

MESA STATE COLLEGE

GRAND JUNCTION, COLORADO ►►

SECOND ANNUAL



SHOWCASE PROCEEDINGS

Wednesday, April 27, 2011

mesastate.edu/showcase

About the Student Showcase

The Student Showcase highlights student works involving creativity, discovery, research, innovation, and/or entrepreneurship through sessions by undergraduates at Mesa State College and Western Colorado Community College. The Student Showcase builds on classroom experience and is a venue where students can share their work with faculty, student peers, and community members. Students participating in this campus-wide forum have distinguished themselves as scholars. The sessions' abstracts are published in this *Showcase Proceedings*.

Student Showcase Planning Committee

Andres Aslan, Physical and Environmental Sciences

Jennifer Barton, Academic Affairs

Blake Bickham, Teacher Education

Julie Bruch, Languages, Literature and Mass Communication

Adele Cummings, Social and Behavioral Sciences

Keith Fritz, Kinesiology

Carol Futhey, Academic Affairs

Suzie Garner, Art

Philip Gustafson, Computer Science, Mathematics and Statistics

Alma Jackson, Health Sciences

Darin Kamstra, Music

Luis Lopez, Languages, Literature and Mass Communication

Cindy Lueb, Sponsored Programs

Bill McCracken, Manufacturing and Industrial Services,

Western Colorado Community College

Jessica Oviatt, Academic Affairs

Deborah Parman, Business

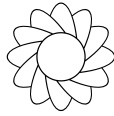
Timothy Pinnow, Theatre

Steve Werman, Academic Affairs, Biological Science

The Student Showcase Planning Committee extends appreciation to Mike Mansheim and Jeremy Smith for all of their design work in support of the showcase.

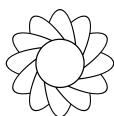


MESA STATE COLLEGE
STUDENT SHOWCASE
PROCEEDINGS



Wednesday, April 27, 2011
Grand Junction, Colorado

FACULTY SPONSORS



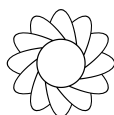
Faculty Member

Thomas Acker
Andres Aslan
Jake Allee
Adam Ballif
Julie Barak
Scott Bevill
Blake Bickham
Steven Bradley
Morgan Bridge
Adam Cochran
David Collins
Adele Cummings
Carlos Elias
Arun Ektare
Suzie Garner
Phil Gustafson
Kurt Haas
Tim Hatten
Myra Heinrich
Alma Jackson
Verner Johnson
Darin Kamstra
Deborah Kennard
Scott Kessler
Barry Laga
Gig Leadbetter
Rick Livaccari
Gary Looft
Warren MacEvoy
Bill McCracken
Kyle J. McQuade
Chad Middleton
Tamera Minnick
Rick Ott
Erik Packard
Deborah Parman
Vincent Patarino
Lori Payne
Gigi Richard
Eric Richtmyer
Robert Ryan
William Sands
Steve Schulte
Dan Shultz-Ela
John Sluder
Johnny Snyder
Bill Tiernan
Mayela Vallejos-Ramírez
Heather Waggoner
Thomas Walla

Department

Languages, Literature and Mass Communication
Physical and Environmental Sciences
Art
Music
Languages, Literature and Mass Communication
Physical and Environmental Sciences
Center for Teacher Education
Art
Business
Languages, Literature and Mass Communication
Physical and Environmental Sciences
Social and Behavioral Sciences
Music
Computer Science, Mathematics and Statistics
Art
Computer Science, Mathematics and Statistics
Languages, Literature and Mass Communication
Business
Social and Behavioral Sciences
Health Sciences
Physical and Environmental Sciences
Music
Physical and Environmental Sciences
Physical and Environmental Sciences
Languages, Literature and Mass Communication
Kinesiology
Physical and Environmental Sciences
Manufacturing & Industrial Services
Computer Science, Mathematics and Statistics
Manufacturing & Industrial Services
Biological Sciences
Physical and Environmental Sciences
Physical and Environmental Sciences
Computer Science, Mathematics and Statistics
Computer Science, Mathematics and Statistics
Business
Social and Behavioral Sciences
Computer Science, Mathematics and Statistics
Physical and Environmental Sciences
Social and Behavioral Sciences
Kinesiology
Kinesiology
Social and Behavioral Sciences
Computer Science, Mathematics and Statistics
Business, Applied Science & Information Services
Business
Physical and Environmental Sciences
Languages, Literature and Mass Communication
Theatre
Biological Sciences

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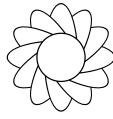
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ABSTRACTS



Presenter(s): **Moses Agbenyo, Molly Roth, Tyler Sickles,
and Ashley Wiseman**
Title: PHI BETA LAMBDA COMMUNITY SERVICE PROJECT
Major(s): Business Administration — Finance, Management, Marketing;
Computer Information Systems
Department: Business
Faculty Sponsor: Deborah Parman

Abstract: During the fall of 2010, student members of the Mesa State Chapter of Future Business Leaders of America – Phi Beta Lambda (PBL) developed a community service project. This project was the Children’s Harvest Festival, an event that provided children and families of the community a safe and enjoyable environment to celebrate the Halloween Holiday. This presentation will introduce the audience to the mission and goals of PBL along with a brief history of the organization. The presenters will then focus on the planning, organizing and execution of the Children’s Harvest Festival. Participation in the Student Showcase will help bring about more awareness of PBL. It will also show how the Mesa State Chapter of PBL contributes to the community and to the success of students at Mesa State College.

Presenter(s): **John Ahern, Reuben Corbett, Sandra Nunez, Sandra Rivera,
and Christopher Steele**
Title: A PERFORMANCE OF THE FIRST MOVEMENT OF ROBERT
SCHUMANN’S PIANO QUINTET, OP.44
Major(s): Liberal Arts, Music — Performance, Education
Department: Music
Faculty Sponsor: Carlos Elias

Abstract: Very few young adults are exposed to quality classical music in today’s pop-culture dominated society. The presenters’ goal is to help others build an appreciation for high-quality and well composed music such as Schumann’s *Quintet in E-flat major*. This piece will be performed by John Ahern on piano, Reuben Corbett on cello, Sandra Nunez and Sandra Rivera on violins, and Christopher Steele on viola. The key to truly appreciating a work of music is knowing the history of the work and its composer. Considered by many to be one of the best chamber music pieces, Schumann composed his *Quintet* in little more than a week during his “Year of Chamber Music.” The piece was dedicated to his wife, piano virtuoso Clara Schumann, who made it a staple of her repertoire. The lyrical melodies and the emotional intensity, often characteristics of Schumann’s works, make the *Quintet* enjoyable and even invigorating to listen to. For lack of time, only the first movement will be performed (approximately 7 minutes). Before the performance, the performers will take a few minutes to present information about the musical form of the piece and a short description of events that occurred in Schumann’s life at the time.

Presenter(s): **Lynn Albers**
Title: PEYOTE: A BRIEF EXAMINATION OF ITS PREHISTORIC AND
EARLY SPANISH COLONIAL ERAS
Major(s): Liberal Arts — Non-Education
Department: Social and Behavioral Sciences
Faculty Sponsor: Steve Schulte

Abstract: Misinformation and ethnocentric judgment have plagued peyote (*Lophophora williamsii*) since it first became historically known. Examined are two currents of the peyote tradition’s history: its deep archeobotanical roots and prehistory, as well as peyote’s impact upon the New World (Mexican) Spanish Colonial era (1500s – 1700s). An initial

background discussion of peyote, a small, spineless cactus endemic to the Chihuahuan Desert of North America, is essential prior to investigation of the featured streams of historical thought. This background includes: peyote's nomenclature and etymology, basic botany, common botanical confusions involving peyote, fundamental active pharmacological constituents, its biogeography, and the indigenous peoples whose homeland is within peyote's native habitat. Peyote's archeological record and early trade history are addressed, concentrating upon radiocarbon dating and alkaloid analysis of ancient specimens. Also considered are various trial records and edifying peyote decrees of the New Spain Holy Inquisition, which arrived in 1571 partly in response to the significant concern regarding Native American peyotism. Early documented medical recognition and anthropological attention of peyote by Spanish physicians, explorers, missionaries, and natural historians is also noted. The modern peyote complex in the form of the Native American Church is the largest contemporary American Indian religion, having an estimated 300,000 members. Despite serious efforts to eradicate it, the longevity and durability of the peyote tradition is remarkable.

Presenter(s): **Jeffrey Allen**
Title: THE EFFECTS OF HETA TREATMENT ON 4140 STEEL
Major(s): Mechanical Engineering
Department: Physical and Environmental Sciences
Faculty Sponsor: Scott Kessler

Abstract: For this experiment the presenter will be machining 12 tensile specimens out of 1/8" X 1" 4140 flat bar stock steel. These tensile specimens will then be heat treated in an oven at 2000F for 3 hours, and then quenched to maintain their internal crystalline structure. Two of these bars will be the control, and then the rest of them will be put into a 400F oven in 4 hour increments for up to 20 hours. This will change the crystalline structure, and therefore should change the Ultimate Tensile Strength of the specimens. A linear regression model analysis will be performed to determine what effects the annealing in the 400F oven has caused to the tensile specimens.

Presenter(s): **Kristian Ambors and Milton Arroyo-Diaz**
Title: TIME CAPSULE
Major(s): Computer Science
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Lori Payne

Abstract: Most students today have difficulties remembering the locations and important dates that happened during history. By relating history to students' day-to-day lives, students will be more able to remember important information rather than memorizing and reading it from a textbook. For these reasons, the presenters decided that it would be in the students' best interest to read history as if they were living it. The presenters focused on fifth grade students since general history is taught during this grade. The project will consist of two first person narrative stories of important characters in history. At the end of the stories, a ten question quiz will be administered through the program and the student's score will be recorded in a database for the teachers to look at later. The outcome will hopefully prove that reading history through particular narratives will improve academic test scores, and help students remember the information.

Presenter(s): **Triston Arisawa and Megan Vogel**
Title: MSCBIZCLUBS.ORG
Major(s): Computer Information Systems
Department: Business
Faculty Sponsor: Johnny Snyder

Abstract: The Department of Business has been in need of a website to host the business department clubs. This gave the Association of Information Technology Professionals (AITP) club an opportunity to design and build a website for the National Collegiate Conference in Orlando. The purpose of the MSCBiz Clubs website is to promote the business department clubs, serve as a communications tool for the clubs and the student body, and create a clear vision of what the clubs stand for. The team used systems analysis

and design techniques learned here at Mesa State College to design and build the finished MSCBizClubs.org website. The analysis began with interviews with Dr. Carpenter who provided clear requirements for the website. The team then considered all aspects of planning the website, such as time requirements, work schedules, benefits and alternatives. The analysis consisted of taking the requirements and logically translating them into various diagrams used in the analysis process. The team created many types of diagrams, such as Data Flow Diagrams that visual communicate the flow of data, Entity Relationship diagrams that communicate relationships between tables, and Sequence Diagrams that communicate the sequence of the flow of data. These diagrams assist in the understanding of systems and communicate the design to those who will be constructing the system. After completion of the analysis phase the team began design of the website. In this phase the team took the logical analysis and the physical considerations to the design of the website and database. This insured that the design would work properly in the website. In the final phase, the team constructed the website using standard methods with web programming languages such as HTML, PHP, CSS, and JavaScript. The website was designed to be user friendly so that appointed club members can easily maintain and update their club's information and content on the site. It was designed this way so that members can edit their site with minimal effort and no web programming experience whatsoever. Additional stakeholder levels are also included in the website in order to manage the clubs and the users.

Presenter(s): **Donovan Asselin, Samantha Moores, and Justin Reed**
Title: THE FINDER
Major(s): Technology Integration — Network Technician,
Computer Aided Design
Department: Business, Applied Science and Information Services, WCCC
Manufacturing and Industrial Services, WCCC
Faculty Sponsor: Bill McCracken and John Sluder

Abstract: This Student Showcase demonstration will introduce a product called "The Finder," and the team will explain how this product will benefit consumers. The team's objective was to develop a product to locate missing objects using Bluetooth technology. The idea for the project came about because of how often people misplace items. "The Finder" was created to save time and eliminate hassles. "The Finder" will be two objects, a locator and a small attachment that emits a signal or noise when "The Finder" is nearby a missing object. The product will consist of one remote locator device and several signal emitting devices that will come pre-linked to the locator. The signal emitters will be designed to attach to almost any surface or location. This product can benefit everyone and will be very simple to use. There will be a screen on the remote capable of displaying graphics and text. "The Finder" will be simple to setup and will not require technical skill to operate. The demonstration for "The Finder" will be using the device to locate a nearby missing object. The audience will be encouraged to assist with the finding or misplacing of the object during the demonstration.

Presenter(s): **Eric Ballard, Phillip Cunningham, Evan Clapper, Adam Keen, and Nicholas Reecy**
Title: CURBSIDE COMPOSTING FEASIBILITY STUDY
Major(s): Environmental Science and Technology — Environmental
Restoration and Waste
Department: Physical and Environmental Sciences
Faculty Sponsor: Deborah Kennard

Abstract: A feasibility study was conducted to assess the demand of food waste composting in the local area. A survey was created and sent to local businesses to determine interest in the project. Food waste was measured in order to determine the volume of compost that would be created. Research was conducted to assess where willing buyers of food compost are located and whether they would be willing to pay for food compost. The results will be used by the Mesa County Landfill.

Presenter(s): **Pace Bates**
Title: TESTING COATING THICKNESS VS. COATING PERFORMANCE
Major(s): Mechanical Engineering
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Rick Ott

Abstract: Friction is a resistive force among contacting components and is a common cause of component failure. Coatings can be applied to moving parts to reduce the negative effects of friction. Friction reduction coatings can be in the form of a powder, liquid or solid. The coatings will each have an optimum thickness at which the friction reduction will no longer decrease. To find this thickness, a test will be constructed to compare the resistive force for solid coatings of different thicknesses. Boron Nitride and Molybdenum Disulfide are common solid lubricants, also referred to as dry lubricants. Each coating will be applied to a 1"x1.5"x.075" specimen of 304 stainless steel. The surface of each specimen will be roughened to ensure that the first layer is sufficiently bonded to the material. A ball-on-disc tester provided by Engineered Coatings, Inc. will be used to test the resistive force created by each specimen. The optimum thickness of the coating will be the thinnest application with the lowest recorded resistance.

Presenter(s): **Brandon Bearden**
Title: OPEN SOURCE EMBEDDED SYSTEMS
Major(s): Computer Science
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Warren MacEvoy

Abstract: Everywhere we look embedded systems are all around us. They are what makes televisions change channels and what makes the microwave buttons work. We live in a world where we pay for everything or at least anything of quality. Whoever heard of a free television or microwave? There is another way. Open source technologies allow us free access to high quality product. Although parts will always cost money, the technology that makes those parts work together to create televisions and microwaves does not have to, and shouldn't, cost money. This is the concept at the heart of this research and why open source technologies are used. The project itself contributes to the same community with a belief that openness breeds innovation. The advancement of civilization should be the heart of what drives the next generation of inventors, not the mighty dollar. This talk is of interest to anyone that wants to learn what is actually behind all the devices we use everyday like cell phones, computers and televisions. We learn what can be done in the spirit of openness and what we can truly achieve if we work together, unrestricted.

Presenter(s): **Mandy Beilman and Katie Walters**
Title: LOUISE ERDRICH AND THE OVERLAP WITH THE ROMANCE GENRE
Major(s): English — Literature
Department: Languages, Literature and Mass Communication
Faculty Sponsor: Julie Barak

Abstract: This presentation will be on the author that the ENGL 370 class is studying this semester, Louise Erdrich. Her books focus on Native Americans, and sometimes the novels overlap with other literary genres. The presenters will analyze several of Louise Erdrich's novels as they relate to other genres, primarily that of the romance genre. The presenters will demonstrate the common assumptions about the romance genre and where Erdrich aligns with those expectations and where she differs. The presenters will highlight different ways of looking at texts, such as with various critical lenses, and then demonstrate them to the audience in a way that is understandable, enjoyable and educational. By looking at this in a "fun" manner, the presenters will be able to relate better to the audience and as well as make it memorable. A brief skit will be included at the beginning to demonstrate a cliché romance scene and then one found in one of Erdrich's novels. From there, the presenters will use PowerPoint to demonstrate the differences and similarities between the two genres and how this critical thinking relates to the English major as a whole.

Presenter(s): **Nicole Bennett and Keeley Jensen**
Title: GATEWAY TO THE SOUL
Major(s): Biological Sciences — Biology, Kinesiology — Exercise Science
Department: Art
Faculty Sponsor: Suzie Garner

Abstract: The dream of most collegiate level students, or anyone with a taste for adventure, is to go abroad and travel the world unknown. The presenters would like to send an invitation to escape to a place where history comes alive along the photographic path of the well know cities — from the famous cathedral in Koln, Germany, to the Colosseum in Rome, to David in Florence, down to the Moulin Rouge of Paris, France. Within these well known cities lays modern and historic art where unknown parts of the heart come alive. These selected photographs capture only a moment in the life of times past and encourages the craving for more knowledge and visitation of these unknown wonders. Following this path of discovery, growth, knowledge, tears, laughter and emotional connection to a unique cultural perspective, the presenters branched and grew to new ways of thinking and experiencing everything around them and including understanding and finding lost parts of themselves. Join this bond and experience the path of gaining wisdom in ways of expression and how a picture shows the gateway to the soul.

Presenter(s): **Justin Bishop, Megan Lane, Spencer McAdoo, and Jonathan Wilson-Wheeler**
Title: ENERGY EFFICIENCY
Major(s): Business Administration — Finance, Marketing, Management; Sport Management
Department: Business
Faculty Sponsor: Tim Hatten

Abstract: This presentation addresses the issue of educating the Millennial generation on the petroleum industry. The presenters will relay facts they have gathered about alternate energies, and the efficiency of them. The ultimate goal will be to prove that for our current lifestyles petroleum is still the most efficient way to provide energy. Conservation is the only way we will be able to change anything in a short period of time. The medium the presenters have chosen to best educate this group of people is an internet game that is similar to Farmville or Sim City in which the participant will have to run a city and build energy plants to run it. Participants will have to choose what type of energy to use because of the costs and energy production, and also see the effect it has on the environment around it. The presenters believe this will improve the petroleum industries image because it will show that although there are a lot of other energy sources out there petroleum is still the most efficient.

Presenter(s): **Zach Black**
Title: PROJECTILE MOTION STUDY
Major(s): Mechanical Engineering
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Rick Ott

Abstract: The physics of projectile motion can be used to analyze any object falling or launched thru the air within earth's atmosphere. A projectile is defined as an object upon which the only force is gravity. When launched from the earth's surface a projectile's motion can be represented by a parabolic shape. The vertical motion of the projectile is independent of the horizontal motion and is only affected by gravity. Changing the angle the projectile is launched at changes the maximum vertical height and maximum horizontal distance the projectile will travel. The objective of this study is Measure the range (horizontal distance) of a projectile launched at positive 2.5° increments from 35° to 55° to verify maximum range is achieved at a 45° launch angle. The data will be analyzed using a hypothesis power testing analysis.

Presenter(s): **Joseph Blehm, Anthony Johnson, and Adam Perry**
Title: INVENTORY CURATOR
Major(s): Computer Science
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Lori Payne

Abstract: The presenters are designing an inventory management system to track inventory, determine current sales and trend lines, and to provide sales representatives an easily accessible tool to determine inventory and assist their customers by being able to look up the details of a specific product or possible options.

Presenter(s): **Matthew Bollinger, Byron Glad, Matthew Green, and Marshall Sweatt**
Title: INTERACTIVE TABLETOP ROLE PLAYING SOFTWARE
Major(s): Computer Science
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Lori Payne

Abstract: The presentation will include a summary of the process of creating a graphical user interface program that will be used as an aid in tabletop role playing games. The presentation will also include the process of selecting a visual interface for the user. The motivation for this project is to make the experience of playing a tabletop game easier and more efficient. The user will be able to point and click to perform game calculations that otherwise would be done by pencil and paper. This product will be adaptable to all tabletop role playing games, improving the user's experience all around. The intended audience of this project is people who have an interest in tabletop role playing games.

Presenter(s): **Douglas Bolton, John Horn, Alexandra Melgoza, Scott Nauman, and Janelle Ruis**
Title: REUSE OF FACEMASKS IN THE HOSPITAL SETTING
Major(s): Nursing
Department: Health Sciences
Faculty Sponsor: Alma Jackson

Abstract: The 2009 – 2010 influenza season brought with it more than the H1N1 influenza virus; it also brought with it shortages of N95 face masks in local hospitals. The shortages of these essential facemasks lead to the need for many hospitals to write directives dictating how to reuse these masks. Little research outside of the Centers of Disease Control (CDC) has been completed on the reuse of N95 masks and infection rates among patients of healthcare providers. Utilizing Florence Nightingale's theory of environmental controls, this quantitative experimental design will utilize a control group and experimental group in a local hospital to determine if reuse of face masks does not increase nosocomial infections. This will be completed by utilizing two Medical Surgical Nursing units at the same hospital; one unit will receive teaching about the CDC guidelines and the other unit will be asked to follow current hospital standard operating procedures. Utilizing direct researcher observations and a nurse self reporting tool, an analysis will be completed. Utilizing several statistical values, a disproval of the null hypothesis will have a level of error less than alpha with a confidence level of +/- 3% and a p-value of 0.05. Recommendations for further research surround the uncontrollable external sources of infection outside the control of nurses.

Presenter(s): **Michael Braun, Cody Garcia, Luke LeFebre, and Chance Winn**
Title: DIESEL VEHICLE EMISSIONS
Major(s): Transportation Services — Automotive Technology, Diesel Technology
Department: Manufacturing and Industrial Services, WCCC
Faculty Sponsor: Gary Looft

Abstract: Diesel vehicles have been misunderstood for years in regards to emissions. The actual emissions caused by the diesel vehicle, kept in good running order, is extremely low.

The very principles of diesel combustion, makes diesel a clean alternative for gasoline. The key to low emissions is keeping the vehicle operating properly. The technician has many electronic diagnostics options to be sure the engine is running correctly and not emitting pollution. A secondary benefit of the diesel vehicle is improved power and fuel economy. How can the technician keep the electronic systems at their peak performance to keep the vehicles emissions at the lowest levels? It is now imperative to properly diagnose emission related problems with a diesel powered vehicle. Being able to use diagnostic skills and having an understanding of the engine systems, and combustion process will allow the diesel vehicle owner the ability to keep their vehicle running properly and not contribute to polluting our environment. A diagnostic routine to determine if all the installed emission devices are keeping the emissions within Environmental Protection Standards is performed by a technician who can diagnose problems related to diesel emissions and performance. Keeping current on the changing technologies will allow a well trained technician, who understands the complex systems, emission concepts and new fuel technology, the ability to have a very productive and challenging future.

Presenter(s): **Emily Breiner and Jessica Hogue**

Title: DIVERSITY ANALYSIS OF CHUSQUEA CATERPILLARS

Major(S): Biological Sciences — Biology

Department: Biological Sciences

Faculty Sponsor: Thomas Walla

External Funding Sources: National Science Foundation and Beta Beta Beta National Biological Honor Society

Abstract: *Chusquea scandens* (Poaceae) is the dominant plant species in the montane forests of the equatorial eastern Andes and is host to a vast diversity of herbivores. The researchers used data from a quantitative sampling study to investigate the diversity of lepidopteran caterpillars in the family Geometridae feeding on *C. scandens* at Yanayacu Biological Station in Ecuador. The researchers classified 569 photographed caterpillars into morpho-species and analyzed patterns of diversity for the sample community. The researchers qualitatively compared seasonal diversity to rainfall patterns and made predictions for avian predator activities.

Presenter(s): **Brendan Bridge**

Title: ELECTRICAL PROPERTIES OF COLD PLASMAS

Major(s): Physical Sciences — Physics

Department: Physical and Environmental Sciences

Faculty Sponsor: Bill Tiernan

Abstract: The planet Earth is not a very hospitable place for plasmas to exist but outside of Earth's atmosphere the plasma state dominates. It has been estimated that over 99% of the universe both by mass AND volume is in the plasma state. Artificially created plasmas are predominantly showing up more and more in modern life, however. Several electronic devices in everyday life incorporate plasmas such as plasma television sets and fluorescent lights. Creating a plasma means ionizing a gas but ionized particles are much harder to model than non-ionized particles because in an ordinary gas one only has to worry about particle impacts, while in a plasma there exist non-negligible electrostatic forces which can lead to some very interesting behavior. The experiment was to create a cold plasma with a strong electric field and measure voltage and current at different pressures.

Presenter(s): **Sherri Brittingham, David Cornes, Jacob Franck, Rex Halterman, Amie Hayes, Kathryn Kindall, and Jacob Thaden**

Title: MINI ANAGAMA PROJECT

Major(s): Art, English — Secondary Education Licensure

Department: Art

Faculty Sponsor: Jake Allee

Abstract: In this age of rising energy costs, ceramics as a medium for art making at the private studio level is becoming increasingly more difficult. Firing ceramic objects takes some type of fuel source that is usually of a non-renewable nature and comes from a commercial entity. Even the common electric kilns in ceramics studios use electricity generated from coal burning power plants. The mini anagama project is an effort to create low cost kilns for firing ceramic objects that use the renewable resource of wood to fire ceramics to a permanent state.

Presenter(s): **Suzanne Bronson**

Title: AN EXPRESSIONIST FILM

Major(s): English — Writing

Department: Languages, Literature and Mass Communication

Faculty Sponsor: Barry Laga

Abstract: The music video *Fire Coming Out of a Monkey's Head* demonstrates the presenter's creative response to the final project assigned in Introduction to Film Studies which required students to show awareness of basic film elements like mise-en-scene, cinematography, sound, and editing. There were specific techniques the assignment required the presenter to weave into the framework of the video, including, among many other elements, a well-composed shot, a tracking shot, stop-motion, pan, tilt, parallel editing, meaningful use of depth of field, setting, lighting, and sound. The presenter applied previous knowledge of film history as well as the knowledge gained in film theory and genre in the Film Studies class in shaping the production of the video. As for the narrative itself, the video is the expressionistic imagining of the Gorillaz's song *Fire Coming Out of a Monkey's Head* which the presenter took to interpret the physical and emotional changes a young person goes through as he moves from adolescence to adulthood. The presenter tries to convey the emotional reality of the narrator through the choice of imagery and editing.

Presenter(s): **Bailey Brown**

Title: ALICE IN WONDERLAND

Major(s): Theatre — Design/Technical

Department: Theatre

Faculty Sponsor: Heather Waggoner

Abstract: This project presents the costume designs for a production of "Alice In Wonderland." The goal of the project was to design, build, and use costumes for this show. The costumes were designed based on a fusion of Victorian era fashion and modern steampunk influences.

Presenter(s): **Casey Brown**

Title: A COMPARATIVE STUDY OF TWO PROMINENT FOOTBALL THROWING TECHNIQUES

Major(s): Physical Sciences — Physics

Department: Physical and Environmental Sciences

Faculty Sponsor: Chad Middleton

Abstract: In the popular sport of American football, there exists two prominent football throwing techniques. These two overhead motions appear to be quite similar but possess many different qualities. The researchers will be determining quantitative differences in the two motions by using equipment at the Monfort Family Human Performance Laboratory. The Human Performance Lab provides a number of technologies (i.e. motion detection, high speed cameras, accelerometers, etc.) that will be used to analyze and

compare both motions. The primary method of analysis will be through experimentation on a Vicon Nexus motion detection system. This system uses a series of reflective markers that are placed on the body and ball and 14 infrared cameras that record the reflective marker locations in three dimensions. From the information obtained by the system, both velocities and accelerations can be derived for every individual marker. The researchers find and compare the speed of the ball, speed of wrist, time it takes from beginning to release, magnitude of the force applied and the motion of the center of mass. The magnitude of the force applied will be used to compare similar effort throws. The more effective throw will be the one that produces the larger velocities and the shorter time. The researchers can then use the path of the center of mass as a possible precursor to a more optimal throw.

Presenter(s): **Nicolette Buchard, Holly Duensing, Kim Hall, and Kelsi Hicks**

Title: VIRTUAL REALITY DISTRACTION THERAPY FOR PAIN AND ANXIETY CONTROL

Major(s): Nursing

Department: Health Sciences

Faculty Sponsor: Alma Jackson

Abstract: This research proposal studies the effects of virtual reality (VR) therapy as a way to decrease pain and anxiety levels during painful procedures. Pain experiences involve sensory, affective, and cognitive experiences; therefore, pharmacological treatment may not be sufficient to relieve all the discomfort (Chan, Chung, Wong, Lien & Yang, 2007). VR therapy has been found to be an effective tool in managing pain and anxiety through immersion as it demands the attention of the patient distracting them from the pain of the current procedure (Gold, Kim, Kant, Joseph & Rizzo, 2006). This quantitative quasi-experimental study will examine pain and anxiety levels as a dependent variable affected by the independent variable of VR therapy. The researchers will study a convenient sample of 20 patients, with a minimum age of 18 years, and who are undergoing multiple painful procedures. It is the belief of the researchers that there will be a significant statistical difference between the experimental group receiving VR therapy and the control group without VR therapy in the reports of pain and anxiety levels. Levels of pain and anxiety will be assessed through the use of a visual analog scale (VAS), state trait anxiety scale, and heart rate. Multiple factors influence the pain experience including the psychological distress, pain-related distress, and the sensation of the pain stimuli. The implementation of VR therapy will help decrease the awareness of psychological distress, pain sensation, and pain related distress through distracting the patient from cognitively processing these aspects of pain. Inadequate pain management is detrimental to both physical and psychological well being (Wells & Rider, 2007). The use of VR therapy is a cost effective and appropriate adjunct to pain management during painful procedures.

Presenter(s): **Drew Buffington, Corey King, Megan Poole, Cloie Sandlin, and Tanner Whaley**

Title: CONSUMER BEHAVIOR BRAND RECOGNITION SURVEY

Major(s): Business Administration — Marketing, Management; Mass Communication; Sport Management

Department: Business

Faculty Sponsor: Deborah Parman

Abstract: A consumer brand recognition survey was conducted for the purpose of testing respondents' ability to connect a specific brand symbol with a particular brand. Results were cross tabulated to depict the demographics of the respondents that replied to our survey. The surveys were collectively administered to a convenient sampling of 50 people. The 10 brand symbols were chosen to include a variety of products including food and beverages, clothing, accessories and luxury items. The survey was designed to conduct most questioning on a scale to allow the respondents to choose how they felt about the brand symbol, or the product the brand symbol was associated with. Only one open-ended question was included. The presentation will be on the statistical information the team gathered while conducting this project, and the team's marketing recommendations to the companies. The significance of the project is to make specific recommendations based on the research to the companies so they can make adjustments to strengthen their brands.

The intended audience includes the marketing sectors of the companies associated with the brand symbols we surveyed, which include The Green Giant, Quaker Oats, Kraft Mac & Cheese, Hamburger Helper Hand, Fruit of the Loom, New Balance, Juicy Couture, Green Bay Packers, Mazda and Sobe.

Presenter(s): **Becky Burgess, Channing Demonja,
and Amber Johnson-Wright**
Title: ENERGY INDUSTRY
Major(s): Business Administration — Business Economics, Finance
Department: Business
Faculty Sponsor: Morgan Bridge

Abstract: This group will be presenting the energy industry. The presentation will focus on three major companies within the energy industry that include BP, Exxon Mobil and PetroChina. Some of the areas of focus include: the future of energy demand, foreign relations and contracts, the importance of future planning and preparation, and the difference between privately owned companies (BP, Exxon Mobile) and Government owned companies (PetroChina). Together, these areas of focus help to represent the growing energy industry and the complex business structure that is created with it.

Presenter(s): **Jared Cahalan, Kayla Espinoza, Erik McDermott,
and Sergio Mendoza**
Title: GAS 'N SUCH
Major(s): Computer Science
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Lori Payne

Abstract: This presentation will be about a "Gas 'n Such", a program which would be used in an average small town convenience store. The reason for the program is so that employees of a convenience store will be able to do tasks such as ring up customers, turn gas pumps on, manage payroll, and count inventory, plus any other basic tasks a service station may need.

Presenter(s): **Donald Cardin, David Farnsworth, Tyler Mooney,
and Mike Rowe**
Title: CNG MOTOR CONVERSION: A GREENER FUTURE WITH
COMPRESSED NATURAL GAS
Major(s): Process Systems Technology, Technology Integration,
Manufacturing Technology — Machining Technology
Department: Business, Applied Science and Information Services, WCCC
Manufacturing and Industrial Services, WCCC
Faculty Sponsor: Bill McCracken and John Sluder

Abstract: With the rising price of gasoline and the constant dependence on foreign oil the demand for alternative fuels needs to be met. Compressed Natural Gas (CNG) is a clean burning abundant fuel source that can meet this demand. Not only can CNG be captured from recycling processes such as waste water treatment, it is also the most abundant national fuel source. This project will consist of converting a small gasoline engine to use CNG fuel to bring awareness to this alternative fuels capabilities and potential. With today's growing environmental concerns we need to turn our interests to local energy sources.

Presenter(s): **Shelly Chapple Clements**
Title: LA POESIA DE JAIME SABINES: A MIXED MEDIA
PRESENTATION
Major(s): Spanish — Literature and Language
Department: Languages, Literature and Mass Communication
Faculty Sponsor: Thomas Acker
Note: This presentation will be given in Spanish and English.

Abstract: The purpose of this bilingual presentation is to introduce Jaime Sabines to the audience and to share his poetry through mixed media. Jaime Sabines was a contemporary

Mexican poet. He was born March 25, 1926 in Tuxtla Gutiérrez, Chiapas, Mexico and died March 19, 1999. His words speak directly and ring true to his readers. His poetry is appreciated by students, housewives, the elderly generation, and academic scholars. He is known as “the sniper of literature”. A month of research in Cuernavaca, Morelos, México analyzing his work entitled “Me preocupa el televisor” will show that Sabines was a poet who embodied the everyman with his sensitivity to joy and the suffering of life. The presentation will include an oral biography of Sabines accompanied by a power point presentation. The presenter will read three of Sabines most popular works in Spanish and discuss them in English. The final poem will be expressed by a video presentation in which local high school students dance to the voice of the poet himself reading “Me preocupa el televisor”. The video representation will be discussed in English and this will conclude the presentation.

Presenter(s): **Aaron Clymer**
Title: THE EFFECTS OF HUMIDITY ON PROJECTILE MOTION
Major(s): Mechanical Engineering
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Rick Ott

Abstract: An object in motion remains in motion at a constant velocity until acted upon by a force in Newtonian physics. A projectile traveling through the atmosphere encounters humidity as stationary water particles that impart a force opposite the direction of travel. The water content of air is proportional to the drag force imparted on the projectile. Drag is a force that reduces the speed of the projectile and therefore reduces the range of the projectile. The range of a projectile is directly proportional to atmospheric humidity when fired at a fixed positive angle relative to the ground in an isotropic atmosphere. This experiment was conducted using a Nerf® launcher and a humidity-controlled environment to analyze the effect humidity has on the range of a projectile.

Presenter(s): **Will Coleman, Tyler Collins, Andrew Foster, and BJ Stone**
Title: POWER REGULATION SYSTEM
Major(s): Manufacturing Technology — Machining Technology;
Process Systems Technology
Department: Business, Applied Science and Information Services, WCCC
Manufacturing and Industrial Services, WCCC
Faculty Sponsor: Bill McCracken and John Sluder

Abstract: Power use in the home is a major source of electricity consumption in the United States. The project will try to create a system that will help average Americans monitor and lower their power use. The system will use current sensors to measure the energy usage, the information will be sent to a computer which will collect it all and compare it to a limit that is set. If the total power use is over the limit the computer will shut off certain outlets and keep them off until the power use drops. The system will be placed into a solar trailer that will act as a model home. This power regulation system will enable the owner to monitor how much energy is being used in the home. This will allow the homeowner to reduce power use, thus saving the homeowner money and saving the environment.

Presenter(s): **Andy Cook and Daniel Hernandez**
Title: EFFECTS OF PRESCRIBED FIRE ON THE SOIL SEED BANK IN THE COLORADO NATIONAL MONUMENT: WILL CHEATGRASS (BROMUS TECTORUM) INVADE THE SITE POST-BURN?
Major(s): Environmental Science and Technology —
Environmental Science
Department: Physical and Environmental Sciences
Faculty Sponsor: Deborah Kennard

Abstract: In the Fall of 2010 the National Park Service and Bureau of Land Management conducted a prescribed burn in the Colorado National Monument. The burn was in an area

dominated by big sagebrush (*Artemisia tridentata*). Prescribed burning is commonly used as a control factor in sagebrush ecosystems because fire produces a flush of nutrients and allows more light and moisture for understory species, enhancing the reproduction of many native and non-native forbs and grasses. Cheatgrass (*Bromus tectorum*) is one of the non-native grasses known to take advantage of post-fire conditions and is also known to inhabit Colorado National Monument. This study investigated the soil seed bank in and around the prescribed burn area in an effort to determine how much cheatgrass seed is available and where it is located. Soil samples taken from random locations in and near the burn were placed in the greenhouse at Mesa State College and the resulting sprouts were identified and counted. The results of the investigation suggest that the fire reduced the seed bank in the burn and that a viable seed bank exists in the area immediately surrounding the burn. Only time will tell whether or not cheatgrass will prevail over native species.

Presenter(s): **Quinn Cooper, Brittney Garcia, Michael Mankoff, Melanie Pershall, Danielle Peterson, and Megan Ramey**
Title: PERCEPTION OF 10 COMMON RESTAURANT LOGOS
Major(s): Business Administration — Marketing; Sport Management
Department: Business
Faculty Sponsor: Deborah Parman

Abstract: A group of six students decided that they wanted to test recognition of 10 restaurant logos and the related perception of these companies. The logos were stripped of their brand names and presented only with their trade dress and logo. The team designed and administered a survey to 25 male respondents and 31 female respondents of all age groups. Within the questionnaire, each logo had a yes or no question asking if the respondent recognized the logo. If the respondents said “yes”, they were then asked to identify the logo they recognized by writing in the name of the company that they identified with the logo. After this, a set of ordinal interval hybrid scaled questions with differential descriptors were presented. The results to these questions were entered into a SPSS Statistical Software data base to analyze the data collected from the survey and to generate cross tabulations based on respondent demographics. The team further analyzed these results. The major conclusions gathered from the results were: 1) The percent of company logos that were recognize; 2) How the companies were perceived by consumers; 3) How some companies are recognized but cannot be identified. These results could be used by companies to see if they are reaching their target market through effective company representation and brand marketing.

Presenter(s): **Holly Corbin, Mary Fuller, Nicholas Moore, Gabriella Rockwell, Spencer Rockwell, Stephani Soto, and Chelsea Tomasi**
Title: SHAKESPEARE A LA MODE(RN)
Major(s): English — Literature, Writing; Sociology;
Theater — Acting/Directing
Department: Languages, Literature and Mass Communication
Faculty Sponsor: Kurt Haas

Abstract: Ben Jonson wrote in the prefatory verse to Shakespeare’s First Folio, “He was not of an age, but for all time!” (l. 43) Yet by now it seems merely cliché to attest to Shakespeare’s “timelessness.” Moreover, perhaps the nature of Shakespeare’s undying relevance is that he is always remarkably timely; that is, he is just pliable enough that each epoch can transpose, reconfigure, and represent his work in a way that suits its needs, desires, and goals. “Shakespeare a la Mode(rn)” seeks to do just that: capture the spirit of Shakespeare by invigorating his text with contemporary interpretation and performance. The group will present a collage of selections from the sonnets as well as the plays in order to highlight the modern concerns implicit in Shakespearean themes and motifs. The goal is to land somewhere in between, say, *10 Things I Hate About You* – “Shakespearean” in the loosest sense – and a performance one might see at the Globe – as strictly textual (and contextual) as a performance can still be. In other words, the performers will develop the interaction between Shakespeare’s artistry and the relevant matters of today’s world in order to shed new light on both.

Presenter(s): **Michael J. Cramer**
Title: THE EFFECT OF MODERATE ALCOHOL CONSUMPTION ON FUEL UTILIZATION, PERCEIVED EXERTION AND RUNNING PERFORMANCE BETWEEN SEXES
Major(s): Kinesiology — Exercise Science
Department: Kinesiology
Faculty Sponsor: Gig Leadbetter

Abstract: Because many athletes enjoy having an alcoholic beverage with their evening meals, they are concerned that the alcohol may hinder their recovery and overall running performance. "Runner's World" magazine contacted the Montfort Human Performance Research Laboratory to study the effects of alcohol on running performance. Ten experienced long distant runners ran on the treadmill at 75% of their VO₂ MAX for 45 minutes to deplete glycogen stores (GDR) and at 80% to exhaustion (RTE) to investigate the effects of alcohol consumption on running performance. Each subject consumed alcohol (AB) to blood alcohol content (BAC) of 0.08% or non-alcoholic beer (NAB) and consumed a high carbohydrate meal after GDR. The following morning they performed a RTE. The RTE measured in time between sexes was assessed using a two way analysis of variance (ANOVA). The results indicated that females performed significantly better after alcohol consumption for the RTE than males. This pilot study leads to questions that need further investigated relating to the metabolism processes in the female body in regard to glycogen storage and alcohol consumption. Any individual who enjoys an alcoholic beverage and competes on any level will find great interest in this project.

Presenter(s): **Jenna Creighton, Christine Hulse, Marsha Hutton, and Caileen Smith**
Title: AN EXAMINATION OF THE USE OF ALTERNATIVE MATERNAL POSITIONS DURING A LICENSED NURSE MIDWIFE BIRTH IN RELATION TO THE OCCURRENCE OF PERINEAL TRAUMA
Major(s): Nursing
Department: Health Sciences
Faculty Sponsor: Alma Jackson

Abstract: While routine episiotomy has been historically performed to minimize the extent of perineal laceration, it is an essentially harmful intervention during the birth process. Because minimal evidence exists regarding how to address the concern of perineal integrity, continued research is necessary to identify methods and relationships of specific interventions that may influence patient outcomes. Although maternal positioning has been identified as having some significance on perineal intactness, the setting and standardization of procedures have been relatively inconsistent. There is therefore a lack of ample research regarding the specific effects of alternative birth positions in relation to perineal trauma during a licensed certified nurse midwife birth. The significance of this and other related studies present considerable implications for the overall health and well being of the postpartum patient. The purpose of this study is to examine the intervention of alternative maternal positioning during a licensed nurse midwife birth in relation to the occurrence of perineal trauma. This study will implement a quasi-experimental retrospective chart review of births that were attended by a licensed nurse midwife. The review will include births that occurred at St. Mary's Hospital in Grand Junction, Colorado from January 2009 through January 2010. A sample size of 403 will be obtained using simple random sampling. It is anticipated that the use of alternative maternal positioning during a hospital birth attended by a nurse midwife will reflect a decreased incidence and degree of perineal trauma.

Presenter(s): **Courtney Cryer, Megan Forrest,
Jennifer Lammers-Agosto, and Rebecca Rugel**
Title: HIGH RISK LIFESTYLE CHOICES AND THEIR INFLUENCES ON
NURSE'S PERCEPTIONS AND TREATMENT OF PATIENTS
Major(s): Nursing
Department: Health Sciences
Faculty Sponsor: Alma Jackson

Abstract: The personal bias of a nurse has the potential to effect patient treatment and outcomes. A negative attitude toward a patient has an effect on the level of care patients receive. This is important because the goal of nursing is to restore the patient to optimal levels of health and wellness regardless of the factors that may influence the patient's disease state. The objective of this research is to determine that if a patient's diagnosis is viewed as self-inflicted or is the result of high-risk behavior, will it have a negative influence on the nurse's perception and subsequent care of the patient. The study being used is a quantitative quasi-experimental correlational research design to gather and analyze the responses of registered nurses working on inpatient units at St. Mary's Hospital in Grand Junction, Colorado. Chronbach's alpha will be used to calculate the internal validity of greater than 0.7. Nurses were selected using the randomization method by choosing every fifth nurse who met the predetermined criteria. The data collection procedure consisted of distribution of a case study and a corresponding questionnaire modeled survey. Information was interpreted using Pearson's r correlation coefficient. The predictor is the patient's diagnosis, and the outcome will be the nurse's perception of the patient's diagnosis and subsequent treatment.

Presenter(s): **Shane Daniels, Kenny Gimple, Jerome Kiefer,
and Eric Wilcox**
Title: BUILDING A RESUME WITH EXAMPLE WORK PORTFOLIO
SOFTWARE
Major(s): Computer Science
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Lori Payne

Abstract: The *Student Works Portfolio* software combines and maintains your projects in one place, thus creating an organized resume. The presenters will demonstrate how the Students Works Portfolio records your work history and creative endeavors throughout your career, in turn creating a polished resume. Delphi, a visual object-oriented programming language, was used to create this software. During the Student Showcase, the presenters will describe the process by which they developed the *Student Works Portfolio*.

Presenter(s): **Jonell DeVency, Cody Snider, Rick Stengel,
Bri Sulley, and Alex Swaynie**
Title: ADVANCED MARKETING / AMERICAN PETROLEUM
Major(s): Business Administration — Marketing
Department: Business
Faculty Sponsor: Tim Hatten

Abstract: This team's project is focused on making an Integrated Marketing Communications (IMC) program for American Petroleum Institute (API). The team will present it to API in a PowerPoint format. The team will also present a communication strategy to reach the project's target market: 18-24 year old men and women around the world. The team will also show forecasting for demand and consumption trends in each energy sector around the world and in our backyard.

Presenter(s): **Rose Doerr, Julie Ketcham, Jennifer Martinez,
and Dianna Puckett**
Title: THERMOGRAPHY AND LOW BACK PAIN
Major(s): Nursing
Department: Health Sciences
Faculty Sponsor: Alma Jackson

Abstract: The prevalence of work-related low-back injuries has long been a concern in the nursing profession. The purpose of this study is to determine the reliability of infrared thermography in evaluating nurses' readiness to return to work after suffering work-related low-back injuries. Thermography utilizes body heat to discern level of inflammation in an affected area. The hypothesis in this study is that infrared thermography is an effective adjunctive means of evaluating injured nurses' level of readiness to return to work. The sample will consist of 40 nurses with work-related low-back injuries. A snowball sampling method will be used to recruit participants. The experimental group (20 participants) will undergo thermal imaging weekly for two months or until inflammation has subsided. The control group (20 participants) will not undergo thermal imaging. A survey will be used to elicit data regarding rate of re-injury within six and twelve months of returning to work in both groups. The number of nurses who experience re-injury, which is the dependent variable, will indicate the effectiveness of thermography in determining readiness to return to work.

Presenter(s): **Misty S. DuBois**
Title: A CONTEMPORARY VIEW OF LANDSCAPE THROUGH THE
MODERNISTIC STYLE OF MARK TANSEY
Major(s): Art — Art History
Department: Art
Faculty Sponsor: Steven Bradley

Abstract: In a world of bombarding images, the traditional landscape genre fails to compete. In a study of modernism through the eyes of Mark Tansey, landscape is reinvented for a new vision of the world around us. An in depth study of Mark Tansey's approach will examine his definite points of interest lacking in today's world of landscape paintings. He addresses the question of re-presenting representational subject matter, value complexity, and photo realistic paintings with historical content. The importance of the presentation is to bring awareness to environmental concerns with a new visual approach. The entire presentation is a way to reconnect a traditional two-dimensional medium with a modern audience through the study of art history.

Presenter(s): **Paul DuCray**
Title: LAPTOP ON A BOARD
Major(s): Technology Integration — Network Technician
Department: Business
Faculty Sponsor: Johnny Snyder

Abstract: This poster will illustrate a deconstructed/re-constructed laptop which could be used to solve space issues on a physical desktop. The deconstruction phase was accomplished with relative ease, but the reconstruction was hindered by hardware and software issues that had to be resolved. The programming tasks and hardware configuration issues will be discussed with the audience in this presentation of "laptop on a board."

Presenter(s): **Jared Dworshak, Anthony Johnson, and Adam Weimer**
Title: NOTE GENERATOR
Major(s): Computer Science
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Arun Ektare

Abstract: This programming group is building a call flow checklist/account documenter that will provide a form with elements normally handled on client specific interactions. The tool will be used to help call center representatives be better equipped to perform standard tasks by allowing them to meet the documentation criteria set by their quality assurance department

Presenter(s): **Jessica K. Fisk**
Title: GUERRILLA ART
Major(s): Art — Art History, Studio Art
Department: Art
Faculty Sponsor: Steven Bradley

Abstract: Non-commissioned public art is a force for positive social change in contemporary society. The *Guerilla Art Showcase* will survey the current movement and its artists while emphasizing how these artists and their work function as a vehicle for positivity, egalitarianism, innovative thinking, and personal freedom. Like the art itself, the *Guerilla Art Showcase* is open to all ages and backgrounds. The far-reaching goal of this presentation is to assist viewers in seeing street art and other free public art installations not as an urban nuisance, but rather as a welcome reprieve from human apathy. This presentation hopes to inspire artists to create socially relevant work outside the parameters of the gallery and beyond the influences of cash flow and commissions. With visual examples of the work as a background for the lecture and discussion forum, this student showcase promises to be a unique and interesting exploration into a very present and significant artistic genre which has, until now, seldom been given a meaningful place by art historians as an influential component in today's art and social scene.

Presenter(s): **Kelsey Follett and Alexis Skarda**
Title: INDIVIDUAL CASE STUDY OF RUNNING IMBALANCES
Major(s): Kinesiology — Exercise Science, Adapted Physical Education
Department: Kinesiology
Faculty Sponsor: William Sands

Abstract: Using thermal imaging, the electromyograph, high speed video and force plates we evaluated an elite NCAA division II runner. The analyses of the different modes of testing showed a deactivation of the gluteus medius, hyperactivation of the compensatory muscle, lower sacral iliac heat indicating inflammation and over-striding. The combination of these abnormalities was causing her to put 1.8 times more force on one leg than the other, which was indicated using our Vicon analysis system with the force plates incorporated. This is a common problem that occurs in many endurance runners due to muscle compensation which can prevent maximal performance as well as cause chronic pain and eventually injury. A prescription of strengthening exercises including inverted, everted, and neutral hip abduction were recommended to help strengthen the gluteus medius and minimus. Electrical stimulation was also used to train her non firing muscle to activate. With proper rehabilitation she was able improve her one mile time by twenty seconds within a five week period.

Presenter(s): **Jennifer Frans, Jesusita Herrera, Constance Arkadia Krabacher, and Jesús Raffo-Risco**
Title: THE FEMININE VOICE OF LATIN AMERICA
Major(s): Spanish — Literature and Language; Psychology
Department: Languages, Literature and Mass Communications
Faculty Sponsor: Mayela Vallejos-Ramírez
Note: This presentation will be in Spanish.

Abstract: The position of women in society can be viewed from a variety of perspectives. As a final project in the class of Hispanic Poetry, the students have analyzed poems from four female Latin American authors. Each of these women wrote about different aspects of women's roles and social experiences. Through an analysis of the feminine views presented by the poetic voices of these authors, we can begin to understand the situation of Latin American females, past and present, in the areas of work, motherhood, love, and eroticism. This presentation will be a panel of the four students reading their final papers in Spanish. The work of Jesusita Herrera will analyze the poetry of Rosario Castellanos, a Mexican poet who demonstrates her struggles as a working woman in a patriarchal society through her writing. Jesús Raffo-Risco will contrast two poems from Claribel Alegría of Nicaragua, whose poetry demonstrates two perspectives about being a mother: the satisfaction of being a creator and the concern of passing on sadness to her child. Jennifer Frans will discuss the expectations of men in relationships with "real women," as expressed in the feminist poem "Reglas de Juego para los Hombres que Quieren Amar a Mujeres Mujeres," by the Nicaraguan poet Gioconda Belli. Constance Krabacher will discuss the ways in which eroticism is repressed in Central American women and how men expect women to fulfill stereotypical, unrealistic, and chauvinistic roles by examining the poems "Es Muy Difícil" and "Abre Sexo" by the Costa Rican poet Ana Istaru.

Presenter(s): **Julia Fritz**
Title: ISOPRENILCYSTEINE METHYLATION IS REQUIRED FOR CYTOKINESIS IN DICTYOSTELIUM.
Major(s): Biological Sciences — Biology
Department: Biological Sciences
Faculty Sponsor: Kyle J. McQuade
External Funding Source: Beta Beta Beta National Biological Honor Society

Abstract: Ras family GTPases are small, monomeric signaling proteins found in cells. These molecules are involved in a variety of essential cellular processes, including cell cycle regulation, chemotaxis, and endocytic vesicle formation. These proteins are also over-expressed in many cancers, making them an attractive target for research and development of cancer therapeutics. Current research suggests that restricting the addition of a methyl group, a required modification of Ras GTPases, can shrink tumors. This project is aimed at understanding how restricting methylation impacts cell behavior. Methylation is regulated by a single enzyme, isoprenylcysteine carboxyl methyltransferase. Using the cellular model *Dictyostelium discoideum*, a social amoeba, our lab is attempting to characterize the impact on cell division when isoprenylcysteine carboxyl methyltransferase is inhibited. Actively growing cells are harvested and stained to determine if there are a higher number of multi-nucleated cells when this enzyme is restricted. Preliminary data suggest that cells unable to methylate Ras GTPases do have a higher number of multi-nucleated cells, possibly due to an inability to properly undergo cytokinesis.

Presenter(s): **Alexis Galvin**
Title: DOES A BOTANICAL HERB FORMULA AID ACCLIMATIZATION TO HIGH ALTITUDE?
Major(s): Kinesiology — Exercise Science
Department: Kinesiology
Faculty Sponsor: Gig Leadbetter

Abstract: Thousands of individuals make their way to high altitude every year, whether for recreation or job-related activities. It is an ongoing struggle to find non-prescription drugs to prevent or alleviate acute mountain sickness and thus enhancing our stay at altitude.

The purpose of the study was to compare High Altitude Help (HAH) versus placebo for alleviation of acute mountain sickness (AMS) and to determine if HAH improves exercise performance. The subjects (n=54, 28 females and 26 males) began taking the HAH tincture by mouth two times per day, four days prior to ascent. A shuttle run, "beep test", was performed by all subjects 1 week prior to ascent and at altitude for an estimation of VO₂ maximum. Data showed that HAH administration had no effect for either decreasing AMS symptoms or increasing performance respectively. AMS incidence was almost equal in placebo vs. treatment.

Presenter(s): **Juan Garcia**
Title: BOVINE BLUES
Major(s): Graphic Design — Animation
Department: Art
Faculty Sponsor: Suzie Garner

Abstract: In an increasingly digital age, the print medium is rapidly diminishing. As a result, syndicated cartoonists are also disappearing. Many of us grew up during an age where we received our news mainly from newspapers and television, but with the explosion of the Internet, and the subsequent "smart phone" boom, some people today have rarely held a live printed newspaper. Cartoonists are an interesting group of people: these artists characterize life and make it their own. The comic strip "Bovine Blues" is an experiment on satirizing college life from the perspective of a student. Straying away from digital means makes the work more personal. Actually holding a brush and pencil keeps the artist connected to the origins of the medium.

Presenter(s): **Jaco Gerbrands**
Title: USING THE STATIC, COUNTERMOVEMENT AND DROP JUMP TO TEST THE STRENGTH, POWER AND REACTIVITY OF THE MSC WOMEN'S TRACK TEAM
Major(s): Kinesiology — Exercise Science
Department: Kinesiology
Faculty Sponsor: William Sands

Abstract: Strength, power and reactivity are important components to any anaerobic dominant sport. Being able to measure these components for strengths and weaknesses is important for developing the proper training protocol. The Monfort Family Human Performance Lab (MFHPL) measured the Mesa State Women's Track team sprinters (n=15) for these three components. The static jump (SJ), counter movement jump (CMJ) and a drop jump (DJ) were used to measure strength, power and reactivity respectively. The SJ was performed by starting in the squatting position, where knees would be at 90 degrees and jump as high as they could. The CMJ required the athletes to start in the standing position and then dropped quickly to aid in a power counter jump. The sprinters performed the DJ by dropping from a height of 36cm and rebounding off the force platform as quickly as possible. Throughout the three jumps the athletes were instructed to keep their hands on their hips to prevent any technique advantages. The project was done in the lab with each athlete performing two trials of the three jumps. Information drawn from the data showed the athletes were strong but needed to work on their power and reactivity. From these results the proper training adaptations were recommended. Further testing, to see if training adaptations were effective, is planned in certain increments of the training periodization.

Presenter(s): **Melanie Gertson**
Title: "MY OWN LITTLE WORLD" VIDEO
Major(s): English — Secondary Education Licensure
Department: Languages, Literature and Mass Communication
Faculty Sponsor: Barry Laga

Abstract: In this student's first ever video, viewers are invited to watch the transformation that takes place when a certain awareness happens: that there is more to life than amassing 'things' and merely existing, that there are people all around us who need help, and often, we don't have to give money to help them, merely our time and energy. Sung

by Matthew West, the song “My Own Little World” accompanies this Intro to Film Studies project. The assignment was to create a meaningful music video which incorporates such basic film elements as mise-en-scene, cinematography, sound and editing. This video also utilizes such specific film techniques as a well-composed shot, depth of field, pan, tilt, and stop-motion editing, and represents a working knowledge of film theory and narrative. In watching this short work, viewers gain greater acceptance and understanding of how simple efforts can be effective in our community.

Presenter(s): **Gordon Gibson, Byron Glad, and Dylan VanPelt**
Title: INVENTORY MANAGEMENT AND CUSTOMER QUOTING DATABASE
Major(s): Computer Science
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Arun Ektare

Abstract: Many small businesses walk a fine line between bringing in a profit and providing an affordable product to their customers. With the use of the computer software program designed, these businesses can keep close track of their inventory. A graphical user interface allows users to navigate the software to easily enter and edit new customers, orders, products, ingredients and recipes. The program utilizes a database to access information on customers, base ingredients, products, and nutrition. With this information, business employees and owners can make certain they are achieving the profit margin necessary to stay in business.

Presenter(s): **Gordon Gibson**
Title: MP3 FORMATTING
Major(s): Mathematics
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Phil Gustafson

Abstract: Many people use MP3 players to listen to and store their compressed audio files. Few people, however, know how and why mathematical algorithms make the compression possible. This presentation will illustrate the MP3 compression process by utilizing an example from a small data set. Programs that were specifically designed to illuminate the MP3 compression process will be presented. These programs will be utilized to show a simplified version of the MP3 compression process using a voice wave and possibly other sound waves. Through this simplified version of the MP3 compression process the effect of the process on the sound waves will be examined by listening to sound files, which have compression rates of up to 90 percent. In addition, the MP3 compression process will be examined to determine why certain algorithms, as opposed to others, were utilized in the MP3 process.

Presenter(s): **Tonya Gonzalez, Katie Nowicki, Cheryl Olson, and Bobbie Paulson**
Title: EFFECTS OF FAMILIAL VOICE INTERVENTIONS ON COMATOSE PATIENTS
Major(s): Nursing
Department: Health Sciences
Faculty Sponsor: Alma Jackson

Abstract: The aim of this study is to investigate the effects of familial voice recordings on comatose patients in the Intensive Care Unit. This research group believes that familial voice recordings will produce positive effects and improve outcomes of comatose patients. In recent years there has been an increase in research of non-pharmacological therapies to promote healing of patients who are critically ill, including music, therapeutic touch, and family presence. Many studies conducted on family presence show evidence of positive changes in patients’ physiological measurements and outcomes. Despite many positive observations, there continues to be a lack of formal research regarding familial presence, particularly the effects of familial voice on patients. For this research study, familial voice recordings will be played in a controlled setting to a quasi-experimental design group

comprised of a purposive sample of 10 comatose patients with a Glasgow Coma Scale rating of 6 to 8, and whose hearing is intact. The patient's pulse rate and intracranial pressure measurements will be recorded twice a day for 5 consecutive days; the results will then be analyzed by a biostatistician utilizing the Pearson's r correlation analysis method.

Presenter(s): **Jennifer Graham**
Title: GIS MAKES IT POSSIBLE FOR OIL AND GAS EXPLORATION
Major(s): Physical Sciences — Geology
Department: Physical and Environmental Sciences
Faculty Sponsor: Verner Johnson

Abstract: GIS (Geographic Information Systems) is a multi-faceted mapping program that can make a lot of things happen or even solve problems. Some examples of use include locating natural resources, analysis of subsurface geology, and well exploration. GIS allows for a large variety of statistical data to be formatted into the mapping system. This statistical data can range from quantitative to qualitative data. With GIS the statistical information can be sorted in just about any way imaginable to change the look of the mapped area so that a particular statistic can be viewed as a layer on the map surface. This is important for planning processes like seeing how much of natural resource occurs in an area. For example, a geologist could take petroleum well information, format it into GIS data, and run a query to view important information. Specifically like levels of a resource that they are looking for in relation to specific bedrock units to predict where natural resources might found. This poster shows how well information and the depth to the Dakota formation can be used to locate hydro carbon deposits in the Wilson Creek area of northwestern Colorado.

Presenter(s): **Anna Gramlich, Audrey Reynolds, Brittany Skelton, and Heather Westcott**
Title: MEDICAL MARIJUANA AND THE EFFECTS AS A TREATMENT FOR ATTENTION DEFICIT HYPERACTIVITY DISORDER
Major(s): Nursing
Department: Health Sciences
Faculty Sponsor: Alma Jackson

Abstract: The purpose of this paper is to examine the effects of medical marijuana as a treatment for the attention and focus deficits that accompany Attention Deficit Hyperactivity Disorder (ADHD). A controlled experimental design was used in this study. This quantitative study takes place in Grand Junction, Colorado. Participants will be voluntarily recruited from primary care doctors in the valley. A classroom setting will be used to administer the tests and for adequate observation of the participants. Forty participants will voluntarily consent and will have to have never used marijuana. This study will measure the ability to focus through observations by the recorders during the general knowledge exam, and the score on a Mini Mental Status Exam (MMSE). An independent samples t-test will be run to determine the results of this study. The researchers anticipate finding a strong correlation between medical marijuana use and an increase in the ability to focus in persons with ADHD.

Presenter(s): **Rob Hartop, Julie May, and Luke Sutherland**
Title: VIABILITY ANALYSIS OF JUICE JUNCTION
Major(s): Business Administration — Finance
Department: Business
Faculty Sponsor: Morgan Bridge

Abstract: Three students are analyzing the viability and sustainability of Juice Junction, an on-campus smoothie retailing business. Specific issues include an overview of the smoothie industry, benchmarking against related companies, sensitivity analysis, coverage of variable and fixed costs, and recommendations for changes. Financial data for multiple periods is being collected in order to perform trend analysis helpful in future planning and for comparison to macro-level industry trends.

Presenter(s): **Caitlin Heath and Peter Schulze**
Title: CIRCUITRY-BASED SIGNAL REFINEMENT FOR PHOTON DETECTION
Major(s): Physical Sciences — Physics
Department: Physical and Environmental Sciences
Faculty Sponsor: David Collins

Abstract: In an effort to refine raw signals from a photomultiplier tube (PMT), circuitry is designed to amplify signals associated with the arrival of a photon at the PMT, and to reduce background noise and transmission defects. To accomplish this, an inverting amplifier is built using basic circuit design principles, combining both noise reduction and signal amplification components. The end result is a signal that exhibits clear spikes indicating detection of single photons which can be easily distinguished from intrinsic background noise by a high speed counter. The amplifier and counter are used to measure the rate at which photons arrive at the PMT. This can further be used for relating photon counting to light intensity measurements, having utility for interferometry applications.

Presenter(s): **Jesusita Herrera, Rafael Orozco, Carolina Rodríguez, and Marlene Romero**
Title: EL IMPACTO DE LOS TRABAJADORES CON VISA H2A EN LA COMUNIDAD Y EN LA MANO DE OBRA ('IMPACT OF H2A VISA WORKERS IN THE COMMUNITY AND THE WORKFORCE')
Major(s): Spanish — Applied Professional Spanish
Department: Languages, Literature and Mass Communication
Faculty Sponsor: Thomas Acker
Note: This presentation will be given in Spanish and English.

Abstract: Agriculture contributes \$16 billion each year to Colorado's economy. This bilingual project will inform the audience regarding the labor and social impact of H2A Visa workers of Latino descent in the local community and workforce. It will include information about the impact of their absence in their country of origin as well as the process of obtaining an H2A Visa. An important part of understanding local H2A Visa conditions is through their integration into the community; an organization that facilitates this is the Hospitality Center in Palisade. The Hospitality Center provides and coordinates services specifically for these migrant and seasonal farm workers and their families. The research information collected from surveys of employees and their employers at orchards in Mesa County, as well as the staff and volunteers at the Hospitality Center, is evidence of the need for this type of employee. The decades — long presence of the temporary migrant workers in the agricultural sector of the Grand Valley has enriched the economy and the culture of the local community.

Presenter(s): **Jesusita Herrera, Rafael Orozco, and Carolina Rodríguez**
Title: THE CULTURES WE INHERIT / LAS CULTURAS QUE HEREDAMOS
Major(s): Spanish — Applied Professional Spanish
Department: Languages, Literature and Mass Communication
Faculty Sponsor: Mayela Vallejos-Ramírez
Note: This presentation will be given in Spanish.

Abstract: This presentation given in Spanish will include two perspectives of what it is like to be of Hispanic descent living in the United States, specifically from Chicano and Mexican points of view. This will also include the history of the Mexican American War that resulted in a loss of land and left many people with a loss of identity. After many years of not being accepted by either culture, Mexican Americans have identified themselves as Chicanos with pride and power. As of recent times there is a new wave of culture in the United States created by an increase of immigration from Mexico, bringing with them a culture that is distinct from the Chicano culture.

Presenter(s): **Melissa Herrera**
Title: THE CONSTRUCTED IDENTITY OF THE ISLAMIC VEIL IN MODERN FRANCE
Major(s): History
Department: Social and Behavioral Sciences
Faculty Sponsor: Eric Richtmyer

Abstract: The Islamic veil worn by a small number of Muslim women in France has fractured society over important issues of religion and national identity. When examining the rhetoric and the reactions of the French people, one sees how the veil has been constructed by perceptions and misperceptions. The issues of decolonization, sexuality, immigration and the Algerian War all influence how the French understand the Islamic veil. When this is put into the context of the French ideas of nationhood, communalism, private vs. public spheres, and what constitutes being “truly French,” we can understand the outrage more clearly. The knowledge of France’s history with the Islamic veil is relevant to America because the United States faces the same issues concerning the degree of assimilation for the Islamic culture and the emotions that surround this problem. Interpreting and understanding the constructed identity of the Islamic veil in France will help America understand its own situations with assimilating others to its nationhood.

Presenter(s): **Brandon Hildebrand, Devon Hinkson, Dallas Ray, Dylan VanRoekel, and Chance Winn**
Title: KEEPING OPTIMUM FUEL ECONOMY IN THE MODERN AUTOMOBILE
Major(s): Transportation Services — Automotive Technology
Department: Manufacturing and Industrial Services, WCCC
Faculty Sponsor: Gary Looft

Abstract: In today’s high fuel cost market, the vehicle must be kept in perfect running condition to optimize fuel mileage. How can the technician keep the systems a peak operating parameters? The vehicle’s fuel, ignition and other related systems can make the automotive technician’s job a very complex one. The real problem is the ability of the on-board computer systems to mask problems until they become a significant problem for the motorist. This masking of minor problems leads to reduced fuel economy and accelerated engine wear. The diagnostic tools needed to diagnose the performance parameters of the vehicle have become very complex, and require keen critical thinking skills to use all the available on-board computers and current diagnostic equipment to determine the root cause of the problem. A complete understanding of all the vehicle systems and their interaction is necessary to bring the vehicle to its optimum performance. The money spent to keep the vehicle at optimum performance, usually regular scheduled maintenance, is minimal compared to the high cost of the fuel and shortened vehicle life. On-board diagnostic scans can detect fuel mileage issues before the customer detects a problem. The presenters will demonstrate how an automotive technician performs these tests and discuss sample results.

Presenter(s): **Trisha Hyatt**
Title: LOCATING ANCIENT UNCOMPAHGRE AND GUNNISON RIVER GRAVELS ON THE UNCOMPAHGRE PLATEAU
Major(s): Physical Sciences — Geology
Department: Physical and Environmental Sciences
Faculty Sponsor: Andres Aslan

Abstract: Ancient Uncompahgre and Gunnison River gravels on the Uncompahgre Plateau have been a subject of study since the late nineteenth century. The Uncompahgre Plateau is a Laramide northwesterly trending structure that is located in southwestern Colorado. The Gunnison, the North Fork of the Gunnison, Lake Fork of the Gunnison and the Uncompahgre Rivers have sources that originate in the San Juan and Elk Mountains. Each of these source areas have different rock types. These different rock types are reflected in the modern river gravels. There are many ancient river gravel deposits located on the Uncompahgre Plateau, and the rivers responsible for these gravels are controversial. Grays Cow Camp, Pool Creek and Goddard Creek are locations on the Uncompahgre Plateau where ancient river gravels were collected. This project will perform petrologic descriptions

on samples at these three sites and these descriptions will be compared to the modern river gravels. This comparison will determine which river is responsible for the ancient river gravels at each site. These interpretations will once and for all answer the question of which river(s) crossed the Uncompahgre Plateau.

Presenter(s): **Carrie Imel**
Title: "KILL THE INDIAN, SAVE THE MAN"
Major(s): Post Baccalaureate Licensure, Secondary
Department: Center for Teacher Education
Faculty Sponsor: Blake Bickham

Abstract: "Kill the Indian, Save the Man" is a short documentary that tells the story of Native American boarding schools in the U.S.A. beginning in 1869. It explains the reasons for and repercussions of the Bureau of Indians Affairs' use of these schools in "civilizing the natives." It is meant to enlighten and inform the audience of a little known historical chapter of education in America. This film was created for future educators in hopes that understanding some of our past mistakes when dealing with diversity will help us to not recreate them. The presenter drew from multiple resources in order to create the script for this short film. This documentary was created using iMovie and Garage Band from iLife 11 suite software and owes many thanks to Jarrod Harper for his technical expertise.

Presenter(s): **Gregory Indivero**
Title: CHANNEL MORPHOLOGY & SEDIMENT TRANSPORT OF RED CANYON, COLORADO NATIONAL MONUMENT
Major(s): Physical Sciences — Environmental Geology
Department: Physical and Environmental Sciences
Faculty Sponsor: Gigi Richard

Abstract: The goal of this study is to characterize the channel morphology of Red Canyon in the Colorado National Monument (CNM) in order to better understand the channel-forming discharge regime of this ephemeral stream system. Red and Columbus Canyons' outlet is the 5th largest drainage in the CNM. Red Canyon's geologic setting of steep sedimentary canyon walls and a crystalline impermeable channel bottom lends itself to intense localized high flow events. Fieldwork will involve cross-sectional channel surveys, and measurements of channel gradient and grain-size distribution. Channel-forming flows will be estimated by computing the discharge required to mobilize the bed material (D84). To estimate the channel-forming flows the critical shear stress will be calculated using the Shields Equation ($\tau_c = \tau^*c(\rho_s - \rho_w)gD84$). A modified DuBoys equation ($hc = \tau_c / \gamma_s$) will then be used to calculate the critical flow depth. The discharge required to achieve this critical flow depth will be modeled using HEC-RAS software. The results will then be compared to Richard et al.'s (2007) study on the channel morphology of No Thoroughfare Canyon in the CNM. This research will help conceptualize the geomorphic work needed in order to maintain Red Canyon's channel.

Presenter(s): **Geo Kelly, Kayla Kraynie, Lauren Nicholas, Chad Pasterz, and Lauren Thackaberry**
Title: SELLING THE AMERICAN PETROLEUM INSTITUTE
Major(s): Business Administration — Marketing
Department: Business
Faculty Sponsor: Tim Hatten

Abstract: This project seeks to answer the question that was posed to Dr. Hatten's advanced marketing class, how does one educate the 18-25 year old market on national energy issues? This assignment was given to the class as a practical application of a marketing major. The background information necessary for a reader to fully understand the work is very little. The project is a rough summary of the American Petroleum Institute, including how the target market is defined, the gathering of primary research and the main ideas the group intends to present to the API. The results to be shared by this presentation will be the most effective way to target a desired sales market and versatile ways to use marketing in a non-traditional manner. The larger significance of this project is in showing the ability

to take a large task, such as marketing for the American Petroleum Institute, and divide it into smaller tasks to attain a successful marketing plan. The intended audience for this project is anyone interested in how a business decides how to sell, or how to devise a plan on what to do to reach a desired market.

Presenter(s): **Rashad Khamis**
Title: THE "HOT HAND" IN BASKETBALL
Major(s): Mathematics
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Erik Packard

Abstract: When one watches a basketball game on television, it is very common to hear the announcer say that a player has the "hot hand." Players believe that they should "feed the hot hand," by giving the ball to a player more often if that player has hit a number of shots in a row. However, if a player makes three shots in a row, does that mean he has a better chance of making the next shot than someone who has not made three shots in a row? In this presentation, we investigate this phenomenon by analyzing streak shooting in the course of a game to determine, mathematically, if the "hot hand" is real or not.

Presenter(s): **Tyrell Kipp, Con Trumbull, and Geoffrey Warden**
Title: GEOLOGIC MAP OF THE REDLANDS FAULT, EAST-CENTRAL COLORADO NATIONAL MONUMENT
Major(s): Physical Sciences — Geology
Department: Physical and Environmental Sciences
Faculty Sponsor: Rick Livaccari

Abstract: Throughout the Colorado National Monument, the SW-dipping Redlands Reverse Fault forms the core of the Redlands Monocline. This fault places Proterozoic migmatite over Triassic or Jurassic-age sediments and has up to 1,300 ft of structural relief. In map view, dipping strata of the Redlands Monocline in the northwestern and southeastern portions of the Colorado National Monument form a 2,000 ft wide zone. In these areas the strata typically dip $<45^\circ$ NE. There is a dramatic narrowing of the strain zone towards the central part of the Redlands Monocline. The team has produced a large-scale (1:3,500) map of the central part of the Redlands Monocline. Here, the monocline is about 500 ft wide in map view and the strata are subvertical to overturned (dips of 50 to 85° SW). Sedimentary strata adjacent to the Redlands Reverse fault are also highly brecciated forming zones up to 15 feet wide. The researchers suggest that the overall wide to narrow strain pattern of the Redlands Monocline is the result of multiple, closely-spaced reverse faults in the wide northern and southern areas. These faults merge into a single reverse fault along the narrow central part of the Redlands Monocline.

Presenter(s): **Tyler Kruckenberg**
Title: RELATIVE AGE CORRELATION IN THE GRAND AND BATTLEMENT MESA AREA
Major(s): Physical Sciences — Geology
Department: Physical and Environmental Sciences
Faculty sponsor: Andres Aslan

Abstract: An assortment of surficial geologic deposits surrounds the flanks of two prominent high-elevation mesas in west-central Colorado; the Grand and Battlement Mesas. Alluvial fan and debris-flow fan deposits have prograded along the slopes of the mesas, and in places, bury Tertiary bedrock of the Uinta, Wasatch, and Green River Formations as well as ancient Colorado River gravel terraces. As the Gunnison and Colorado Rivers incised valleys on opposite sides of the mesas, younger fan deposits were created at lower elevations relative to older, higher fan deposits. This study uses relative age relationships to compare fan deposits found on the south side of the Grand Mesa to those on the north side of Battlement Mesa. In order to do this comparison, long profiles of fans and their corresponding heights above modern rivers were measured. Relative ages of the deposits were grouped and assigned on the basis of height above the Colorado and Gunnison Rivers. A relative age correlation of the alluvial deposits in the Grand and Battlement Mesa area will provide a more refined understanding of how the deposits on opposite sides of each mesa are related to each other, and if they reflect glacial-interglacial cycles.

Presenter(s): **Mike Lobato**
Title: COMPARISON OF THE BAYAN OBO REE ORE DEPOSIT OF INNER MONGOLIA, CHINA AND THE MOUNTAIN PASS REE ORE DEPOSIT OF CALIFORNIA WITH REE ORE BEARING ROCKS OF THE IRON HILL CARBONATITE COMPLEX AND ADJACENT AREAS OF COLORADO
Major(s): Physical Sciences — Geology
Department: Physical and Environmental Sciences
Faculty sponsor: Andres Aslan

Abstract: This study examines similarities and differences among the rare earth element (REE) bearing ore deposits from Bayan Obo, Inner Mongolia, China, Mountain Pass, California, and the Iron Hill carbonatite complex of western Colorado. The Mountain Pass REE ore deposit and the giant, polymetallic Bayan Obo deposit have historically been the United States' primary source of REE's. Currently the world's largest REE mine, Bayan Obo ore reserves are estimated to be 48 million metric tons of rare earth oxide (RE₂O₃) at an average grade of 6 percent. Remaining reserves of REE ore at Mountain Pass are estimated to be 20 to 47 million metric tons of RE₂O₃ at an average grade of 8-9 percent. The Iron Hill carbonatite complex of Gunnison County, Colorado is regarded as one of the best examples of carbonatite-alkalic rock associations in the world. Using geochemical REE ore data from Bayan Obo, Mountain Pass, and Iron Hill, the compositions of carbonatite, bastnaesite, and monazite are compared to normalized chondrite REE values found in Earth's upper crust. This comparison provides a baseline that will aid in exploration for similar deposits in areas adjacent to Iron Hill.

Presenter(s): **Will Lostumbo**
Title: AXIAL BENDING IN ALUMINUM ALLOYS
Major(s): Mechanical Engineering
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Rick Ott

Abstract: The tensile strength of aluminum alloys is important in mechanical engineering because of the effects on the geometry of a part. Mechanical engineers design components for use in the packaging industry. The packing industry utilizes machinery to fold, seal, or package paper products such as cereal boxes and milk or orange juice cartons. Packaging equipment is prone to failure which is minimized by understanding the forces due to loading, tension, compression, and torsion. A mechanical component, called a slat, is used to transport paper products in a Wrap Around Packer (WAP). A significant number of 6061-T6 aluminum slats failed within normal operating conditions in less than two years. The slat was redesigned using 2024-T4 aluminum to address the bending failure. The bending test consisted of fixture to recreate the forces the slat is subjected to while testing with incremental loads. The data collected from the bending test will be analyzed using a 2 factor Analysis of Variance (ANOVA). The Tensile strength of 2024-T4 aluminum has been compared to 6061-T6 aluminum by an axial bending test determine the tensile strength of 2024-T4 aluminum is optimum for use as a slat.

Presenter(s): **Katie Lowery and Angelia Simpson**
Title: A NEW TYPE OF MYSTERY: HYBRIDITY OF THE MYSTERY GENRE IN LOUISE ERDRICH'S NOVELS
Major(s): English — Literature
Department: Languages, Literature and Mass Communication
Faculty Sponsor: Julie Barak

Abstract: In a world of television programming filled with intrigue and suspense in such shows as *CSI*, *NCIS*, and *Law and Order*, the mystery genre is a hot topic. However, classic works by Sir Arthur Conan Doyle and Edgar Allen Poe have been overly used to the point of being cliché, and modern-day readers need something fresh and new to capture their attention. Renowned author Louise Erdrich's unique writing style manages to take the formulaic genre readers are familiar with, but also mixes in something that is wholly original, producing a novel that will appeal to various readers from all walks of life. What Erdrich manages to do with the mystery genre is replace a plot centered on crime and

murder with narratives filled with much larger mysteries such as life's greater plan and secrets from the past. For this presentation, a genre study will be performed by Katie Lowery and Angelia Simpson with the use of close reading techniques applied to Louise Erdrich's novels *Tracks* and *The Last Report on the Miracles at Little No Horse*, in order to explain the significance of how Erdrich alters the recipe of the standard mystery novel. Note: This presentation is meant to be paired with a genre study also focusing on works by Louise Erdrich performed by Mandy Beilman and Katie Walters.

Presenter(s): **Thomas Martens**
Title: BRITTLE MATERIALS: TENSILE STRENGTHS AND CRACK PROPAGATION
Major(s): Mechanical Engineering
Department: Physical and Environmental Sciences
Faculty Sponsor: Scott Kessler

Abstract: A brittle material is classified as a material that exhibits little or no yielding before failure (Hibbeler 2008). Brittle materials have higher strengths in compression than in tension. Brittle materials under tensile forces fail randomly and microscopically before sudden catastrophic failure. Crack propagation is random in brittle materials and makes it hard to calculate theoretical tensile fracture stress. Since crack propagation in brittle materials is random tensile fracture stresses are averaged for samples of the same brittle material. Crack growth is due to tensile stresses and the crack grows along planes normal to the maximum tensile stresses (Norton, 2010). The objectives of this study are twofold. First to compare theoretical tensile strengths of 8620 alloy steel and 4140 alloy steel to tabulated data and second to demonstrate that failure cracks of brittle materials propagate perpendicular to the maximum tensile stresses.

Presenter(s): **Jonathan Mellor, Luke Moses, and Craig Weir**
Title: RETAIL TIRE SUPPLY SOFTWARE
Major(s): Computer Science
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Lori Payne

Abstract: In any business, knowing what items you have in stock and being able to reliably and quickly know which items to reorder is critical. Tire salesmen and store managers understand this more than most people. This software is designed to simplify checking the current stock and to allow merchandise to be easily reordered.

Presenter(s): **Page Merrifield and Cody Parkes**
Title: THROUGH THE LENS
Major(s): Mass Communication — New Media
Department: Languages, Literature and Mass Communication
Faculty Sponsor: Adam Cochran

Abstract: Communication is an essential element of any society. Its purpose? Understanding. Even in visual communication, mutual understanding is sought. The objective of this project is to effectively communicate a message with the use of photography. Using the rule of thirds, the golden ratio, and information from interviews with professional photographers the presenters will apply the knowledge gained to improve their photography skills and abilities and better convey the message behind the image. Incorporating these techniques and knowledge create a deeper understanding of the message contained within the photo.

Presenter(s): **Cole Nash**
Title: SHOULD GOVERNMENTS BE ALLOWED TO CONDUCT ELECTRONIC SURVEILLANCE OF ANYONE?
Major(s): Business Administration — Management, Computer Information Systems
Department: Business
Faculty Sponsor: Johnny Snyder

Abstract: The rise of the Internet, along with outdated or non-existent laws, have created new threats to government wiretapping abilities. Traditionally governments were able to monitor phone lines with their wiretapping abilities, but governments are not able to tap items such as Skype and BlackBerry that have encryptions on their communication, therefore creating a grey area in the system.

Presenter(s): **Tina Peltier and Sarah Wilson**
Title: THE EFFECTS OF GREEN TEA EXTRACTS ON THE SOIL AMOEBA, DICTYOSTELIUM DISCOIDIUM
Major(s): Biological Sciences — Biology Concentration
Department: Biological Sciences
Faculty Sponsor: Kyle McQuade

Abstract: Recent studies suggest that green tea has chemopreventive and chemotherapeutic activity, but the mechanisms by which compounds in green tea affect health is unknown. The researchers are investigating how compounds in green tea, and especially antioxidants known as catechins, affect cellular behaviors in the social amoeba *Dictyostelium discoideum*. Initial evidence suggests that epigallocatechin gallate (EGCG), the most prevalent and active catechin in green tea, alters aggregation and morphogenesis in *Dictyostelium*. These results suggest *Dictyostelium* to be a good model in which to identify potential molecular targets for green tea catechins.

Presenter(s): **Erin Redifer**
Title: HOMELESS WOMEN AND ADDICTION: BUILDING EFFICACY
Major(s): Sociology — Human Services
Department: Social and Behavioral Sciences
Faculty Sponsor: Adele Cummings

Abstract: This presentation identifies and addresses the needs of homeless women struggling with addiction who are trying to regain a sense of normalcy in their lives. This is a population that often goes unnoticed, as, typically, when people think of homelessness, they think of men. Addiction creates and sustains homelessness, with nearly 61% of the female homeless population reporting a lifetime problem with alcohol and a history of drug abuse. There are several rehabilitation programs available to homeless women, the Salvation Army being the most notable, but programs for this population lack community and monetary support, and they often focus on one problem, such as addiction, without addressing other needs, like homelessness. The most beneficial treatment program would address three coexisting needs: ongoing treatment and support, life skills development, and building skills to engage in and maintain meaningful relationships.

Presenter(s): **Mitchell Reid**
Title: TREBUCHET: LAGRANGIAN MECHANICS APPLIED TO AN ANCIENT SIEGE ENGINE
Major(s): Physical Sciences — Physics
Department: Physical and Environmental Sciences
Faculty Sponsor: Chad Middleton

Abstract: The trebuchet was an ancient siege engine well known for its use in the twelfth and thirteenth centuries. Because the trebuchet is a multi-body system, understanding its motion through the use of Newtonian mechanics is incredibly difficult. For this presentation, Lagrangian mechanics are applied to a simple yet realistic model of the

trebuchet and the Lagrange equations of motion are derived. The researchers then experimentally obtain values for the two angular coordinates as a function of time and find a roughly linear relationship between these coordinates in two different time regimes. Using these linear relationships, the equations of motion simplify dramatically and the researchers attempt to obtain semi-analytical solutions describing the motion.

Presenter(s): **Bryan Richards**
Title: QUATERNARY GEOLOGY OF THE YAMPA RIVER BASIN
Major(s): Physical Sciences — Geology
Department: Physical and Environmental Sciences
Faculty Sponsor: Andres Aslan

Abstract: The Yampa River in northwest Colorado is an important tributary of the Green River, and is the primary drainage in the Yampa River Basin, which includes the Little Snake and Elk Rivers. Detailed mapping of fluvial terrace remnants in the Yampa River Basin indicates that there are 8 terrace levels that range in elevation from 10 to 159 m above the modern river. Terraces were mapped and named based on differences in relief relative to the river. Recognized map units include: Qal/Qt 0, Qt 10, Qt 20, Qt 30, Qt 43, Qt 55, Qt 83, Qt 125 and Qt 159. Terrace correlations between the Elk and Yampa Rivers are significant because the Elk River Qt 55 map unit contains the 640 ka Lava Creek B volcanic ash and the terraces along the Yampa River lack chrono-stratigraphic markers. The ages of the high terraces were estimated to be 1.47-1.87 Ma assuming a constant incision rate based on the Lava Creek B ash. Long profiles of major tributaries of the Yampa River indicate knick-points at different elevations. This observation could indicate late Cenozoic differential uplift of the northern Colorado Rockies or simply variable bedrock influences in each drainage.

Presenter(s): **Jacob Richmeier**
Title: A COMPARISON OF THREE DIFFERENT STYLES OF BASE RUNNING IN WOMEN'S COLLEGE SOFTBALL
Major(s): Kinesiology — Exercise Science
Department: Kinesiology
Faculty Sponsor: William Sands

Abstract: In softball, players are not allowed to leave the base until the ball has left the pitcher's hand, which eliminates most of the subjectivity involved with stealing a base. The purpose of this series of tests was to determine the fastest starting position for softball players to get from first to second base. The three most popular styles of starting are: track start (lead foot is extended away from bag with back foot on bag), rocker start (lead foot is on bag with back foot behind bag), and side start (with back foot on bag and front foot parallel to bag facing inwards towards pitcher). Using timing gaits, at intervals 5, 10, 20, 30, 40, and 58 feet, the researchers were able to determine which starting position was fastest for each interval. With this information the researchers can advise coaches on which starting position is most effective when running, sliding into, and stealing bases in women's collegiate softball.

Presenter(s): **Jacob Richmeier**
Title: THE CASE STUDY OF A MALE OLYMPIAN DISTANCE RUNNER, RUNNING WITH PAIN
Major(s): Kinesiology — Exercise Science
Department: Kinesiology
Faculty Sponsor: William Sands

Abstract: Since running is Olympian Distance Runners' career, it is important to keep him training and competitively racing. A male Olympian distance runner (ODR) is currently training for the 2012 Olympics, and came to the Monfort Family Human Performance Lab because he has been experiencing foot pain while training and racing. ODR's complaints were as follows: pain in his right (R) foot, left (L) lateral posterior shank and superior Achilles pain, blood blisters under the bilateral great toes and lateral to bilateral 5th metatarsal heads, L foot is slightly larger than R, bilateral calf pain at margin of medial and lateral gastrocnemius heads, and bilateral SI pain with accompanying pain at superior margins of gluteus maximus. With the use of high speed video the researchers were able to see a

few running imbalances associated with ODR's complaints, including an excessively fast lateral to medial pronation as well as general over pronation. Thermal imaging allowed the researchers to see areas of inflammation, and the TekScan analysis mapped the pressures of his foot, which showed the researchers bilateral high pressure regions beneath and posterior to the great toe also associated with the blood blisters. Other tools such as photographs, a large number of shoes to test, and barefoot running were all useful in creating a diagnosis, as well as helpful ideas for a new shoe design specific to ODR's running technique.

Presenter(s): **Spencer Rockwell**
Title: PERFORMATIVE ABSTRACT EXPRESSIONISM: ALLEN GINSBERG'S "HOWL"
Major(s): English — Literature
Department: Languages, Literature and Mass Communication
Faculty Sponsor: Barry Laga

Abstract: Abstract Expressionist (AE) art and Allen Ginsberg share many affinities. In fact, much of Ginsberg's poetry even resembles the artistic techniques of AE painters, so much so that his poems are often like portraits. The presenter will perform an analysis of Allen Ginsberg's major long poem "Howl" that treats the poem as an Abstract Expressionist painting. The performance will include jazz – another artistic love and influence of Ginsberg's – and film as well as selected readings from the poem, along with images of important Abstract Expressionist works from Rothko, Newman, Klein, and others.

Presenter(s): **Ashley Rowley**
Title: CORRELATES OF OBJECTIFIED BODY CONSCIOUSNESS
Major(s): Psychology
Department: Social and Behavioral Sciences
Faculty Sponsor: Myra Heinrich

Abstract: According to Roberts and Fredrickson (1997), objectification of the body arises from the tendency to internalize a view of oneself based on others' perceptions. An intensified focus on the body has been correlated with harmful impacts such as lowered self esteem, heightened anxiety, eating disorders, sexual and marital dissatisfaction (Calogero & Thompson, 2009; Meltzer & McNulty, 2010; Roberts & Fredrickson, 1997), sexism, anxiety, and less social power for women (Franzoi, 2001). McKinley's Objectified Body Consciousness (OBC) is a construct that arose from objectification theory and is measured through: body surveillance (how much individuals focus attention on their appearance); body shame (the extent to which internalization of cultural body standards has occurred); and control beliefs (beliefs in the ability to change personal appearance and comply with cultural expectations). This study examined correlates of OBC including relationships between OBC, attachment qualities and assertiveness. The following results are expected: participants with secure attachment styles would experience low OBC; participants with insecure attachment styles would experience high OBC; as participants were less assertive they would experience more OBC; and finally, females would experience more OBC than would males. A multivariate analysis of variance will be used to analyze data from over 100 student volunteers.

Presenter(s): **Wendy Sikes**
Title: A SELECTIVE HISTORY AND EXPLORATION OF ABSTRACT EXPRESSIONIST PRINTMAKING
Major(s): Art — Studio Art
Department: Art
Faculty Sponsor: Steven Bradley

Abstract: For the Student Showcase, the presenter will be showing a brief slideshow exploring the use of the medium of printmaking by artists associated with the Abstract Expressionist movement. This project will survey the various methods used relative to the content of specific pieces. The historical significance of these artists and artworks will

argue for the place of these methods as a successful alternative to traditional printmaking techniques.

Presenter(s): **Audra Smolek**
Title: HYDROLOGY OF THE GRAND MESA
Major(s): Geographic Information Science and Technology
Department: Physical and Environmental Sciences
Faculty Sponsor: Verner Johnson

Abstract: Grand Mesa contains water resources for Grand Junction and surrounding areas. Most of the Grand Mesa is managed by the United States Forest Service which provides various recreational activities within the forest boundaries. The objective of this research is to use Geographic Information Science(GIS) to look at the diversions, ownership, access rights, hydrologic elements of streams and tributaries on the Grand Mesa. Furthermore, a majority of the forest's hydrological features and access routes have been converted into shapefiles through the use of a GPS. The analysis of the data is to determine the hydrological aspects of the area. By utilizing GIS, this research will provide an investigation into the Grand Mesa's water issues, and is part of an ongoing analysis of field data and scientific studies to evaluate how water is being consumed.

Presenter(s): **Lisa Solko**
Title: A SUCCESSFUL MIX OF ART PROMOTED IN MEDIA AND EXHIBITIONS OF TODAY
Major(s): Art — Art History
Department: Art
Faculty Sponsor: Steven Bradley

Abstract: Today's art is multi-faceted. As demonstrated in art magazines and books published in 2010 and 2011, there is an increase of attention for artists who do not focus on one specific media or style, but instead use multiple forces to create art with an impact. These forces include combining a variety of available artistic means with a look to historical art references and current worldly happenings. A single artist brings distinct concepts, tools, media, and styles together within a specific piece or series of connecting pieces. As a rule, focusing on one direction to create a completely unified body of work has reigned supreme in the art world for many years. Now, many artists are simultaneously producing a diverse catalogue of work, and art supporters are encouraging and embracing this new direction. A specific interesting trend is the inclusion of dialogue and viewer interaction where the making of art is not being kept separate from the people who are experiencing it. Instead, museums, galleries and artists are making collaboration part of art itself.

Presenter(s): **Breanna Spencer**
Title: SURFACE ELECTRICAL MYOGRAPHIC ACTIVITY OF THE VASTUS MEDIALIS OBLIQUES AND THE VASTUS LATERALIS OBLIQUES DURING STANDING TERMINAL EXTENSION AND SHORT ARC QUAD EXERCISES
Major(s): Athletic Training
Department: Kinesiology
Faculty Sponsor: Robert Ryan

Abstract: Vastus Medialis Obliques (VMO) strengthening is a crucial component of any post-surgical knee rehabilitation program. VMO weakness can cause future post-surgical knee pain if not strengthened properly. Performing the Standing Terminal Extension (STE) and Short Arc Quad (SAQ) exercises have been reported to isolate and strengthen the VMO more than the Vastus Lateralis Obliques (VLO). The purpose of the study was to determine if the STE or the SAQ is more effective recruiting the VMO over the VLO. Participants (n=27) were randomized into two groups – STE –SAQ (n=14) and SAQ-STE (n=13). Muscle recruitment of the VMO was compared to the VLO during STE and SAQ exercises using normalized (sEMG/ maximum voluntary contraction) surface electrical myographical (sEMG) activity. Statistical analysis using a paired t-test found no statistically significant difference between the VMO and VLO muscle recruitments, during the STE and the SAQ and no statistically significant difference regarding VMO recruitment between the STE and the SAQ (all p values greater than 0.05). The decision to choose one exercise over the

other during knee rehabilitation to isolate the VMO compared the VLO should be based on whether an open chain or closed chain exercise is desired based on the injury.

Presenter(s): **Ethan Stanley**
Title: 5D COSMOLOGY AND THE ACCELERATED EXPANSION OF THE UNIVERSE
Major(s): Physical Sciences — Physics
Department: Physical and Environmental Sciences
Faculty Sponsor: Chad Middleton

Abstract: Cosmology is the study of the universe on the largest of scales. It goes beyond the solar system and even the galaxy and attempts to explain the origin and evolution of the universe. Astronomical observations indicate that the universe is expanding at an accelerating rate, going against what even Albert Einstein expected, and modern cosmology seeks to answer why. One possible explanation is the presence of extra, unseen dimensions. This research considers the effects of one extra dimension and explores solutions to the equations of cosmology that could explain the observed accelerated expansion.

Presenter(s): **Samantha Straw**
Title: MATHEMATICAL MODELING OF STRIKE-SLIP FAULTING
Major(s): Mathematics
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Dan Shultz-Ela

Abstract: In this talk, the mathematics used to analyze the stresses and displacement of a strike-slip fault will be discussed. The stress distribution can be modeled by Laplace's equation, which is a partial differential equation. Solutions to this equation can be found by using complex variables. The surface displacement surrounding the San Andreas Fault will be compared using this theoretical model.

Presenter(s): **Sarah Strong (with Dominic DelSignore)**
Title: THE ANALYSIS OF CREATIVITY IN MUSIC COMPOSITION
Major(s): Music — Liberal Arts
Department: Music
Faculty Sponsor: Darin Kamstra

Abstract: In the loud world that musicians and composers are now living in it is very difficult to find inspiration to spark original creativity. The presenter would like to share how she finds her inspiration for musical composition, which is not entirely through others' music, but also through everyday noises and even silence – although there is no such thing as true silence because even in a deprivation chamber it's possible to hear the human body working. The beliefs of the presenter, that have developed through years of musical training, are that everyone is creative but some people simply do not know it yet. The presenter would like to help teach the audience how to find their original creativity and argue against the idea that original creativity does not exist; i.e. everything has been done before. The presentation will be a lecture and a performance, ending with a composition that the presenter and the audience created. Dominic DelSignore will assist with recording.

Presenter(s): **Rebecca Strott**
Title: A SOLDIER'S FAITH KEEPS HIM FIGHTING: "THERE ARE NO ATHEISTS IN A FOXHOLE"
Major(s): History
Department: Social and Behavioral Sciences
Faculty Sponsor: Vincent Patarino

Abstract: To an individual who has never experienced the horrors of war, it can be, literally, out of sight and mind. While soldiers are rightfully glorified for their bravery

and willingness to fight and die for cause and country, their experiences are often not understood by those on the home front. When states or nations go to war, the cause is necessarily identified as righteousness versus evil. For the soldiers in combat however, their focus is often more immediate: self and group survival. In the heat of battle, knowing that death may come at any moment, many soldiers have expressed a need for comfort and some notion that if life ends here, the spirit is eternal. From the religious wars of the medieval era to WWI, spiritual faith inspired soldiers and gave them strength to fight when all hope seemed lost. The importance of religion during these times is reflected in the poetry, songs, and hymns written by and for combatants. Soldiers demonstrated their devotion by continuing to express their faith during wartime. While wars always have varied political and religious objectives, in the heart of a soldier, all wars are religious wars because “there are no atheists in a foxhole.”

Presenter(s): **Jeremy Styers**
Title: STATISTICAL ANALYSIS OF INPUT RANDOM VARIABLES THAT SIGNIFICANTLY IMPACT WHETHER OR NOT A DRAG RACE IS WON
Major(s): Mechanical Engineering
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Rick Ott

Abstract: Data accumulated from the 2010 drag race season will be analyzed to determine which explanatory random variables significantly impact whether or not the race is won. A multiple logistic regression model will be used to determine the explanatory random variables. The data collected includes lane, reaction time, opponents reaction time, 60 ft. E.T. (elapsed time), 330 ft. E.T., 660 ft. E.T., 660 ft. mph, 990 ft. E.T., 1320 ft. E.T., and 1320 ft. mph.

Presenter(s): **Marshall Sweatt and Eric S. Wilcox**
Title: A JOYSTICK OPERATED ROBOT FOR COMPETITION
Major(s): Computer Science
Department: Computer Science, Mathematics and Statistics
Faculty Sponsor: Warren MacEvoy
External Funding Source: Collbran Job Corps FIRST Robotics Program

Abstract: Come see a robot built for the FRC (FIRST Robotics Challenge) competition. The researchers have been working on a project to help students from the Collbran Job Corps Center in the construction and programming of a robot. FIRST (For Inspiration and Recognition of Science and Technology) sponsors these projects, and the students need mentors to aid with all aspects of their creation. The machines in these events are designed for playing a game against other robots each year and can be quite exotic. The researchers will be demonstrating the operation, construction and programming required for this kind of undertaking. This robot is wirelessly controlled and freshly returned from competition, so come see it in action!

Presenter(s): **Megan Vogel**
Title: ESTABLISHING TRUST IN AN ELECTRONIC COMMERCE ENVIRONMENT
Major(s): Computer Information Systems
Department: Business
Faculty Sponsor: Johnny Synder

Abstract: The purpose of this research is to define trust in an e-commerce environment and the importance of trust to the parties involved. Trust is a key factor that determines the success of the interactions between organizations and consumers, and is of particular interest in an e-commerce environment. The individual factors that establish trust, and a subjective method for measuring trust levels will be explored through this research.

Presenter(s): **William Walsh**
Title: VOLCANISM IN NORTHERN COLORADO AND THE CROWNER FORMATION: WHAT DO THE VOLCANICS IN THE YAMPA RIVER VALLEY TELL US ABOUT THE ORIGIN THE CROWNER FORMATION?
Major(s): Physical Sciences — Geology
Department: Physical and Environmental Sciences
Faculty Sponsor: Andres Aslan

Abstract: Phreatomagmatic volcanic eruptions occur when magmas come in contact with ground water. The ground water flashes to steam, creating violent eruptions that eject rock and debris into the air and surround the crater with breccias and tuffs. The craters formed during these eruptions are known as maars. Maars craters have steep walls, are typically round to oval in shape, and have diameters that range from 200 to 6,500 ft across, and 30 to 650 ft in depth. These craters fill with water, forming natural lakes. The Crowner Formation is a gray volcanic conglomerate containing clasts of Precambrian granite, Browns Park sediment and basalt fragments. The origin of the Crowner Formation is controversial, because it might show the earliest down cutting of the ancestral Yampa River. Alternatively, the Crowner Formation may simply reflect a late phase of Miocene phreatomagmatic volcanism in northwestern Colorado.

Presenter(s): **Clara Warbritton**
Title: INDIVIDUAL CASE STUDY OF HIP INSTABILITY
Major(s): Kinesiology — Exercise Science
Department: Kinesiology
Faculty Sponsor: William Sands

Abstract: This presentation is an individual case study of hip instability associated with severe pain during everyday activities in a female dancer. Medical diagnoses had thus far failed to lead to a resolution of the problem. Multiple gait analyses were done with high-speed video, muscle weakness and muscle activation were analyzed with EMG, and thermal imaging looked at areas of heat associated with inflammation. Through these assessments a diagnosis of muscle weakness in the hips including the gluteus medius, minimus and sacroiliac regions was made along with a suspicion of a hip labral tear. A prescription of strengthening exercises such as inverted everted, and neutral hip abduction were recommended along with electrical stimulation to help strengthen the gluteus medius and minimus to aid in hip stabilization. After making initial progress in recovery, the patient suffered a second injury and was advised to seek medical treatment. A labral tear of the acetabulum was discovered and repaired with surgery. In conclusion, the hip weakness and pelvic instability was treated with the help of strengthening and stabilization exercises but an acetabular tear caused by improper technique required medical treatment.

Presenter(s): **Geoffrey Warden**
Title: EVIDENCE FOR INCISION OF THE COLORADO RIVER RELATED TO HISTORIC (1880-1940) ARROYO EVENTS IN THE SEMI-ARID SOUTHWEST
Major(s): Physical Sciences — Geology
Department: Physical and Environmental Sciences
Faculty Sponsor: Andres Aslan

Abstract: Dendrochronology of cottonwood trees on the Colorado River floodplain near Fruita, Colorado was used to reconstruct the floodplain history, and to determine if any floodplain changes coincided with historic arroyo incision. Sixteen cores were used to estimate an average growth rate that was then applied to 42 diameter measurements to approximate the age of the trees. Age dates for the trees range from 163 to 7 years B.P. The modern floodplain (FP1) is mostly tamarisk and sparse cottonwood trees that range in age from 7 to 44 years (1966-2003 A.D.). An intermediate terrace (FP2) rises 1-2 m above FP1. FP2 is the most densely vegetated terrace and contains large numbers of cottonwood trees that range in age from 46 to 108 years (1902-1964 A.D.) The Cottonwood terrace (CT) rises 1-2 m above FP2 and contains sparse numbers of large, isolated cottonwoods that range

in age from 135 to 163 years (1847-1875 A.D.). The gap between tree ages between FP2 and CT coincides with a period of historic arroyo incision across the Colorado Plateau. This may indicate a correlation between the arroyo events of tributaries, and incision along the Colorado River.

Presenter(s): **Derek West**
Title: FINDING THE MATHEMATICAL ERROR WHEN USING ALUMINUM STRAIN GAUGES ON STEEL RODS
Major(s): Mechanical Engineering
Department: Physical and Environmental Sciences
Faculty Sponsor: Scott Kessler

Abstract: The strain of the material can be calculated using the change in conductivity of a strain gauge. There are many types of strain gauges. Each type of strain gauge is to be used on a specific material. In the field, the strain gauge needed for the material you are testing may not be available. When this happens, the range of error of the strain gauge on a material that it's not made for is needed to make a good assessment of the material being used. This range of error can be calculated by comparing the reaction of the strain gauge on both materials. This experiment will be done with the use of steel rods. Steel and aluminum specific strain gauges will be placed on the rods. The rods will then be heated so that they expand. As they expand, the conductivity of the strain gauges will change and give us the ability to calculate the strain. The two readings of the steel and aluminum gauges should be different enough to find the error between the actual strain and the strain that is assumed with the aluminum gauge. These calculations will show if this is a reliable way to measure strain.

Presenter(s): **Dustin Wise**
Title: A MUSIC VIDEO PRESENTATION OF: THE MUSTARD SEED THEORY
Major(s): Music — Elective Studies in Business
Department: Music
Faculty Sponsor: Adam Ballif

Abstract: The media industry today is undergoing rapid change. With advancements in modern technology, professional media products are becoming increasingly more affordable and accessible to the independent musician, artist, or filmmaker. These advancements are allowing independent artists to set the new standard of creativity and professional quality in their respective industries. The music video entitled *The Mustard Seed Theory* will show how two independents make an artistic vision come to life using today's latest music, video, and web media technology. The music of this work is written and produced by Dustin Wise of Plaid Owl Productions. The song demonstrates some of the digital recording techniques that will be used by current and future artists to shape the new music industry. Wade Yamaguchi of Yamo Films captures the video. The visual work as a whole represents a co-operative production, writing, and directing effort between Dustin Wise and Wade Yamaguchi. The presentation will give a brief outline of the process required to complete a successful music video. Audience members will be exposed to concepts of digital recording, on-set video techniques, postproduction techniques, and web-based distribution.

Presenter(s): **Rachael Wright**
Title: THE CATHOLIC CHURCH: CONTROL AND THE SPREAD OF POPULAR BELIEFS IN LATIN AMERICA
Major(s): History
Department: Social and Behavioral Sciences
Faculty Sponsor: Vincent Patarino

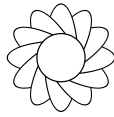
Abstract: One of the central issues related to the growth of religious culture in Latin America during the sixteenth and seventeenth centuries is the spiritual and political issues faced by the Catholic friars and how these affected the friar's relationship with the indigenous population. The value of investigating the Church's actions is that it explains why contemporary Latin American society includes a wide range of popular Christian beliefs

and retains high levels of native influence within the ceremonies of the Church. Using multiple primary source documents, including writings by Bartholomew De Las Casas, Fray Pedro De Gante's letter to Charles V of Spain, Bernal Diaz's writings on the conquest, Alexander VI's *Piis Fidelium*, and selections from the journal of Christopher Columbus, it is clear that the Church faced numerous problems after the Conquest; problems that were faced by both the Spanish settlers and the clergy. The evidence suggests that the treatment of the natives by the settlers and the difficulty of navigating the administration of both the Church and Spanish Crown created many of the issues that the friars faced in Latin America. In their quest to spread the Word, the clergy faced opposition from all sides: settlers, the Spanish Crown, and the Papacy. These challenges helped to create the rich and fertile range of popular Christian beliefs in Latin America.

Presenter(s): **Royce Young**
Title: THE CORRELATION BETWEEN SOIL ORGANIC CARBON AND SOIL TEXTURE AS THEY RELATE TO THE PRESENCE OF PERENNIAL VEGETATION
Major(s): Environmental Science and Technology — Environmental Restoration & Waste
Department: Physical and Environmental Sciences
Faculty Sponsor: Tamera Minnick

Abstract: The correlation between soil organic carbon and soil texture was examined, in relation to the presence of perennial vegetation in an undisturbed reference site in the Piceance Basin in western Colorado. This is part of a larger study investigating vegetation and soil structure and function after natural gas development. The reference site was located in Rio Blanco County, Colorado. The site was sampled in a 9m x 12m plot. A sample point was randomly located in each of the 48 1.5m x 1.5m grid areas. There were also 4 randomly located subplots of 2m x 2m in which 16 random locations were sampled, making a total of 112 samples. The soil texture for each sample was determined by separating the sand from the silt and clay. A comparison of soil organic carbon, which was determined by the previous study, to the percentage of sand resulted in a linear correlation; increased sand content was correlated with decreased soil organic carbon. Geostatistical analysis of sand, clay, and bulk density also indicated a spatial autocorrelation of these measures at a distance similar to plant spacing. These results suggest an "island of fertility" underneath shrubs in which fine soil particles are captured by the plant canopy and deposited directly under the canopy of the shrub. Others have found this phenomenon leads to a higher water holding capacity and higher nutrient levels directly under the shrub, compared to the bare interspaces between plants. This results in higher plant growth rate and more soil organic carbon under the shrub.

FIRST-YEAR MECHANICAL ENGINEERING DESIGN EXPO



Presenter(s): **Travis Adams, Corey Bendetti, Rory Eilers, Jeremy Lawrence, and Chase Ross**
Title: HYDROELECTRIC ENERGY CONVERSION
Major(s): Mechanical Engineering
Department: Physical and Environmental Sciences
Faculty Sponsor: Scott Bevill

Abstract: Hydroelectric power accounts for over 92 percent of all renewable energy production today. This demonstration of hydroelectric power shows students how hydroelectric energy is produced so they will be more informed in the science of renewable energy. A hydroelectric generator is designed to take the potential energy from the water being held above a turbine and convert it into electricity. In this design, water runs down a pipe and gains kinetic energy and turns a turbine. The motion from this turbine wheel spins a shaft inside a generator which runs a magnetic field across wiring, creating electricity. The efficiency of the hydroelectric generator is calculated as power (output) divided by the potential energy of the water (input).

Presenter(s): **James Ahmed, Zack Bruner, Jeff Pike, and Mike Thorpe**
Title: THE POWER OF MAGNETISM
Major(s): Mechanical Engineering
Department: Physical and Environmental Sciences
Faculty Sponsor: Scott Bevill

Abstract: It has been observed that superconductor materials, commonly used on micro-chip processors and Maglev trains, are able to prevent magnetic fields from penetrating through it. The purpose of this project was to demonstrate the levitating abilities of a superconductor when placed in a magnetic field, known as the Meissner effect. The demonstration that was created consisted of a circular track composed of three magnets side by side around the entire track. The two outer two magnets had their North Pole facing up while the center magnet had its South Pole facing up. Placing a superconductor (cooled to -166C) above the center magnet would cause the superconductor to levitate around the track effortlessly. The designers will showcase this energy efficient superconducting effect to raise interest and awareness regarding Eco-friendly alternatives.

Presenter(s): **Kyle Bartels, Jose Morales, Kyle Parsons, and Robert Russell**
Title: STEAM ROCKET
Major(s): Mechanical Engineering
Department: Physical and Environmental Sciences
Faculty Sponsor: Scott Kessler

Abstract: Some alternative fuels like water, air, and solar energy are renewable. However these forms of energy are not ready to use in their present form. The team designed an alternative fuel for rockets. Instead of the traditional propellants, they came up with an idea to harness water/steam as a propellant. Building a test stand to secure the engine system allowed them to repeatedly test the efficiency of the water/steam engine. The idea is to heat water inside the tank until it becomes steam, and then release it through the nozzle which will create thrust. This information can then be used to calculate such things as launch height, and the length of time the engine will "burn." They created a design that allows us to heat the water and then pressurize it in the engine compartment of the rocket. Some down-sides to using this propellant include shortened burn rate, limited amount

of time to launch the rocket due to water cooling, and limiting thrust obtained from the engine. They demonstrated that it's possible to use renewable energy to create enough thrust to propel a rocket.

Presenter(s): **Ryan Benson, Jason Johnson, Rosalio Moreno, and Conrad Sweat**
Title: HUMAN-POWERED MONOWHEEL
Major(s): Mechanical Engineering
Department: Physical and Environmental Sciences
Faculty Sponsor: Scott Kessler

Abstract: While they may look like a futuristic or advanced transportation concept, efficient, human-powered monowheels have been around since the late 19th century. A monowheel is a single-wheeled vehicle in which the occupant resides inside the wheel, and the wheel rotates around him. The purpose of this project was to successfully design and build a monowheel capable of transporting a single person using only human power. This monowheel was constructed of relatively cheap components, and was designed to demonstrate concepts such as the ability to remain upright via gyroscopic stabilization and conservation of angular momentum, as well as showcasing possible designs for zero-emissions transportation.

Presenter(s): **Nick Burton, Matt Cooper, Stephanie Lenhart, and Anthony Martin**
Title: MOTORIZED CAR
Major(s): Mechanical Engineering
Department: Physical and Environmental Sciences
Faculty Sponsor: Scott Kessler

Abstract: It is said that Darda Cars are capable of reaching speeds up to 30 miles per hour. A typical Darda Car measures 2.75 inches long and 1.5 inches wide. Team Victory wanted to design a larger scale version of the motor. The team wanted to know if they could build a larger motor that could accelerate the car to over 30 mph. Team Victory used computer aided design technology to model the components first. From there they manufactured the parts by using machined parts as well as parts from a 3-D printer. The motor was then installed into a RCA PT Cruiser Model Car which was a 1/16th scale car. The team created this car to inform children and teenagers about conservation of energy, kinetic energy, and potential energy. Potential energy is stored when the car is wound before it is released. The potential energy is then transferred into kinetic energy when it is in motion. Team Victory was successful in building this kinetic motor.

Presenter(s): **Jeremy Cleaveland, Julia Crown, Elijah Liestman, and Drew Soper**
Title: AN EDUCATIONAL EXHIBIT TO DEMONSTRATE ELECTROMAGNETIC SUSPENSION
Major(s): Mechanical Engineering
Department: Physical and Environmental Sciences
Faculty Sponsor: Scott Bevill

Abstract: Suspension of an object in midair requires the controlled application of a force to overcome gravitational force. The purpose of this project was to create an exhibit to demonstrate how a precisely controlled electromagnetic field could suspend an object. The magnetic force on the object must be equal and opposite to the force of gravity. The primary challenge of magnetically suspending an object lies in the rapid and precise control of the magnetic force. A basic prototype was built and analyzed. The magnetic force was controlled by adjusting the voltage supplied to the electromagnet. A Hall-effect was researched and found to be the optimal approach to rapidly adjust the electromagnet's force. The project provides an engaging demonstration of electromagnetism, gravity and Newton's second law.

Presenter(s): **Leighton Darnell, Christa Krebs, Alex McDonald, and Ty Sickels**
Title: WATER PURIFICATION SYSTEM
Major(s): Mechanical Engineering
Department: Physical and Environmental Sciences
Faculty Sponsor: Gigi Richard

Abstract: The number of casualties caused by contaminated and polluted water far exceeds the number of casualties caused by all forms of violence on the planet. The idea of this project was to create an educational exhibit that shows how purified water can be created easily and efficiently, without the use of advanced systems. A water purification system was designed that requires minimum upkeep and is comprised of a reservoir of water that transports polluted water to a container with a glass cover. Water from the reservoir flows into the container and heat from the sun vaporizes water into steam. The steam collects on the glass, where it cools and condenses to pure water and is collected. The pure water that is produced shows the concept of solar heat breaking the hydrogen bonds between water molecules causing vaporization, which separates the water from the pollutants. The project shows how simple it is to create purified water using everyday concepts that can be easily replicated.

Presenter(s): **Tyler Dicamillo, Blake Harlow, Jason Stults, and Jesse Talley**
Title: COMPRESSED AIR POWERD GO KART
Major(s): Mechanical Engineering
Department: Physical and Environmental Sciences
Faculty Sponsor: Gigi Richard

Abstract: Two-stroke engines, like those commonly found in weed eaters and some recreational vehicles, are easily converted to and powered by compressed air. A two-stroke engine is an internal combustion engine that completes the cycle in two movements of the piston, as compared to four-stroke engines that are more commonly used today (like many car engines). The purpose of this project was to create an educational toy while exploring the possibility of using compressed air to power a vehicle. The team converted a two-stroke internal combustion engine to a compressed air powered engine. The result is a simple design to power a go-kart for sheer enjoyment, but also creates an environmentally friendly way to power a vehicle using only air. The energy to compress the air comes from a solar panel that recharges a battery. As a result, the go-kart demonstrates an eco-friendly alternative to the internal combustion motor by producing no emissions. The toy successfully demonstrates energy conversion and the forces of air acting on a piston to do work.

Presenter(s): **Jeff Fisher, Daniel Harbert, Marcus Matthews, Erik Montoya, and Curtis Rauen**
Title: DEMONSTRATION OF THE ALPHA STIRLING ENGINE
Major(s): Mechanical Engineering
Department: Physical and Environmental Sciences
Faculty Sponsor: Scott Bevill

Abstract: The Stirling engine is a type of motor that relies on an external heat source rather than internal combustion to generate mechanical work. As the air inside a cylinder is heated, it expands and drives a piston to deliver power to the crankshaft. The objective of this project was to create a working model of a Stirling engine to demonstrate thermodynamic principles. The Stirling engine was connected to a generator and lightbulb to illustrate the effective output of the engine. This project effectively showed conversion of energy by taking a small amount of heat and creating motion, aka kinetic energy, through a crank. The fact that the Stirling engine is powered by an external heat source makes it a more effective demonstration of the thermodynamic principles involved in engine operation than an internal combustion engine.

Presenter(s): **Jan Fredrik Mosnes, Robert Rowsam, Roxy Thompson, and Alex Zemezouak**

Title: NBG HOVERCRAFT

Major(s): Mechanical Engineering, Biology

Department: Physical and Environmental Sciences

Faculty Sponsor: Gigi Richard

External Funding Source: Panorama Consulting

Abstract: For the Introduction to Engineering Projects class's educational toy project, the Nitrobubblous Genii (NBG) team built a one-person hovercraft. A gas powered leaf blower was used to inflate the cushioning skirt under the craft, and a three-foot diameter electric motor-powered fan was used to propel the vehicle. The project was a model to demonstrate Newton's Laws of Motion: air blown into the craft and air flow through the fan were forces acting upon the vehicle, causing lift and movement and characterizing the First Law of Motion. These forces and the mass of the vehicle were considered in finding the hovercraft's acceleration, and thus an application of the Second Law of Motion. The leaf blower's air volume is 724 cfm and provides the necessary air pressure to cause lift and minimize friction between the skirt and the ground. The air bearing skirt is an inflated tube attached under the craft's base with holes directed toward the middle. When air escapes the tube into the middle, its only path out is to escape under the inflated skirt, causing lift. The NBG team managed their budget, kept a sound schedule, built an effective hovercraft, and furthered their ability to work as a team.

Main Campus



MAP LEGEND

Student Showcase presentations, exhibits, and demonstrations will take place at the following locations across Mesa State's main campus:

Academic Classroom Building (ACB)1
College Center (CC)8
Fine Arts Building (FA)13
Moss Performing Arts Center (MPAC)21
Outside Quad2
Wubben Hall & Science Center (WS)34



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