



ROCKY
MOUNTAIN
COLLEGE

Rocky Mountain College presents

THE
**STUDENT
SYMPOSIUM**

FEATURING SCHOLARLY WORKS FROM STUDENTS ACROSS CAMPUS,
SHOWCASING THEIR WORK AS SHORT LECTURES, POSTERS,
DEMONSTRATIONS, EXHIBITS, PERFORMANCES, AND READINGS

APRIL 10, 2025



POSTERS

*9:00am - 11:00am
Fortin Gym*

TALKS

*11:00am - 4:00pm
Losekamp Auditorium*

SENIOR ART SHOW

*10:30am - 11:30am
Ryniker-Morrison Gallery*

PROGRAM

Poster Presentations

9:00am - 11:00am

Fortin Gym

Oral Presentations

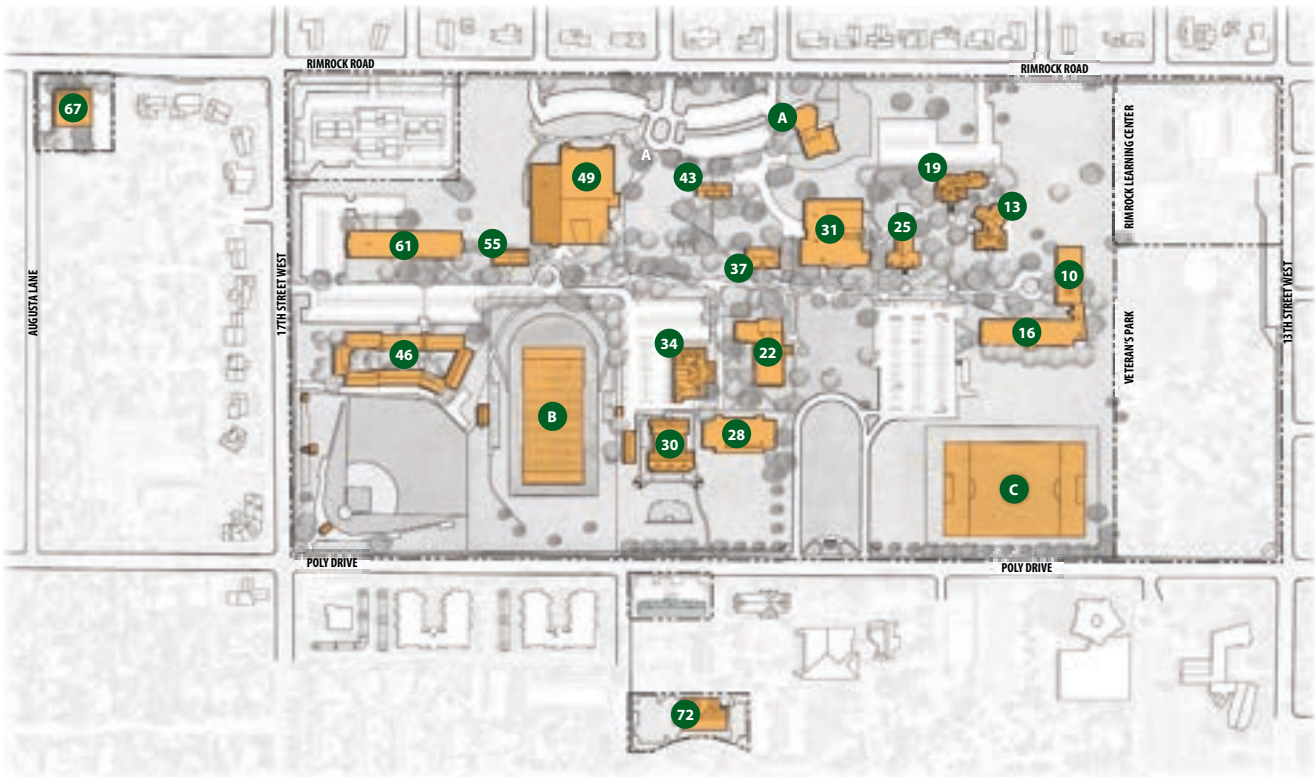
11:00am - 4:00pm

Losekamp Auditorium

Senior Art Show

10:30am - 11:30am

Ryniker-Morrison Gallery



BUILDING

- 55 Alden Hall
- 10 Anderson Hall
- 67 Aviation Hall
- 31 Bair Family Student Center
Dining, Student Lounges
- 28 Bair Science Center
- A Billings Studio Theater
- 30 Charles Morledge Science
Laboratory
- 72 Connor Hall, 2411 Village Lane
- 37 Eaton Hall
- 49 Fortin Education Center
- 61 Jorgenson Hall
- 25 Losekamp Hall
Educational Resource Center

USE

- Offices
- Residence Hall
- Aviation program
- Administration, Bookstore,
- Classrooms & Laboratory Space
- Community Theater
- Laboratory, OTD Classrooms &
Administrative Offices
- Physician Assistant Program
- Administration
- Classrooms, Two Gymnasiums,
Service for Academic Success,
Athletic Administration
- 48-Unit Apartment Building
- Classrooms, Auditorium
- Library LEAP

- 13 Morledge-Kimball Hall

Faculty Offices and Classrooms

- 19 Prescott Hall

President, Great Room,
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and Financial Aid

- 46 Rimview Hall

Residence Hall

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Residence Hall

OFF-CAMPUS PROPERTIES

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Billings Logan International
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- White Aspen Ranch,
481 56th Street W.

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RMC Flight Operations

Equestrian Facility

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How Edited Images Affect Self-Esteem in College Students

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Mule Reproduction
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Gustavo, No More Needles
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The Effect of a Dual-Task Distraction on Fine Motor Skill Performance
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A Comparison Between the Traditional Method Vs. the Modern Method of Cupping

Senior Art Show:

Another World - Artist's Statement

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POSTER PRESENTATIONS

1 Disparate Viral Proteins and Their Effects on Host Cell Functions

PRESENTER(S): Ava Broberg, Taylor Bryan, Morgan Maack, Brianna Roach, Megan Smith, Hunter Terry, Kenidee Wolery

MENTOR: Holly Basta

DEPARTMENT: Biology

DESCRIPTION: Viruses modulate the cell in many ways, from inhibiting the immune response to causing cell death or cancer. In BIO454 Virology, a capstone course for the biology program, we are studying four viruses: (1) Epstein Barr virus (EBV), a double-stranded DNA virus that causes mononucleosis and is linked to many human cancers, (2) encephalomyocarditis virus (EMCV) a single-stranded RNA virus that causes inflammation of the heart and brain in mice, (3) zebrafish endogenous retrovirus (ZFERV) which causes T cell leukemia, and (4) vesicular stomatitis virus (VSV) a single-stranded RNA virus which affects horses and cattle. Using cell culture, transfection and fluorescence microscopy we are investigating viral proteins' ability to modify host cells by causing apoptosis, proliferation, and/or immune response inhibition.

2 Deicing System of ATR 72

PRESENTER(S): Jessica Molter, Kincade Flesch

MENTOR: Mark Donohue

DEPARTMENT: Aviation

DESCRIPTION: The ATR-72 suffers from a detrimental shortcoming if not taken into consideration for flight into known icing. Under normal circumstances, the ATR-72 deals with icing well through the use of pneumatic boots on the leading edge of the wings. Where the ATR falls short of sufficient in icing is during conditions that allow for formation of supercooled water droplets or SLD. American Eagle Flight 4184 in Roselawn Indiana highlights this shortcoming, as the flight encountered SLD conditions for an extended period of time and led to a loss of flight control. During operation in SLD conditions, the water droplets run past the pneumatic boots and freeze aft of the boots. If these conditions are not recognized as hazardous, they can lead to a detrimental outcome.

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POSTER PRESENTATIONS

3 Feral Rabbit Birth Control at Rocky Mountain College

PRESENTER(S): Ella Fox, Robby Gress, Kallyn Wilkins

MENTOR: Kayhan Ostovar

DEPARTMENT: Environmental Science

DESCRIPTION: Feral animals can become serious biological invaders and threaten local ecosystems, urban landscaping, and wildlife. Non-lethal management is often more acceptable to the public. A regularly used non-lethal technique is porcine zona pellucida (PZP), an immunocontraception regularly used to manage feral animals; there are presently no documented studies examining PZP and feral rabbits. We developed methodologies and received training and permits from the state veterinarian board and Montana Fish Wildlife and Parks to conduct an experimental rabbit-PZP study. This required capturing and handling rabbits, mixing PZP and an adjuvant, and administering two doses within a two-week window. Our studying area was located around the Student Center at Rocky Mountain College. To date, we have captured and ear tagged 25 rabbits of which 17 females received PZP. We plan to monitor the success of this project over the course of the summer and adjust methods for revaccination efforts next winter.

4 The Best Way to Improve Lithium Ion Batteries in Aircraft

PRESENTER(S): Zach Burnett, James Hagg

MENTOR: Mark Donohue

DEPARTMENT: Aviation

DESCRIPTION: Lithium-ion (LIION) batteries are transforming aviation by reducing weight and improving energy storage. Compared to lead-acid and nickel-cadmium batteries, they are 80% lighter and offer higher efficiency. Currently, lithium iron phosphate (LFP) and lithium nickel manganese cobalt (NMC) batteries are widely used, each with trade-offs in cost, energy density, and safety. Despite advancements, thermal runaway remains a critical issue, as seen in Boeing 787 battery fires.

The current stainless steel containment system adds significant weight and heat retention concerns. We propose using porous silica (LI-900) as a lightweight, high-temperature-resistant alternative. This material effectively dissipates heat, preventing surrounding damage while maintaining safety. Secured with non-conductive materials and a plastic enclosure, this solution mitigates thermal risks without excessive weight penalties. As lithium-ion technology becomes standard in aviation, improving safety measures like this will be essential to ensuring its reliability in all aircraft types.

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POSTER PRESENTATIONS

5 Montana Youth and Screen Time: An Occupational Perspective

PRESENTER(S): Zachary Simmons, Abigail Harris, Nancy Mathew, Amy Keller, Madison Touchstone, Rachel Crismore

MENTOR: Danyela Farrar

DEPARTMENT: Occupational Therapy Doctorate Program

DESCRIPTION: Excessive screen time (ST) is a growing concern, with significant implications for children's physical, cognitive, and social development. While research has explored the general impact of ST, there remains a need for region-specific studies that examine usage patterns and their influence on child development. This project collects both qualitative and quantitative data through a virtual survey for parents, guardians, or caregivers of children or adolescents in Montana. This research aims to explore how ST influences occupational participation and development.

6 Boeing 737 Rudder Failures

PRESENTER(S): Haley Sannes, Ron Hills

MENTOR: Mark Donohue

DEPARTMENT: Aviation

DESCRIPTION: In the 1990s, multiple Boeing 737s suffered rudder reversal issues that caused numerous fatal incidents. The inciting event in each of these was a failure of a hydraulic power control unit (PCU) that controlled a single rudder actuator and rudder panel.

Testing revealed that the probable cause was the jamming of a dual-servo (probably due to thermal shock). This cannot be guaranteed as some of the relevant incidents took place outside of the United States and, in other cases, the PCU was too damaged to verify the underlying cause. The NTSB investigated and as a result, the FAA ordered the replacement of all relevant servos on all 737s and additional training for all Boeing 737 pilots. The last Boeing 737 incident that could be connected to the rudder PCU was in 1999, and there have been no significant events since that time directly related to this specific issue.

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7 Montana's Natural Landscape: The Key to Healing Veterans and Their Mental Health Challenges

PRESENTER(S): Nicole Kucera, Kelley Jones, Kloie Thatcher, Efren Sanchez, Michael Bruns, Caden Maciejewski

MENTORS: Hyrum Haroldsen, Danyela Farrar

DEPARTMENT: Occupational Therapy Doctorate Program

DESCRIPTION: With Montana's large veteran population, it is critical to address their unique mental health challenges, which include PTSD, depression, and anxiety. Veterans often experience these issues at higher rates than the general population, with rural veterans facing additional barriers to accessing mental health services. This study will examine veterans' preferences for outdoor activities and the perceived mental health benefits of these activities. Through a mixed-methods survey, data will be collected on veterans' engagement in activities like hiking, fishing, gardening, etc., and how these activities may help alleviate symptoms of mental health conditions. The research will also explore barriers to participation and identify key components of nature-based programs that align with veterans' needs. This project seeks to develop effective, client-centered therapeutic interventions that leverage Montana's natural landscape to improve veterans' mental well-being.

8 Examining Factors that Impact Aging in Place for Rural and Frontier Seniors

PRESENTER(S): Ann Burdick, Madison Kelly, Dani Urick, Rylee Halvorson, Hilary Andrews-Bryant, Kori Broesder

MENTOR: Hyrum Haroldsen OTR/L

DEPARTMENT: Occupational Therapy Doctorate Program

DESCRIPTION: This study examines the key supports and barriers among rural older adults in Montana. Adults over the age of 65, who live in rural areas face distinct challenges, including unsafe home environments, limited healthcare access, food insecurity, social isolation, and caregiver barriers. While assistive technology could mitigate some barriers, it's unclear how the adoption of this technology realistically impacts the ability of these older adults to age in place. Using a mixed-methods cross-sectional survey, Montanans ages 65 and older were recruited through Montana State University's Social Data Collection and Analysis Services. Guided by the Person-Environment-Occupation-Performance model, the study explores environmental, nutritional, social, caregiver, and assistive technological factors. Findings will enhance understanding of rural aging challenges and inform future interventions to promote independence and improve quality of life for this population.

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9 Shuffling the Odds

PRESENTER(S): Madeline Munson, Kobe LaRocque

MENTORS: Ulrich Hoensch, William Braubach

DEPARTMENT: Mathematics

DESCRIPTION: This project investigates the effect of shuffles on cards. To answer this question we used mathematical concepts from abstract algebra and identified patterns. We focused on a faro out-shuffle, where the deck is split evenly and the cards are interlace perfectly, leaving the top and bottom card in their original position. To facilitate pattern recognition, the deck was ordered as such: Ace-King of hearts, Ace-King of clubs, Ace-King of diamonds, and Ace-King of spades; we later converted to numbering the cards 1-52. This assumption is used without loss of generality, any order of the deck will give the same results due to the symmetric nature of the shuffle. Our findings indicate that it takes 8 faro out-shuffles for a deck of 52 cards to return to its original configuration. Our findings generalize to any deck size n , of the form $2t$, with t a positive integer.

10 Psychology Program Internships

PRESENTER(S): Jenna Hillman, Laci Maloney, Itzu Romero

MENTOR: Barb Vail

DEPARTMENT: Psychology

DESCRIPTION: The Rocky Mountain College's psychology internship program is one of two capstone programs available to upperclassmen psychology majors. Placements for this program include Advanced Therapy Clinic (ATC), Parkside Elementary School, Hearing and Speech Connection (HSC), and Yellowstone Boys and Girls Ranch (YBGR). The program provides students with the ability to apply psychological principles they have learned in the classroom to real world settings. At ATC, students apply behavior management through Applied Behavior Analysis therapy for children with autism and behavioral challenges. Parkside Elementary and HSC allow for the exploration of relationships among speech therapy and developmental, cognitive, and behavioral psychological principles. YBGR brings real-world experience and connection with youth at a Psychiatric Residential Treatment Facility (PRTF) through the use of Trauma-Focused Cognitive Behavioral Therapy. Opportunities to intern with different organizations demonstrates the diverse career options in psychology and enables students to connect community needs to their future aspirations.

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11 Mapping Memory in 20th Century Europe

PRESENTER(S): Megan Voegele, John Patterson, Paxton McQuillan, Gavyn Holmlund, Kaden Coplen, Haidee Bahner, Devon McHenry, Zach Bion, John Pender

MENTOR: Jenifer Parks

DEPARTMENT: History

DESCRIPTION: Focusing on World War I, the Holocaust, and Cold War, this project by the students of HST313: Europe since 1914, examines how Europeans have interpreted their past by analyzing the ways that communities in Europe have chosen to commemorate these events that have shaped their lives and societies. Analyzing monuments and memorials, this project seeks to understand how the memories of those events--personal, collective, and public--have been preserved (or not) and how those memories have shaped European society and culture. Students were asked to identify a monument or memorial for each event, research its provenance, construction, and purpose; analyze its meaning and symbolism; and plot their findings on a Google Map to show how the monument or memorial fits within the geographical landscape. Each entry draws up a variety of source material to contextualize the monuments and situate them within the historical scholarship, assessing their value to understanding European history.

12 Boeing 737 MCAS System

PRESENTER(S): Remington Porter, Olivia Reifenberger, Carson Allgood

MENTOR: Mark Donohue

DEPARTMENT: Aviation

DESCRIPTION: The Maneuvering Characteristics Augmentation System (MCAS) was introduced on the Boeing 737 MAX to compensate for aerodynamic changes caused by the aircraft's larger, forward-mounted engines. Designed to automatically adjust the horizontal stabilizer and prevent excessive nose-up pitch, MCAS aimed to enhance flight stability. However, its initial implementation relied on a single angle of attack (AOA) sensor, making it vulnerable to erroneous activations, which contributed to two fatal crashes: Lion Air Flight 610 (2018) and Ethiopian Airlines Flight 302 (2019). Investigations revealed critical design flaws, regulatory oversight failures, and insufficient pilot training, leading to modifications such as dual-sensor validation, limited engagement frequency, and enhanced pilot override capabilities. The updated MCAS aligns with advancements in automated flight control systems, incorporating redundancy and improved safety protocols. This project examines the system's evolution, operational mechanics, pilot interface, limitations, and failure modes, emphasizing the need for rigorous oversight and comprehensive pilot training in automation.

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13 Zebrafish Endogenous Retrovirus (ZFERV) Potential Phosphodiesterase is Predicted to Disrupt the Innate Immune System

PRESENTER(S): Megan Smith, Kenidee Wolery

MENTOR: Holly Basta

DEPARTMENT: Biology

DESCRIPTION: Endogenous retroviruses (ERVs) are ancestral viruses integrated into host DNA and inherited through the germline. Zebrafish offer a model for evaluating viral pathogenesis due to their well-characterized immune system that shares similarities with humans. Zebrafish endogenous retrovirus (ZFERV) is selectively expressed in the thymus and random ZFERV insertions have been linked to T-cell leukemia in zebrafish. ZFERV contains a gene similar in sequence to viral phosphodiesterases (PDEs). Viral PDEs inhibit interferon production, which is used to defend against viral infection. In this study, we propose characterization of ZFERV-predicted PDE using cell culture, transfection, and fluorescence microscopy. We hypothesize that expression of the ZFERV-predicted PDE will disrupt a key antiviral pathway, RNase L, which is involved in interferon signaling, by cleaving the effector molecule 2'-5'A. Our research provides insight into the interplay between ERVs and the host immune response and would represent novel characterization of a PDE in a retrovirus.

14 The Effectiveness of Chair Yoga for Native American Middle Aged Women with Type II Diabetes

PRESENTER(S): Jaden Ferris

MENTOR: Christopher Irvine

DEPARTMENT: Health and Human Performance

DESCRIPTION: Type II diabetes disproportionately affects Indigenous communities, affecting 13.6% of the American Indian and Alaskan Native population as of 2021 [1]. Current health initiatives prioritize treatment and prevention of Type II diabetes through changes around diet and exercise [2]. However, indigenous populations living on reservations may not have the necessary resources to implement changes in the same way as urban communities [3]. The purpose of this study was to determine the effects of low-intensity exercise on A1C and BMI in Native American women.

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15 Relationship Between Balance and Short-Term Memory in People With a History of Concussions

PRESENTER(S): Meagan Baham

MENTOR: Patrick Hughes

DEPARTMENT: Health and Human Performance

DESCRIPTION: People with a history of concussions can have persistent deficits in cognitive function. Post-concussion syndrome can be the prolonged effect of sustaining a concussion. This study will focus on the post-concussion effects on balance and short-term memory. Specifically, this study will attempt to observe a significant deficiency in balance and short-term memory in people without a history of concussion compared to people with a history of concussions. Participants in this study will be healthy individuals aged 18-26, have no current neurological conditions, and have finished rehabilitation post-concussion. The participants will be required to complete two tests and a survey. The tests will be the balance error scoring system (BESS) and the Simon Game. The survey will help determine age, gender, how many concussions the participant has had, and when their last concussion was to place them in either the experimental or control group.

16 Psychological Skills Training Prior to Penalty Kick Shoot-Out in Collegiate Soccer Players with High Levels of Self-Reported State Anxiety

PRESENTER(S): Sana Bath

MENTORS: Mindie Clark, Pat Hughes

DEPARTMENT: Health and Human Performance

DESCRIPTION: Anxiety plays an essential role in determining an athlete's ability to perform in high pressure situations. Specifically, state anxiety refers to the temporary (or situational) increase in feelings of nervousness and apprehension, accompanied by somatic anxiety responses such as physiological arousal. In the game of soccer, a circumstance that often elicits the highest levels of anxiety-driven responses in athletes are penalty kick shoot-outs. Because elevated levels of state anxiety can be a limiting factor in high pressure situations like penalty kick shoot-outs, sport psychologists have developed strategies to aid in athlete performance by regulating state anxiety levels. This study explored the effects of basic psychological skills training techniques utilized during a simulated penalty kick shoot-out. Performance, heart rate, and self-reported anxiety levels of collegiate soccer players were examined. Data is currently being collected and the results will be presented at the 2025 RMC student symposium.

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17 The Effects of Instructional Self-Talk on Anxiety and Putting Performance Outcomes Before and During a Simulated Competition

PRESENTER(S): Brooke Ark

MENTOR: Mindie Clark

DEPARTMENT: Health and Human Performance

DESCRIPTION: Mental health, including anxiety management, is increasingly recognized as vital to athletic success, with self-talk emerging as a promising strategy to manage anxiety and optimize performance. This study included 20 student-athletes, examining the effects of self-talk on anxiety and performance in athletes, focusing on the timing of the intervention—before versus during a golf putting task. Anxiety was measured using the State-Trait Anxiety Inventory and the Competitive State Anxiety Inventory-2. Performance was evaluated by successful putts to attempts within the 2-minute task. Perceived effort was also assessed using the Rating Scale of Mental Effort following the task to ensure comparable amounts of effort were given for each putting session. Data analysis will compare within-subject changes and between-subject differences across intervention types and will be presented at Rocky Mountain College's student symposium. This research aims to offer insights into optimizing self-talk strategies to manage anxiety and improve performance in sport environments.

18 Geological Complexity and Ore Formation in the Butte Mining District, Montana

PRESENTER(S): Aaron Richardson

MENTOR: Derek Sjostrom

DEPARTMENT: Geology

DESCRIPTION: The Butte mining district in Montana is a globally significant geological region known for its complex ore deposits and extensive mining history. Centered around the Late Cretaceous Boulder Batholith, its quartz monzonite and granite host rich porphyry copper deposits and high-grade mineralized veins. Magmatic intrusions 73–78 million years ago triggered hydrothermal activity, leading to extensive mineralization of copper, silver, lead, zinc, molybdenum, and gold. Structural controls, including faults, shear zones, and breccia pipes, played a critical role in ore emplacement, resulting in diverse mineralization styles. The district exhibits well-developed zonation, with deeper porphyry deposits transitioning into near-surface high-sulfidation veins. Multiple episodes of magmatism and alteration further contributed to the region's complexity. Butte's mineralization patterns provide valuable insights into magmatic-hydrothermal systems and ore formation. The district remains a key site for geological research, offering a unique record of plutonic evolution, hydrothermal alteration, and metallogenesis.

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19 Precious Metals of the Elkhorn Mountains, MT

PRESENTER(S): Tel Aune

MENTOR: Derek Sjostrom

DEPARTMENT: Geology

DESCRIPTION: The Elkhorn Mountains in west-central Montana are known for their production of polymetallic copper, silver, gold, and other metals formed by replacement and vein deposits. Geologic and geochemical data from the western part of the deposit suggest a moderate to high potential for existence of porphyry-type copper, molybdenum, gold, silver, lead, and zinc. Researching old mines records in the area is a way to understand how successful and rich the ore was and could be today. The mining history of the area from 1872-1874 reported to produce roughly 15 tons of high grade ore that contained 500 to 800 ounces of silver per ton, 15 percent copper in the first 50 feet of the shaft. The geological history of the area with the help of modern techniques like trace minerals and chemical composition of the area can help predicted where to find deposits of precious metals in the Elkhorn Mountains.

20 Geologic History of Hanford, WA: Minimization of Plutonium Enrichment Risk

PRESENTER(S): Mason Williamson

MENTOR: Derek Sjostrom

DEPARTMENT: Geology

DESCRIPTION: On June 18, 1942, the U.S.'s secret Manhattan Project was established to create the world's first nuclear bombs amid World War II. The U.S. chose three sites to develop the technology for this project. The locations were Los Alamos, New Mexico, Oak Ridge, Tennessee, and Hanford, Washington. These places were chosen for their low population and relatively flat settings. Hanford was also chosen for this reason, and it was also geologically an ideal place for plutonium production. Geologically the Hanford Site was favorable because of the Columbia Flood Basalts, which formed about 17-6 Ma, as a result of approximately 350 eruptions that spread lava over Idaho, Washington, and Oregon. Additionally, the Missoula Floods events came, repeatedly flooded the region. These two events created a geologically and geomorphologically favorable conditions for plutonium production and waste disposal, due to the 200-300 feet of sediment above the water table.

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21 Muscular Endurance Tested through the YMCA Bench Press Protocol

PRESENTER(S): Isabella Downing

MENTOR: Mindie Clark

DEPARTMENT: Health and Human Performance

DESCRIPTION: The purpose of this study is to compare effects of a pre-workout supplement and placebo on YMCA bench press performance in physically active adults. Since this test asks participants to complete as many reps as possible (AMRAP) it would be considered a muscular endurance exercise. Previous research has shown that pre-workouts do not benefit aerobic exercise as much as anaerobic exercises. This study seeks to see if this is true when it comes to the YMCA bench press since it's an endurance performance test. The results will be discussed, and data will show the difference when using a pre workout supplement versus using a placebo. Factors will also be explained to describe what may have played a role since there was no significant difference between the two.

22 Music Composition

PRESENTER(S): Drifter Skillicorn

MENTOR: Cara Schreffler

DEPARTMENT: Music

DESCRIPTION: I will be composing a piece of music to explore and present the compositional process. The composition will be tonal, using functional harmony and drawing inspiration from Western composers. For the poster, I will articulate the process of composing a piece of music by drafting, editing, and presenting the work. As a music major, I have the option of writing music in many different fields, including the entertainment industry and educational fields. This project will allow me to develop my skills and illustrate the process of composition so I can better adapt to any situation I may encounter with future students or otherwise in my career.

23 The Effect of Gender Roles on Domestic Violence

PRESENTER(S): Ashlyn Naylor

MENTOR: Tim Lehman

DEPARTMENT: History

DESCRIPTION: This presentation will explore how gender roles and stereotypes led to the rise of domestic violence. Ideas surrounding masculinity and strength as power have shaped the husband and wife relationship in the home. The idea of women being inferior beings sprouted ideas of women being objects or property and therefore subjects to their husbands. Initial marriage laws did not see violence as a ground for divorce and therefore women had no power over what was being done to their bodies. Furthermore, the psychological effects of physical and sexual abuse will be explored as well as the differences between both men and women who abuse their spouse.

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24 CH-47 Engine Fuel Leaks

PRESENTER(S): Josephine Nuce, Addie Baker

MENTOR: Mark Donohue

DEPARTMENT: Aviation

DESCRIPTION: The CH-47 Chinook helicopter is vital for military missions and disaster relief, but it's facing issues with engine fuel leaks. These leaks can put the helicopter and its crew at risk, lead to higher maintenance costs, and even cause dangerous situations like fires. The leaks are often due to old parts, weak seals, or bad connections. Although maintenance procedures are in place, these leaks keep happening, showing that we need to dig deeper to find out what's happening. We also need to train pilots and support crews better on how to handle leaks when they happen. To make sure the CH-47s can keep flying safely and effectively, we need to work together to figure out how to fix the fuel leak problem, improve the design, and enhance training for everyone involved.

25 Vent 1028: An Investigation of a Field Camp Mystery Site

PRESENTER(S): Cecilia Withycombe

MENTOR: Derek Sjostrom

DEPARTMENT: Geology

DESCRIPTION: The field of planetary geology is concerned with geologic processes throughout our solar system. While geologists can typically investigate settings in person, they must deploy other methods to learn about other planets. To better understand the results of remote sensing on other planets, geologists use the same tools on Earthly sites and then investigate these sites in person to better understand what the data from remote sensing entails. Thus, we can better understand the geology elsewhere through remote sensing on Earth.

The GeoSPACE 2024 field camp students split into groups of "astronauts" and "ground control" to emulate NASA's remote and in-person field techniques. These groups investigated their mystery site, located east of Flagstaff, AZ, using remote sensing techniques utilized in planetary geology. The GeoSPACE field camp determined the mystery feature to be a water-influenced maar through these methods.

26 The Effect of a Dual-Task Distraction on Fine Motor Skill Performance

PRESENTER(S): Grace Timm

MENTOR: Patrick Hughes

DEPARTMENT: Health and Human Performance - Health Sciences

DESCRIPTION: Being able to focus one's attention on the task at hand and avoiding distracting stimuli is of great importance to complete daily tasks, specifically tasks that require fine motor skills. Because manual dexterity requires precision, focus, and awareness, it is crucial to be able to avoid irrelevant information and distractions. In order to optimize one's performance of a fine motor skill, it is important to acknowledge the influence dual-task distractions have on the completion of the task. This study analyzed college student athletes at Rocky Mountain College to determine the effect dual-task distractions have on fine motor performance, specifically while performing the Purdue PegBoard Test

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27 Fly-By-Wire System

PRESENTER(S): Emma Tyler, Addyson Randt

MENTOR: Mark Donohue

DEPARTMENT: Aviation

DESCRIPTION: Fly-by-wire (FBW) systems have revolutionized aircraft control by enhancing safety and reducing complexity. Unlike traditional mechanical systems, which relied on hydraulic or cable-based actuation, FBW systems use electronic signals to transmit pilot inputs to the flight computer. This eliminates mechanical linkages, reducing weight, complexity, pilot fatigue, and high maintenance demands. FBW systems are designed with multiple redundancies, ensuring that backup systems can maintain control of the aircraft in case of failure. The system's computer-controlled nature also offers advanced protections, making it highly reliable because of the multiple layers of redundancy. Compared to older systems, like mechanical linkage, FBW offers greater efficiency and safety. This project will explore the functionality of FBW systems, comparing them with older methods, examining their historical development, and outlining operational procedures. It will highlight how FBW systems outperform traditional systems in both performance and safety, emphasizing the importance of these innovations in modern aviation.

28 A Comparison Between the Traditional Method Vs. the Modern Method of Cupping

PRESENTER(S): Sydney Von Bergen

MENTOR: Patrick Hughes

DEPARTMENT: Health and Human Performance

DESCRIPTION: Cupping therapy has become a popular way of treatment for musculoskeletal and fascial pain. Cupping therapy applies cups to areas of the skin that are sensitive and sore and creates a vacuum to pull the skin away from the sore area in order to relieve musculoskeletal pain and tension (Lowe 2017). This study will compare the effects on musculoskeletal pain and range of motion of the two methods of cupping, the traditional method and the modern method of cupping.

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ORAL PRESENTATIONS

1 Music Solo Performance of Alto Saxophone

PRESENTER(S): Savannah Davis

MENTOR: Cara Schreffler

DEPARTMENT: Music

DESCRIPTION: Aria, composed by Eugène Bozza in 1936, was dedicated to famous French saxophonist Marcel Mule. Though Bozza was a trained violinist, he wrote incredible works for wind instruments. This is Bozza's most famous solo work, composed for alto saxophone and piano. Aria quietly opens with a piano introduction, followed with the rich sound of alto saxophone. Bozza's Romantic style is highlighted in the lush chord progressions, rich timbres, flowing phrases, and challenging technique. Savannah Davis, a freshman alto saxophonist and music education major, will perform the work.

2 Stress Coping Mechanisms: Are They Effective?

PRESENTER(S): Hyla Thompson

MENTOR: Jenny Reichert

DEPARTMENT: Psychology

DESCRIPTION: College can be a stressful place for students who can suffer from anxiety due to homework, quizzes, papers, presentations, and exams. Stress can be detrimental to a student's health, sleep patterns, emotional stability, and grades in college. Studies have indicated that stress coping mechanisms can ameliorate stress levels in college students and improve both health and sleep. In this study, we will measure and analyze the effectiveness of using any combination of five stress coping mechanisms to reduce the stress levels of college students and determine their effectiveness. In addition, conclusions from this study may help college students to mitigate their stress levels and attain greater success in their college life and goals through the use of stress coping mechanisms.

3 A Meta-Analysis on The Current Literature Studying the Impacts of Equine-Therapy on the Horses

PRESENTER(S): Velvet Quinlavin

MENTOR: Amy Neuman

DEPARTMENT: Equestrian Studies

DESCRIPTION: The following meta-analysis evaluates existing literature regarding the impacts of equine assisted therapy on involved horses. Equine assisted therapy has garnered increasing attention for the benefits or harm the involved horses potentially sustain. A systematic review of recent studies identifies the key outcomes associated with horses engaged in therapeutic programs. Results reveal that, while equine therapy can contribute to improved well-being and health in involved horses, it also presents challenges, including stress, behavioral changes, and potential physical strain. This analysis highlights the need for further research to understand the long-term effects on horse participants used in equine assisted therapy programs and to establish best welfare practices in these therapeutic environments. Recommendations for future studies include the incorporation of standardized protocols, controlled conditions, and comprehensive assessments of horse welfare to better gauge the risks and benefits of equine therapy on animal participants.

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4 Not Just a Sexual Revolution: a Look at the Benefits of the Birth Control Movement 1930's-1980's

PRESENTER(S): Jetta Briggs

MENTOR: Tim Lehman

DEPARTMENT: History

DESCRIPTION: Public opinion surrounding birth control, sex, and morality from the 1930s to the 1980s changed dramatically from a staunch conservative view to what is framed as a sexual revolution. There are many different arguments that activists relied on to change this viewpoint. From Maternalism to Equalism and everything in between, looking at these different arguments and the sentiments of women from the time period makes it possible to see the change in public opinion. What many see as the sexual revolution was actually a power dynamic shift; framing the shift in opinion on birth control, sex, and morality as only a sexual revolution undermines all of the other benefits and effects of the birth control movement.

5 How Edited Images Affect Self-Esteem in College Students

PRESENTER(S): Ashton Kelsey

MENTOR: Jenny Reichert

DEPARTMENT: Psychology

DESCRIPTION: This study examines how exposure to edited images and time spent on social media affect self-esteem in college students. Participants were asked how many hours they spend on social media then were randomly assigned to one of 4 experimental groups in which they were exposed to a number of photos: unedited photos of celebrity men, men edited, women unedited, and women edited. Participants then completed the imagery scale on perceived attractiveness of the photos and the Rosenberg self-esteem scale. Data analysis will examine self-esteem scores between groups, with the expectation that college students who participate in 3 or more hours of social media time and are exposed to edited images will have lower self-esteem than students who do not engage.

6 Rêverie

PRESENTER(S): Madison Lambert

MENTOR: Cara Schreffler

DEPARTMENT: Music

DESCRIPTION: French composer Claude Debussy was born in 1862 in Saint-Germain-en-Laye, France and died in Paris, France in 1918. One of his most famous solo piano works is Rêverie which was completed in 1890. This is one of his earlier piano works, intended to express a tranquil state of daydreaming. Debussy took the idea of daydreaming from the expression identified in 1654, but the original meaning of the word daydream means to talk in delirium, like in the way of a lunatic. Debussy is considered the leader of Impressionism, which is a distinct style that many other composers continued to follow. In his piece, Debussy uses the aspect of repetition to represent his impressionist ideals and also enhance a tranquil state of being. Rêverie will be performed on piano by sophomore music performance and psychology major Madison Lambert.

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7 The Four Quadrants of Equine Training: Human to Horse Relationship

PRESENTER(S): Isabella Leddy

MENTOR: Amy Neuman

DEPARTMENT: Equestrian Studies

DESCRIPTION: Training, the act of conditioning desirable behavior under human direction, disciplines tameness allowing safe ground handling between humans and horses. Four training quadrants are used to condition behavior in horses: both positive and negative reinforcement and punishment. Different horse demeanors such as social, aloof, fearful, and challenging affect the applied training methods. Respective human to horse relationships are built upon trust gained through the consistency, acknowledgment, and timing of reinforcement and punishment. The human's role in this relationship is to understand equine body language when training new skills in chronological order by applying appropriate reinforcement and punishment through pressure and release lacking extreme usage to avoid teaching undesirable behaviors. Furthermore, the horse's role is to display characteristics of attentiveness and respect of boundaries to human handlers by responding to the applied methods through ability to perform a new skill.

8 An Excerpt from In the Face of Terror

PRESENTER(S): Camilla Nusbaum

MENTOR: Ashley Kunsa

DEPARTMENT: English (Creative Writing)

DESCRIPTION: Reading: This short story revolves around a teenage girl's panic as she searches for a way out of an unforgiving labyrinth of trees. The pinnacle of naivety at the outset, the narrator uncovers the reality of friendship as she battles the abyss of her mind and the threatening world around her.

9 Mule Reproduction

PRESENTER(S): Skylynn Hemstreet

MENTOR: Amy Neuman

DEPARTMENT: Equestrian Studies

DESCRIPTION: This thesis explores the historical and current importance of mules, a hybrid cross between a horse and a donkey, in the equestrian community. Today embryo transfer is a leading form of equid reproduction which necessitates increased availability of viable surrogate animals. Mules are an underutilized option to expand the viable surrogate pool. Despite a pervasive reputation of being a sterile hybrid, recent research indicates female mules, known as jennies, are able to effectively gestate and raise embryo transferred offspring.

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10 Evaluating Common Desensitization Techniques in Horses

PRESENTER(S): Aysia Casares

MENTOR: Amy Neuman

DEPARTMENT: Equestrian Studies

DESCRIPTION: This thesis reviews common desensitization techniques used to eliminate and/or reduce fear response in horses in order to help the horse become habituated to management or environmental conditions. The selected techniques include flooding, counter-conditioning, and positive overshadowing. Flooding is one of the most common methods used in desensitization and involves an immersive introduction to unfamiliar stimuli and results in reduced responsiveness to the stimuli as time progresses. Counter conditioning exposes the horse to an unfamiliar stimulus while also providing positive reinforcement to aid in building a positive association with the stimulus. Positive overshadowing focuses the horse's attention on an alternative, more appealing stimulus as they face an unfamiliar or fearful stimulus. The success of these techniques is situational and varies based on the horse's background, the handler's experience, and the type of targeted stimulus.

11 Gustavo, No More Needles

PRESENTER(S): Rose Eclipse

MENTOR: Ashley Kunsa

DEPARTMENT: English (Creative Writing)

DESCRIPTION: Reading: This poem and piece of creative nonfiction focus on the theme of death. In the poem "Gustavo," the speaker invites readers to reflect on their own losses. Using a fragmented structure to highlight the title character's spiraling, this piece illustrates the challenges to adolescents' mental health, specifically during the COVID era. In the flash essay "No More Needles," the eighteen-year-old narrator gets a tattoo in the wake of her grandmother's death. Juxtaposition of the tattoo needles alongside the grandmother's thirteen years of dialysis treatment underscores the narrator's attempt to connect with her grandmother's pain.

12 The Influence of Music on Memory and Attention

PRESENTER(S): Sam Edmisten

MENTOR: Jenny Reichert

DEPARTMENT: Psychology

DESCRIPTION: Music is commonly used by students when studying for an exam, walking to class, and simply relaxing. But how does it affect cognitive functioning, specifically attention and memory? In this study, participants completed a short memory/attention test while unknowingly listening to different types of music, including lyrical music, ambient music, and silence. Data analysis will compare test scores between groups, with the expectation that participants in the non-lyrical music condition will perform best on both tests.

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13 To Raise a Child, Urine My Thoughts, Cletus

PRESENTER(S): Pamela Merrell

MENTOR: Ashley Kunsa

DEPARTMENT: English (Creative Writing)

DESCRIPTION: Reading: "To Raise a Child": Join the speaker in this evolved list poem of absurd advice on how to raise a child.

"Urine My Thoughts": Complete steps one through three in this humorous didactic poem instructing the reader on what to expect while changing a diaper.

"Cletus": Follow an uneducated hillbilly as he discovers beauty in a high-class girl and yearns to kiss her in this piece of flash fiction set on a working farm and narrated in an unusual first-person dialect."

14 The Impact of Campus Involvement on Academic Performance and Work-Life Balance

PRESENTER(S): Reagan Fellows

MENTOR: Jenny Reichert

DEPARTMENT: Psychology

DESCRIPTION: This study examines how engagement in on-campus activities impacts academic success and work-school balance at Rocky Mountain College. Through an online survey, participants report their involvement in extracurricular activities, their grade point average (GPA), and their ability to balance work and school. It is expected that students with greater involvement will have lower GPAs and decreased perceived work-life balance. The results of this study could potentially lead to the development of better student success tools, ensuring extracurricular activities enhance student success rather than detract from academic performance.

15 Wine Storage and the Effects on Sulfite Concentration and Polyphenol Oxidase Presence

PRESENTER(S): Megan Smith

MENTOR: Ivy Fortmeyer

DEPARTMENT: Chemistry

DESCRIPTION: Proper storage is essential to maintain the freshness and flavor profile of wine. Red wines are typically stored in amber bottles at room temperature. However, white and rosé wines tend to be stored in clear bottles under refrigeration. The efficacy of amber bottles and temperature effects on the degradation of wine were investigated. In this experiment, refrigeration and incubation at 40°C were used to determine the effects of temperature on a key enzyme in wine spoilage: polyphenol oxidase. A Ripper titration was used to measure the concentration of sulfites present in each wine sample and their change over time. Finally, sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) was used to quantify the polyphenol oxidase present in each sample after storage at various conditions for four and eight weeks. Ultimately, storage of wine in the refrigerator, with little exposure to light protected the wine from accelerated deterioration and subsequent spoilage.

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16 Musical Performance

PRESENTER(S): Hailey Barta

MENTORS: Cara Schreffler, Jayme Green

DEPARTMENT: Music and Theater Arts

DESCRIPTION: Soprano Hailey Barta (freshman, double major in Music Education and Theatre Arts) will sing “In My Own Little Corner” from the musical Cinderella. Cinderella was written by Oscar Hammerstein and Richard Rodgers, the premiere American musical theater writing team in the 1940’s and 1950’s, known for classics including Oklahoma! and The Sound of Music. Cinderella tells the story of a young woman forced to be a maid to her stepmother and stepsisters. With help from her fairy godmother, Cinderella transforms into a princess and finds love at a royal ball. This wonderful musical uses music and song to bring depth and emotion to a classic and well-loved story.

17 Sweet or Salty: The Impact of Snacking on Memory Recall

PRESENTER(S): Caitlin Kenney

MENTOR: Jenny Reichert

DEPARTMENT: Psychology

DESCRIPTION: College students are more likely to eat unhealthy snacks both as a supplement and a replacement for daily meals. As both diet quality and chewing alone have been shown to influence cognition, these eating habits could also influence their overall academic performance. This study examines whether the flavor or composition of a snack (sweet or salty) and when a snack is consumed (prior to or during testing) influences performance on a memory task. It is expected that sweet snacks eaten prior to testing will affect memory recall positively compared to other testing conditions.

18 Understanding the Genetic and Embryonic Pathways Associated with Overo Lethal White Syndrome: A Review

PRESENTER(S): Brianna Roach

MENTOR: Amy Neuman

DEPARTMENT: Equestrian Studies

DESCRIPTION: Overo Lethal White Syndrome (OLWS) is a fatal autosomal recessive condition associated with white coat color patterning, primarily affecting foals born to overo patterned American Paint Horses. Foals born as a result are referred to as lethal white foals and have an all white or mostly white coat, blue irises, and are often deaf. These foals typically die within the first 72 hours of birth due to mass intestinal obstruction as a result of aganglionosis of the caudal gastrointestinal tract. It is largely known that OLWS is associated with a dinucleotide mutation in the EDNRB gene; however, the relationships between various other genetic pathways contributing to the disease are not well documented. Through literature review, this thesis aims to outline and make connections between the known genetic and embryonic pathways contributing to OLWS.

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19 A Need for Tribal Reentry Programs in Native American Communities

PRESENTER(S): Collins Russell

MENTOR: Julie Beicken

DEPARTMENT: Sociology

DESCRIPTION: This project examines and compares two issues: the effect of the school-to-prison pipeline on the Northern Cheyenne Indian Reservation and tribal reentry programs for juvenile and adult tribal members post incarceration who are being released back into tribal communities. As part of my internship for Native Indigenous Women's Resource Center (NIWRC), I used existing research and data on tribal reentry programs and the school-to-prison pipeline to come up with interview questions for individuals who work with juvenile and adult tribal members on the reservation. I compared the results of the interviews to the findings of the existing research/data to see whether there is need for tribal reentry programs for tribal members post incarceration; and whether the Northern Cheyenne Indian Reservation is affected by the school-to-prison pipeline. I conclude with recommendations for both juvenile/adult reentry programs and prevention mechanisms for the school-to-prison pipeline.

20 Hereditary Colorectal Cancer in Diverse Populations: An Analysis of Representation in Current Research

PRESENTER(S): Daisy Fisher

MENTOR: Holly Basta

DEPARTMENT: Biology

DESCRIPTION: Evidence-based medicine provides guidelines for cancer diagnosis and treatment. While there are many studies on the genetic basis of colorectal cancers and the penetrance of these genes, many discrepancies exist between results. Furthermore, published studies include participants from primarily European countries and the U.S., or do not disclose their sample population. To determine if current literature accurately depicts the risk for diverse individuals with hereditary colorectal cancer, a literature review was performed. Using the All of Us Database, which contains health information, genomics and lifestyle surveys from over one million participants from diverse backgrounds, genes associated with colorectal cancer will be investigated and compared to current literature to determine applicability for a more diverse population. It is predicted that there may be disparities among current colorectal cancer research that could impact the ways that those with inherited susceptibility are screened, diagnosed, and treated.

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21 Bach's Third Cello Suite Prelude

PRESENTER(S): Julianna DeMontigny

MENTOR: Cara Schreffler

DEPARTMENT: Music

DESCRIPTION: Johann Sebastian Bach's Six Cello Suites are among the most beloved and frequently performed works in the solo cello repertoire. The iconic works were most likely written between 1717 and 1723 and were discovered and published in 1825. While they are now frequently performed and easily recognizable, they were originally used by very few cellists as exercises. The Suites did not gain widespread popularity until the 20th century, thanks to virtuoso cellist Pablo Casals, who fell in love with them and recorded the Suites in 1936. His recordings led to a tremendous increase in their popularity and influence.

The Third Suite in C Major is a bold and energetic movement that explores a wide range of the cello's capabilities. The Prelude serves as a powerful introduction to the suite, balancing technical demands with expression.

Julianna DeMontigny, a junior music education major, will perform the Prelude to Suite Three.

22 Impact of Horses on Modern Policing: Usefulness and Economic Influence

PRESENTER(S): Ella Corey

MENTOR: Amy Neuman

DEPARTMENT: Equestrian Studies

DESCRIPTION: This thesis investigates the modern use of Mounted Enforcement Units (MEUs) and their economic impact on police budgets. MEUs are an often overlooked part of the equestrian industry as their prevalence has waned with the introduction of the car; however, their usefulness in specific modern applications has increased. The use of horses as MEUs is a topic of debate among welfare groups and measuring welfare of horses living in urban environments is challenging, but researchers testing methods of measuring stress found that horses on assignments did not have higher levels of stress than those in training. MEUs are currently used in a variety of settings, such as crowd control, community policing, search and rescue, and Border Control, providing evidence that the horse still holds a place of relevance in these situations. While underutilized, MEUs can make a great impact on the communities they serve and must be deployed more.

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23 Book Bans and the Contemporary Library: Where Are We Now, Where Are We Going?

PRESENTER(S): Mikaela Brockel

MENTOR: Henrietta Goodman

DEPARTMENT: English

DESCRIPTION: The library field has always grappled with the issue of censorship. In the past decade, this has become not just an academic debate, but an actual threat to libraries as an institution. This raises the question, how do librarians feel about and how are they impacted by current book ban and censorship issues? To answer this, it is necessary to examine how book banning has changed. The number of challenges has risen, and there is a new focus on targeting books pertaining to diversity. Also, organizations often bring challenges more than individuals, involving multiple titles at once. Furthermore, bannings can turn into legal battles over First Amendment rights. Another important question is whether neutrality is possible. Are libraries inherently political? And if so, is “neutrality” a political statement in itself, on the side of censorship? Finally, how have these issues weighed on librarians, and how can we go from here?

24 Illuminating Focus: How Varying Light Levels Can Affect Cognitive Performance

PRESENTER(S): Jolia Buchanan

MENTOR: Jenny Reichert

DEPARTMENT: Psychology

DESCRIPTION: Past research in psychology shows that colors can affect an individual’s mood or emotions (Elliot, 2015). However, research on the effect of a light bulb’s color or temperature on focus levels is more limited. In the current study, participants were assigned to complete the Stroop test, a commonly used electronic assessment used by cognitive psychologists, under either a warm or cooler temperature light bulb to test whether temperature affects completion times. Due to limited participation, a correlation between the temperature of a light bulb and focus levels can not be determined.

25 The Effects of Auditory Interference on Cognitive Function: Investigating the Role of Working Memory in the Presence of Auditory Disruption

PRESENTER(S): Taylor Bryan, Grace Williams

MENTOR: Jenny Reichert

DEPARTMENT: Psychology

DESCRIPTION: This study investigates the impact of auditory distractions on reading comprehension in college students. Specifically, it examines whether exposure to spoken word audio (podcast) or high-amplitude music affects recall performance compared to a silent environment. In our study, reading comprehension is used as a tool to measure recall performance. Participants were randomly assigned to one of three experimental groups (spoken word audio, high-amplitude music, or silent environment) and completed a reading comprehension test. Data analysis will compare test scores across groups, with the expectation that auditory distractions will reduce recall performance, with spoken word audio leading to poorer performance compared to music.

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SENIOR ART SHOW

1 Another World - Artist's Statement

PRESENTER(S): Battista Eaton

MENTOR: Todd Forsgren

DEPARTMENT: Art

DESCRIPTION: It is no secret that the world we live in may offer us challenges that are all but expected. Though these challenges may help us grow and become better people, we may find ourselves distracted and unable to appreciate. Battista Eaton, Fire Lilies, 2024 what it is that makes this world beautiful. In the exhibition Another World, artist Battista Eaton isolates images from history, mythology, fantasy, and fairytale to present a world very much like our own, but in a way that encourages thoughtful viewing and appreciation for the beauty present in the stories, people, and objects we encounter. After viewing the objects on display in Another World, Battista Eaton hopes to encourage connections with the beauty and spiritual qualities found in his work to that of our everyday lives so that every moment we live becomes a work of art.



ROCKY MOUNTAIN COLLEGE

1511 Poly Drive - Billings, MT 59102