evidence-based practice intervention to control pain surrounding venipuncture procedures involving pediatric patients. Recent studies show that the use of VR as a tool for distraction may be an effective way to reduce pain during venipuncture procedures. As a low-risk intervention with fewer side effects than standard pharmacological measures, the use of VR shows promise as an alternative method of controlling pain during venipuncture. Moreover, the decreasing cost of VR hardware makes this intervention a realistic choice for most healthcare facilities. These findings offer external evidence to support nurses' use of a novel holistic care tool for pediatric patients.

Poster 7

Ronald Kaminski

Electrical Engineering

Dr. Adrian Jaesim

"A Directive Radiation Pattern for Non-Uniform Antenna Arrays"

Antenna Arrays can be constructed using different number of antenna elements in order to generate electromagnetic radiation patterns that cover the entire spatial domain. The patterns here depend on the number and type of antennas, along with their amplitude and spacing settings. Conventional designs adopt high scale of antennas to achieve a highly-directive patterns of adequate gains that magnify the signal levels. However, the increased number in antenna element yields in high power consumption, phase adjustments and synchronization. Hence this project aims to propose novel radiation patterns that achieve highly-directive signals at reduced number of antennas by settings various spacing and

amplitudes. As a result, the carried design here features low power consumption and reduced size. Overall, the proposed work here presents a promising solution for the radio front heads in 5G cellular devices.

Poster 8

Bailey Balderson	Public Relations	Dr. Adelina Cooper
Emily Cooney	Public Relations	
Brenna Walker	Public Relations	
Jordan Hiatt	Public Relations	
Maria Ciao	Public Relations	
Grayson Abner	Public Relations	

"RSM for U-M-YOU"

Raider Student Media (RSM) is a student organization at the University of Mount Union that encompasses The Dynamo, Studio M and WRMU. As RSM is not well known, the goal of this public relations campaign was to increase awareness of RSM and everything that it encompasses, inform students that it is open to all majors and how to join and to increase engagement through all social media outlets. This campaign uses primary and secondary research on RSM and its peer organizations. Analysis included social media audits, an audience analysis, a situational analysis, a focus group, and student survey. Calendars were created for the specific outlets of the campaign while implementing impact and output objectives throughout this work. Members of this team attended RSM meetings and collaborated with RSM members to have a deeper understanding of RSM and further proceeded with a successful campaign.

Poster 9

Maxwell Williams	Physician Assistant Studies	Prof. Vanessa Worley
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"Interventions to Combat Obesity in School-Aged Children of Low Socioeconomic Status"

Nearly everyone is now aware of the ever-growing epidemic of obesity in America, and how it has insidiously translated over to children. The long-term health consequences of obesity including increased risk of type 2 diabetes mellitus, heart disease, and stroke cannot be ignored. People are also becoming increasingly aware of our nation's tragic health inequity which relates to the social determinants of health. Healthy foods and safe areas to exercise do not exist everywhere. Dozens of healthier food acts have been passed and many initiatives to fight obesity exist, but which actually work to lower obesity rates? Are there effective strategies that can be implemented in schools and communities, especially in areas with lower socioeconomic standing? This systematic review of literature aimed at answering these questions will shed light on the evidence-based, successful

interventions. Next steps in research to improve community health and combat obesity will be recommended as well.

Poster 10

Kesley Putman

Physician Assistant Studies

Prof. Vanessa Worley

"LGBTQ Climate Change: How Can Working and Learning Environments Be Improved for Members of the LGBTQ Community?"

Lesbian, gay, bisexual, transgender, and queer (LGBTQ) individuals have faced discrimination and microaggressions for decades. This painful treatment is tied to heterosexism and transphobia which bring about harmful stereotypes and prejudice toward LGBTQ individuals making them feel disconnected, uncomfortable, and potentially afraid. Even when overt mistreatment does not occur, a climate of exclusion or devaluation can exist. This research asks: How can employers of healthcare practitioners and schools who train medical professionals improve the LGBTQ climate at their facilities? A systematic review of literature was conducted to collect the existing evidence. The results will be presented with the goals of reducing bias, improving health disparities, and bringing comfort and acceptance into patient care, as well as creating inclusiveness and safety, and increasing the diversity of medical professionals in the workplace. Unlike the serious, negative effects of environmental climate change, this type of climate change could improve lives and maybe even save lives.

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Michael Tyler Owen

Physician Assistant Studies

Prof. Vanessa Worley

"Healthcare for the Homeless: Do Needle Exchange Programs Operate as an Effective Method for Combatting Intravenous Pathogen Transmission and Surging Healthcare Costs? "

According to the US Department of Housing and Urban Development, over a half million people experienced homelessness on any single night in 2019. There appears to be a relationship between homelessness and intravenous (IV) drug use. In addition, rising healthcare costs and other public health risks are associated with homelessness and the negative consequences of IV drug use. Numerous states and countries have attempted to combat these problems through implementation of needle exchange programs (NEPs), but are they actually as beneficial as we hope? Since the human immunodeficiency virus (HIV) is one of the most transmissible blood-borne pathogens, this systematic review of literature will compare the costs of HIV treatment with the cost-effectiveness of NEPs. Can NEPs reduce hospital admissions, lower costs, and decrease HIV transmission? While the topic can be divisive, there may be ethical, practical, and empathetic reasons to carefully consider while finding ways to help this vulnerable population.

Poster 12

Korin Vaughn

Physician Assistant Studies

Prof. Vanessa Worley

"The Use of Virtual Reality for the Reduction of Acute Pain in Burn Patients"

Virtual reality (VR) is not only an increasingly popular form of entertainment, but also a new tool for the medical field! The use of distraction techniques, such as VR, in clinical settings can decrease the severity of pain experienced by patients during medical procedures and reduce the need for traditional pain management options, such as opioids. A systematic review of literature was conducted to determine if VR use by burn patients during wound care procedures (when used alongside traditional pain management) is effective in decreasing acute pain. The use of VR did prove to be effective in reducing the pain experienced by these patients as shown in multiple studies found in peer-reviewed publications. Medical providers can consider the use of VR as an alternative pain management strategy and this can ultimately reduce the need for opioids, limiting the side effects and addiction risk associated with them.

Poster 13

Cory Barnett

Physician Assistant Studies

Prof. Vanessa Worley

"Does Vitamin D Supplementation Prevent or Lessen the Severity of COVID-19?"

According to the Centers for Disease Control and Prevention, over 28 million people in the US have been infected with coronavirus disease 2019 (COVID-19); countless other lives have been impacted as well. Scientists and medical professionals have fought diligently and now have prescription medications and vaccinations to use in the fight, but at the beginning of the pandemic many avenues to prevent or lessen the severity of COVID-19 were being aggressively investigated. Vitamin D received significant attention because of observational studies suggesting it might reduce the risk of respiratory infection. This systematic review of literature will bring together the latest and highest quality research on vitamin D for the prevention and/or treatment of COVID-19. While vitamin D deficiency is common and needs to be diagnosed and treated, the results are inconclusive regarding the average person taking oral vitamin D supplements to prevent or treat COVID-19 because the evidence is mixed.

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Brianna Gassman

Exercise Science

Dr. Ronald Mendel

Sabrina Stocker

Exercise Science

"Effects of KT Tape on Muscle Flexibility, Inflammation, and Soreness"

Based on personal communication with athletic trainers and physical therapists approximately 31% of their athletes use KT Tape. KT tape is used by healthcare professionals to reduce inflammation and pain, provide muscular support, and promote blood flow within tissues despite the lack of clinical research. There has been research on specific uses of KT Tape, but no research supports the claim that KT Tape is effective for the purpose of muscle recovery for athletes in general as it claims. This study aims to examine the effects of KT Tape on muscle flexibility, inflammation, and soreness specifically within the population of collegiate athletes. Seven male and 8 female athletes at the University of Mount Union participated in a muscle damaging protocol of 100 drop jumps. Flexibility, girth, and soreness were

assessed before and after the muscle damage protocol, as well as, 24, 48, and 72 hours post. Data was not analyzed by abstract submission.

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Wyatt Kohl

Athletic Training

Prof. Rachel Cummings

"The Ketogenic Diet as Treatment for Individuals Diagnosed with Epilepsy"

Epilepsy is a neurologic disorder characterized by recurrent seizures. Epilepsy can be treated through prescribed medications or dietary changes. The ketogenic diet, or KD, is one form of dietary treatment that has been shown to reduce seizure rates in individuals diagnosed with epilepsy. The results of different medications and the ketogenic diet were examined and compared in this critically appraised topic. Upon comparison of the data found, the results of KD intervention may be as high or higher than the results of medicinal intervention with less adverse effects to the patient's overall wellness.

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Luke Henwood

Exercise Science

Dr. Ronald Mendel

Mitch O'Hara

Exercise Science

"Cold Water Immersion and the Post Exercise Hypotensive Response "

Initially, during exercise, blood pressure (BP) rises due to vasoconstriction within the blood vessels (Cutler et al. 2019). This increase in BP during exercise is the driving force of the post exercise hypotensive (PEH) response. The purpose of this study was to see if cold water immersion (CWI) would induce the same effects as exercise and cause a PEH response, to overall lower the resting BP's of the individuals. Hypertensive individuals (N=2, 19-32y) were physically active (non-exercising). Participants were submerged in an ice bath ($8^{\circ}\text{C} \pm 1^{\circ}\text{C}$) for two non-consecutive days a week, for 8 weeks, for a total of 10 minutes. BP, skin temperature, stress levels, and pain levels were measured during testing. Four post-submerge BP's were measured every 15 minutes for one hour, and skin temperature was taken throughout the duration of the test. Data collection was not complete at the time of abstract submission.

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Ingi Elgamili

Physician Assistant Studies

Prof. Vanessa Worley

"Hypopituitarism Evaluation After Traumatic Brain Injury"

In this moment there is someone somewhere who struck their head and sustained a traumatic brain injury (TBI). The Centers for Disease Control and Prevention estimate that about 1.5 million Americans sustain TBI every year. TBI is a serious burden causing morbidity and mortality, but often patients expect to recover quickly with a full return to normal life. Unfortunately, normal is out of reach in many cases. Why do some patients not get better? What do clinicians sometimes miss? The pituitary gland! The pituitary is a structure in the brain that is vital to regulate various physical functions and processes in the

human body; it can be damaged in TBI. This research, a systematic review, aims to put hypopituitarism after TBI under the spotlight. Supported by the evidence, recommendations on when and how to fully evaluate TBI patients, techniques to detect hypopituitarism, and the best course of treatment will be presented.

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Miranda Meadows Physician Assistant Studies Prof. Vanessa Worley

"Cut the Cord! ...But When? A Systematic Review to Determine the Best Timing for Umbilical Cord Clamping"

The National Vital Statistics Report states that almost 3.8 million babies were born in the US in 2018. Each and every one of those babies who developed and thrived during gestation did so because of nutrients they received through the umbilical cord. In the very first moments of life, that cord is cut, leaving the baby without the support that they were used to. What timing for cord clamping/cutting results in the most short and long-term benefits and the lowest risks? A systematic review was conducted and found the strongest evidence to be the American College of Obstetricians and Gynecologists (ACOG) 2020 recommendation that for vigorous infants, cord clamping be delayed for at least 30-60 seconds after birth. Now research is focused on the application of this concept to infants that are not vigorous at birth. Don't cut the cord on your knowledge! Instead, come and learn about exciting developments in the future of medicine.

Poster 19

Gabriella Cataloni Computer. Engineering Dr. Vahraz Honary

"Comparison of Stress Levels Between STEM and Non-STEM Majors in Higher Education"

Stress is an unescapable aspect of life, especially throughout the year's individuals attend college. During this time, students experience the pressure of being on their own for the first time, handling financial situations, and forming new relationships. These are problems students have to deal with on a daily basis. On top of that, put the pressure of taking exams, doing homework, and completing projects. These activities can create different amounts of stress for students in different majors, which leads to a variety of coping mechanisms. This paper focuses on monitoring students' physiological signals using a state-of-the-art wearable device, E-4 wristband watch by Empatica, which can sense and store the student's electrodermal activity (EDA) signal during different extracurricular and academic activities. EDA will be used as an indicator of the user's stress level during these activities. By analyzing the collected data from STEM & non-STEM students, this research can compare the students stress levels. Furthermore, students in STEM courses and students in non-STEM courses will wear the sensors during different styles of exams and classes to compare stress levels. By collecting data in sub-categories such as online vs in-person lectures and online vs in-person exams in both STEM and non-STEM majors, we will investigate the effects of using technology on the level of stress in students.

Poster 20

Natalie Bubenheim

Biology

Dr. Chris Stanton

" Behaviors of a Donkey (*Equus asinus*) and Two Hair Sheep (*Ovis aries*) at the Huston-Brumbaugh Nature Center "

An ethogram is an inventory of clearly defined behaviors that can be utilized in behavioral research to create activity budgets, which show the amount of time an animal spends in the various behaviors. I observed the behaviors of a domesticated donkey, *Equus asinus*, and two domesticated hair sheep, *Ovis aries*, at the Huston-Brumbaugh Nature Center to outline the typical winter/spring behaviors of each animal. Each animal was observed to construct a primary ethogram which was used to create three activity budgets by recording the behaviors of each animal at various times throughout the day (morning, afternoon, and evening) in 30 minute intervals. It is hypothesized that the animals will exhibit similar behaviors regardless of the species and that they will vary depending on the time of day. These results will provide a resource for future behavioral research on two species who have not been extensively studied ethologically.

Poster 21

Carson Ciesinski

Geology and Environmental Science

Dr. Andrew Hutsky

"Paleoenvironmental Reconstruction of the Cleveland Shale Using GIS Mapping and Diversity Analysis of Vertebrate Fossil Specimens"

Understanding and interpreting paleoenvironments is important for gaining understanding of the nature of modern environments, as well as understanding the effects of environmental change. Fossil specimens can provide insight into the life of animals, despite being extinct, while rock features tell a story of the depositional environment and the conditions of past ecosystems. Utilizing GIS mapping, 360-million-year-old fossil specimens from the Cleveland Museum of Natural History's Vertebrate Paleontology collection, and the geology of the Cleveland area, the environment of Ohio during the Devonian period could be recreated in order to understand more about the Devonian mass extinction. This information is valuable because it can be used as reference for environments in current marine ecosystems for conservation and ecological purposes.

Poster 22

Alex Leeper

Exercise Science

Dr. Ronald Mendel

Kendall Shadie Exercise Science

"The Effect of the "The Right Stuff" on Dehydration during Anaerobic Performance"

The sports drink "*Right Stuff*" claimed to combat symptoms of dehydration and improve athletic performance. There is sufficient evidence that suggested the consumption of a low carbohydrate beverage during prolonged exercise will be beneficial to performance (Kang et al., 1995). However, fewer studies evaluated sports drinks consisting of differing electrolyte concentrations with no carbohydrates included on anaerobic performance. Therefore, the purpose of this study was to address the effect of

“Right Stuff” and hydration status during anaerobic performance. Subjects were recruited from the wrestling team and involved 3 Wingate (30-second cycle test) tests on three consecutive days. The three separate trials (Wingate) consisted of the subjects in a euhydrated state, dehydrated state, and dehydrated state with subsequent consumption of the *“Right Stuff”* prior to testing. Data collection was not complete at the time of abstract submission.

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Saira Bhutta Physician Assistant Studies Prof. Vanessa Worley

"Do Migraine Headaches Increase a Person's Risk of Stroke? A Systematic Review"

Epidemiologic studies indicate that 82-92% of strokes in the US are ischemic. Around 15 million people are diagnosed with stroke worldwide each year; 5 million dies and another 5 million are left disabled. Commonly known risk factors for stroke are high blood pressure, smoking, diabetes, high cholesterol levels, and obesity. This research project has revealed another risk factor: migraine headache with aura (warning signs). In this systematic review of literature, I explored whether migraine increases the risk of ischemic stroke and if/how it can be reduced if any association exists. The review identified a meta-analysis, prospective cohort study, and case-control study that all reveal a strong association between migraine with aura and ischemic stroke, independent of other risk factors. This research is relevant for those with migraines; they should be aware of their increased risk. If you have migraines with aura, come find out what you can do!

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Olivia Buch Art Education and French Prof. Lisa Parnell and Dr. Margo Miller

"Through My Eyes"

Eyes are the window to the soul, is what my Grandma has always said. Everyone sees life differently. Words can mean different things to people. No one knows if we all see colors the same way. Our lives shape our minds... how we learn, play, explore, what we focus on, what we're interested in, it all makes us into who we are and how we perceive life itself.

That's what I built my project on. I've always loved the act of personification, the idea that one person's mental image of a word could be completely different than the person's beside them, so I chose to convey the way I see some ideas or words. From the Four Horsemen of the Apocalypse character portraits to tattoo designs, I wanted to emphasize mediums I love to work with already and ones I wanted to practice. Art means always improving and learning.

Poster 25

Jenna Smith Exercise Science Dr. Ronald Mendel

Gabrielle Wegener Exercise Science

"Does Red Bull Increase Distance Traveled Among Aerobic Recreationally Active College-Aged Students?"

The purpose of this study was to investigate the effects of Red Bull and Red Bull Sugar-free (SF) on total distance of a timed run in recreationally active college students. Excess sugar consumption has been linked to various diseases and an increase in weight/obesity of the general public. Excess sugar intake often occurs in consumption of fluids, including energy drinks. If excess sugar is a concern, can sugar-free energy drinks be an option exhibiting the same effects as the regular version? On two separate occasions, participants consumed a Red Bull or sugar-free Red Bull prior to a 15-minute running session. Total distance run was the primary variable of interest with blood glucose levels and heart rate also measured at various points throughout the exercise session. No significance was found between conditions; however, habituation status for total distance was statistically significant ($p=0.006$).

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Emily Schutt Exercise Science Dr. Ronald Mendel

Keeley Malone Exercise Science

"The Effects of Exercise Intensity and Modality on Stress Levels"

Exercise has been shown to decrease stress and improve mood (Maletic et al. 2007). Extensive research has examined the relationship between mental health and exercise; however, few studies have determined the type and intensity of exercise for the best results (Carpio-Rivera et al. 2016, Mikkelsen et al. 2017). The purpose of this study was to determine which modality and intensity of exercise best reduces stress. Twenty men and women were recruited and randomly assigned to one of five groups based on intensity (high, low), modality (biking, running), and a control group. Salivary samples were collected pre- and post-exercise to analyze cortisol levels as a marker of stress. There was no statistical significance pre- and post-exercise between modality and intensity. Subjects also completed two stress questionnaires. One was to determine acute versus chronic stressors, while the other was taken pre- and post-session to determine current stress levels. Questionnaire analysis was not yet completed at time of submission.

Poster 27

Lauren Gabriele Biology Dr. Phillip LaScola

" Testing the Cardiovascular Effects of Acute and Chronic Stress in Mice"

This study aims to compare the effects of acute and chronic stress on cardiovascular health in mice. This was done by weekly monitoring of weight, white blood cell count, heart rate, oxygen saturation and blood glucose. Fifteen mice were divided into three even groups, with one group being a control that was routinely tested and kept under normal conditions. The acute group was exposed to one stressor per week for 30-45 minutes, with testing immediately after exposure. The chronic group was exposed to one stressor per week, with exposure lasting an entire week. Testing occurred over a six-week period, with one-week acclimation periods at the beginning and end of the study to collect baseline data. Data will be analyzed within and between subject groups to determine any changes in cardiovascular health

and determine overall physiological response to stressors. Data collection was not complete at the time of abstract submission.

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Grant Burke

Physician Assistant Studies

Prof. Vanessa Worley

"The Effects of Wearable Activity Trackers on Physical Health Empowerment in Adult Patients"

Over the last decade, wearable activity trackers have become popular methods by which many people attempt to remain active. Consumers use these trackers as motivation to remain active, track important information for training/conditioning, and understand their energy expenditure. Using the methodology of a systematic review of literature, this research attempts to evaluate the overall efficacy of wearable activity trackers in improving health-related empowerment in patients. It also investigates some important practical ways these activity trackers can be incorporated by medical providers to improve health-related empowerment in patients. Is there a difference between health-related empowerment of activity trackers versus no activity trackers? What about the effects of using these devices in the short-term versus long-term? Results will be applied to help medical providers understand implementation of these devices in medical practice. This project also helps patients gain further insight into the usefulness of activity trackers relative to their overall health.

Poster 29

Rose Morrison

Musical Theatre and Theatre Technology

Prof. Sarah Russell

Olivia Wolfram

Theatre Performance

"Zamlet: Hamlet Zoom Style"

In these "unprecedented times", who will set the precedent for theatre in today's world? Perhaps a group of theatre students from a small private school in the middle of Ohio? When senior Juliana Sutliff made her culminating experience a fully online production of Hamlet, we took Shakespeare to a place out of this world. Literally. With Rose Morrison as costume designer and Olivia Wolfram as makeup designer, we collaborated to create a futuristic cyber world ideal for a Zoom setting. The process began with Juliana, as director, providing us with a board that displayed her ideas for costumes, hair, and makeup. We then got to work, creating design schematics to be translated onto actors. For each character, we created a fully conceptualized look that could fit within a Zoom window. This process taught us to think outside of the box, and Zoom square, to alter storytelling for audiences everywhere. The theatre world will be forever changed by this new medium of theatre, and so will we.

Poster 30

Amber Zheng

Biomedical Engineering

Dr. Loay Al-Zube

"EMG Controlled Robotic Hand "

EMG uses principle of electromyography by measuring electrical signal which generates directly from muscle. Electromyography (EMG) signals can be used for modern human computer interaction. This research project studies the viability and requirements of using Forearm EMG signals in controlling finger flexion and extension of a robotic hand. Forearm EMG, surface electrodes, batteries, resistance, LEDs, servo motors, and a microprocessor kit (Arduino UNO) were all explored and employed together to create a robotic hand that flexes fingers. The servo motors were controlled by the Forearm EMG signals. The validity of outcome was tested experimentally.

Poster 31

Emily Maroni **Chemistry** **Dr. Amy McElhinney and Dr. Chris Stanton**

"A Survey of Microplastic Presence at the Huston-Brumbaugh Nature Center (Stark Co., Ohio) "

The world produces over 300 million metric tons of plastic per year. Plastics that are not properly disposed of, or that escape landfills ultimately break down into microplastics. Microplastics are defined as plastics fragments smaller than 5mm. When microplastics make their way into ecosystems they can negatively affect organisms. Consumption of microplastics has been linked to increased mortality rates in larval fish and earthworms, as well as cancer in humans. The goal of this research project was to determine if microplastics were present at the Huston-Brumbaugh Nature Center and in what areas they were most prevalent. Soil samples were taken from various sites throughout the nature center and visible plastic particles were handpicked from each sample. The results of this research suggested that microplastics were present at the nature center, but primarily in heavily travelled areas.

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Jarod Hunter **Biology** **Dr. Chris Stanton and Dr. Lin Wu**

Dr. Lin Wu

"Analyzing Biodiversity and Water Quality to Determine Overall Health of Ponds at the Huston-Brumbaugh Nature Center"

Freshwater habitats are an important part of the overall environment and can be home to high levels of biodiversity but are often overlooked and understudied. There are two small ponds at the Huston-Brumbaugh Nature Center (the East Pond and the West Pond) and I wanted to determine how healthy they are based on their biodiversity and water quality. To document biodiversity, I collected microorganisms, aquatic insects, and fish from each pond. To determine water quality, I recorded water temperature, dissolved oxygen, and pollutant levels. Based on the results, the West Pond has higher biodiversity and better water quality vs the East Pond. The East Pond could be improved by adding an aerator to increase oxygen levels in the water, which is present in the West Pond. The East pond also has an overgrowth of duckweed so controlling its growth may increase the health of the pond.

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Grant Ferrell

Physician Assistant Studies

Prof. Vanessa Worley

"Could Saliva Be the Key to Diagnostic Clarity with Autism Spectrum Disorder?"

Autism spectrum disorder (ASD) is a complex developmental disability that is often misdiagnosed, diagnosed late, or is even left undiagnosed. The diagnosis has historically been made using the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), which is a set of symptom criteria the patient must meet to be diagnosed. Until recently, there has not been a specific laboratory test to confirm the diagnosis of ASD. This systematic review of literature sought to determine if there were salivary differences in those with ASD compared to those without. The findings suggest that there are microRNAs found only in the saliva of people with ASD that may be used diagnostically. Coupling salivary sample analysis with the DSM-5 criteria should allow for earlier recognition, earlier intervention, and better developmental outcomes for these patients. The salivary testing appears to be a key piece of the puzzle!

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Dana Lucas

Physics and Mechanical Engineering

Dr. Loay Al-Zube

"Characterizing Structural and Material Properties of Nitinol, a Shape Memory Alloy"

Nitinol (NiTi) is a nickel titanium shape memory alloy (SMA) characterized by its affect to change material structure based on temperature. Enduring around 30% deformation without any permanent changes to the material structure as temperature is lowered, many applications in the aerospace, automotive, and biomedical industries exist. This research project studies the effects of mechanical loading on Nitinol using the Instron 5967 tensile testing machine at the University of Mount Union. Stress-strain curves, elastic modulus, and ultimate tensile stress were determined for Nitinol samples above and below the transformation temperature, which ranged from -18°C to 30°C based on the material content. Additionally, microscopy techniques were used to observe the grain size and grain boundary shifts during deformation. Although the expected trend was observed, where deformation increased as temperature decreased, maintaining a consistent low temperature as samples were tested and creating a dog-bone shape sample as set by American Society for Testing and Materials (ASTM) standards provided additional challenges to the project.

Poster 35

Corinne Reed

Physician Assistant Studies

Prof. Vanessa Worley

"Can Hyperbaric Oxygen Therapy Decrease the Severity and Duration of Post-Concussion Syndrome? "

Concussions are a type of traumatic brain injury (TBI); the term concussion is often used to describe mild TBI (mTBI). This kind of head injury is widespread among children, adults, and the elderly. A complication of concussion, called post-concussive syndrome (PCS), occurs when the symptoms of concussion (such as cognitive difficulty, headache, dizziness, mood changes) last longer than expected.

The current management of PCS is focused on treating the symptoms and being patient for recovery. Patients suffering from this often wonder: 'What else can I do to make these symptoms go away?' This systematic review of literature seeks to determine if, an alternative approach, hyperbaric oxygen therapy (HBOT), is effective when used to treat patients with PCS. Specifically, can HBOT decrease the severity or shorten the duration of PCS? If so, the research will also aim to identify which HBOT protocols are most likely to be efficacious.

Poster 36

Carlee Mitchell

Biochemistry and French

Dr. Robert Woodward

"Race Against Resistance: Synthesizing New Small Molecules to Shut Down Antibiotic Resistance in Gram-positive Bacteria"

Antibiotic resistance is growing at an alarming rate, with bacteria developing resistance to recent antibiotics less than a year after their introduction to the market. Since bacteria are acquiring resistance faster than we can find or make new antibiotics, a new approach is necessary to address this pressing issue. One promising new strategy against resistance utilizes a small molecule to directly target and shut down antibiotic resistance pathways and return antibiotics to their former potency. The purpose of this research was to synthesize a small molecule to facilitate research targeting a common resistance pathway in gram-positive bacteria against the antibiotic Fosfomycin. Organic synthesis techniques were used to afford a natural product which will be used to further study enzymes involved in this type of bacterial resistance.

Poster 37

Brandon Duktig

Geology

Dr. Andrew Hutsky

"Differentiating Pleistocene Glacial and Modern Stream Deposits at the Huston-Brumbaugh Nature Center, Minerva OH "

Sedimentologic and landform evidence for the Last Glacial Maximum (11,000 years ago) and extensive continental glaciation exists throughout northeast Ohio. However, during modern times, post-glacial streams have transported and eroded sediment, giving a mixed signal of physical surface processes. As such, this research aims to unravel sediment transport processes by analyzing lateral and vertical sediment grain-size trends of 145 sediment samples from 14 core holes (average depth: 3.5 feet) within two stream valleys at the Huston-Brumbaugh Nature Center (HBNC). Preliminary results indicate that in general, grain-size increases with depth (sand to gravel) and laterally (sand to gravel) with proximity to modern streams. Although several gravel-sized particles contain glacial transport evidence such as grooves, grain-size trends suggest reworking by modern streams. These findings have implications for the evolution of HBNC drainage patterns and natural landscape development, both in the past and modern times.

Poster 38

Paige Knoch

Graphic Design

Prof. Lisa Parnell

"Have No Fear! It's just a book about a spider."

Often children are taught growing up that spiders are scary and if they see one it is okay to squash and kill them. Children have a hard time taking a step back from the things that scare them, looking at those fears head on, and rationally understanding the root cause of what it is that makes them so frightened. Stories can help children grapple with fightful emotions. Children can see themselves reflected in the stories they read. In this study I examined arachnid phobia in children and different illustration styles to construct, write, and illustrate my own children's book. Research has shown having enough knowledge about insects can significantly reduce irrational fear and phobia. My book is about a little girl who brings her pet spider to school for show and tell. At first all the students, even the teacher is scared of her pet. But after hearing the girl talk about her spider and seeing how they interact with one another, the students in the class learn that some things are not so scary after all and become very intrigued with the pet spider. Future implications of my research is the creation of a published book that is a visual piece creating a positive impact on changing perceptions. This could benefit future teachers, parents, and children.

Poster 39 (Virtual Poster)

Katherine Norton

Communication Studies

Dr. Adelina Cooper

"Student Leadership in Marching Band and the Presence of Hazing Effect Group Satisfaction "

Hazing is a form of harassment that occurs when people have already or have begun to integrate into the group (Alvarez, 2015). However, when hazing happens within a marching band, laws become more ambiguous, traditions walk a tight line between proud history or preventable accidents. Vast amounts of research have been done on hazing within fraternities and sororities, but not many have been done with hazing in high schools and marching bands (DeWitt & DeWitt, 2012).

This study strives to deepen the understanding of the student leadership styles, hazing, and the satisfaction rate of past high school marching band members. By giving a quantitative survey to college students who were active members in their high school marching bands- this research has gained a deeper understanding of the high school marching band communication culture.

Poster 40 (Virtual Poster)

Monic Kiconco

Theatre and Communications

Dr. Adelina Cooper

"Appropriation of African American (Black) Hairstyles"

African American or black hairstyles' appropriation by white people has been an issue of controversy for so long, creating waves and confusion in its wake, is it just a hairstyle or does it hold much more meaning to the original owners who in this case are African Americans? This study sought out articles that shed light on what is considered black hair, the hair styles used for this type of hair, what they

mean to the select group of people within that culture, why they do not appreciate Caucasians wearing the same hairstyles for fashion's sake and how all this connects to cultural appropriation. The concentration is on all hairstyles that are generally considered black. Through rhetoric analysis of stories by African Americans, this research gains insight into the politicization and discrimination of black hair that birthed the racism that African Americans have faced from the moment they landed in America. The understanding of the connection between black hair, racism and cultural appropriation would be one step in the right direction to harmonious co-existence for both white and black people.