



**COLORADO MESA**  
UNIVERSITY



Friday, May 2, 2014

# SHOWCASE PROCEEDINGS



FIFTH ANNUAL  
**STUDENT SHOWCASE**



2014

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The Student Showcase highlights student works involving creativity, discovery, research, innovation and/or entrepreneurship through sessions by undergraduates at Colorado Mesa University 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. *Showcase Proceedings* contains the sessions' abstracts.

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# PROCEEDINGS



**Friday, May 2, 2014**  
**Grand Junction, Colorado**



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# ABSTRACTS



Presenter(s)-Major: **Zachary Adair - Mathematics-Statistics**  
Title: AN EXAMPLE OF QUANTITATIVE ANALYSIS IN SPORTS: A PROPOSED ALTERNATIVE TO THE PLAYER EFFICIENCY RATING FOR DETERMINING BASKETBALL PLAYER VALUE  
Department: Computer Science, Mathematics & Statistics  
Sponsor: Darren Gemoets

Abstract: Throughout professional sports every team is looking for an advantage over their opponents. One of those advantages is employing statistics and data analytics to improve team performance. This project explores the statistical analytics in basketball by investigating team and player ratings the industry uses today. Specifically, this project examines the most popular single player rating in basketball, the Player Efficiency Rating (PER). The PER is constructed by using player, team and league statistics and constructing a one number metric which states who is a better player. The problem with the PER statistic for rating a player is that the calculation is complicated for the average fan to understand. Therefore, the presenter constructed a metric which is simpler yet accurately displays the best player. The metric is called the Player Contribution Metric (PCM) and its goal is to accurately determine the most important player on a team and to find the best player overall. Preliminary tests have shown the PCM has been accurate at declaring the best players in the National Basketball Association. Departures between the PCR and PER may reveal undervalued players.

Presenter(s)-Major: **Umar Alkali - Mechanical Engineering Technology, Dominick Brevig - Pre-Engineering, Skyler Doggett - Mechanical Engineering Technology, Hayden Murphy - Pre-Engineering, Alexander Spencer - General Engineering**  
Title: ELECTROMAGNETIC ACTUATION  
Department: Mechanical Engineering  
Sponsor: Scott Kessler

Abstract: Electromagnetic induction has been utilized in many ways throughout history. It has now been employed as means of clean, simple, quiet, and low maintenance kinetic energy. This project used electromagnetic induction not only to move an object across a given path, but to give the operator full variable control. The speed and direction of the actuator is fully adjustable using a linear power switch. This design reduced the complexity of a linear motor or linear actuator, differentiating it from the rest. There are many applications for this technology in the automated world of today. Some examples include a sliding door for a home or business, an assembly line sorting machine that moves along a track, or a new design for a windshield wiper utilizing a single blade along an electromagnetic track. The magnetic actuator enables different units to be propelled along a given track because of the attraction of ferrous iron to electromagnetic flux. With the case of the windshield wiper, the blade would move horizontally across the windshield, effectively clearing the entire window of water in one fluid motion. This design is safer, quieter, and more luxurious than the two windshield wipers found on current vehicles. A "uni-wiper" blade is also easier to replace and maintain than a regular windshield wiper blade. This innovation to electromagnetic actuation involves fewer moving parts and is completely isolated from the elements.

Presenter(s)-Major: **Rebecca Ancell - Nursing, AAS, Meagan Briggs - Nursing, AAS, Leonardo Carvalho - Nursing, AAS**  
Title: SLEEP DEPRIVATION: EFFECTS ON NURSES, PATIENTS, AND THE HEALTH CARE INDUSTRY  
Department: Health Sciences  
Sponsor: Genell Stites

Abstract: There is a wealth of evidence to suggest that sleep deprivation has a negative impact on the field of nursing. The effects of the resulting fatigue are multifaceted, impacting patient care and the well-being of the nurse. There is a higher incidence of errors, lower standard of care, and injuries to patients. Personally, nurses experience biologic responses resulting in decreased immunity and metabolic imbalances, as well as psychosocial responses including irritability and reduced concentration. A meta-analysis was conducted of numerous studies, demonstrating consequences and statistics associated with nurses performing under sleep deprivation. This presentation addresses strategies by which direct-care staff may protect their own health and maintain high quality care for their patients. Additionally, it will provide awareness of this problem to the industry as a whole, encouraging organizations to make modifications that result in increased efficiency and job satisfaction of employees, and reduced costs associated with errors.

Presenter(s)-Major: **Laura Andersen - Liberal Arts Pre-Elem Ed**  
Title: THE FIELD OF TEACHING FROM CURRENT EDUCATORS  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: This project explores the profession of teaching in an attempt to understand what the presenter will face as a future teacher. This project has helped the presenter understand the motivation behind teaching and the field of teaching through research and interviews with current teachers. The research and interviews will be organized in a poster presentation. Teaching is a very hard profession, but with the proper heart and motivation, it can be very worthwhile and satisfying. However, without passion for students and for teaching, many teachers leave the field when it becomes too difficult. On a larger scale, this project is important, because it gives insight into teaching; prospective teachers can gain a perspective from experienced teachers and learn early on whether or not the field of teaching is for them. This has huge significance as it can affirm in some prospective teachers their desire and passion for teaching, but it can also show other prospective teachers that this profession is not for them, saving them money, time, and disappointment.

Presenter(s)-Major: **Kelsi Antonelli - Biological Sciences-Biology**  
Title: HOT CLIMATES AND EXOTIC DIETS: THE EFFECT OF TEMPERATURE ON HERBIVORE HOST SWITCHING  
Department: Biological Sciences  
Sponsor: Thomas Walla

External Funding Source: National Science Foundation Grant DEB-1020518

Abstract: It has been well established that herbivorous insects are restricted to a narrower diet of host plants in the tropics compared to the higher latitudes. This specialization by herbivores forms the basis for the diversity of trophic interactions, community resilience to change, and overall connectedness of species. This latitudinal pattern has been generalized to include elevational gradients, leading to the expectation that organisms in warm lowland rainforest should be strict specialists while organisms living in colder highland rainforests should be generalists. Recent work in the tropical Andes has contradicted this pattern showing that for the highly diverse genus *Eois* (Lepidoptera: Geometridae) feeding on the equally diverse genus *Piper* (Piperaceae), highland species above 2000m are surprisingly more specialized than their lowland relatives. A possible explanation for this pattern invokes the potential for warmer temperatures to improve the ability of herbivorous larvae to metabolize novel plant compounds and thus easily incorporate new plants into their diet. Such a metabolic dependence on temperature would produce the observed patterns of higher specialization in colder tropical climates due to limitations in host switching ability. To test this hypothesis, the researchers investigated the role of temperature on the ability of *Eois* caterpillars to consume novel host plants in the genus *Piper*. The researchers collected caterpillars from the forest and transplanted treatment populations onto their preferred host plant and a new species of *Piper* host plant and reared them at a low elevation while rearing a control group at their native high elevation. It was expected that the warmer temperatures at the lower elevation would cause an increased survivorship on the new host species at low elevations, but both populations of *Eois* at both elevations experienced a high mortality rate when fed a non-host plant species of *Piper*. These results indicate that host shifts are metabolically challenging for *Eois* larvae, and that these barriers are not simply overcome by increased temperatures in the range studied.

Presenter(s)-Major: **Alexander Asay - Geology**  
Title: HISTORICAL GEOMORPHIC ADJUSTMENTS OF THE COLORADO RIVER  
Department: Physical and Environmental Sciences  
Sponsor: Gigi Richard

Abstract: The purpose of this project was to determine how a 51-km reach of the Colorado River in western Colorado has altered its course since 2007. An understanding of the historical changes in the geomorphology of this fluvial system will allow for better predictions of potential future adjustments. This study focused on locations where the removal of invasive riparian vegetation, including tamarisk (*Tamarix* spp.), may have induced bank destabilization and promoted increased channel mobility. In order to discern these historical alterations, the active channel of this 51-km reach of the Colorado River was digitized from aerial photographs from 2008 and 2012 using GIS. The active channel included the main channel, side channels, and the sections of the river with little to no riparian vegetative species as a result of natural river processes. Vegetated islands and mechanically cleared portions of the channel were not considered to be part of the active channel. In addition to determining how the river has altered its course throughout recent history, the resulting maps will serve as a baseline comparison for future changes in channel morphology following removal of invasive riparian vegetation, including tamarisk.

Presenter(s)-Major: **Dylan Ashby - Mechanical Engineering, Terence Haley - Mechanical Engineering, Cole Hanson - Mechanical Engineering**  
Title: IN-LINE VISCOMETER FOR MONITORING HYDRAULIC FRACTURING FLUIDS  
Department: Mechanical Engineering  
Sponsor: Francisco Castro

External Funding Source: Halliburton

Abstract: Aqueous polymer solutions of guar or xanthan gum serve as emulsion stabilizers to increase sand carrying capacity of hydraulic fracturing fluids, or proppant, used to stimulate oil and natural gas well production. Polymer viscosity is monitored continuously during geological formation fracturing to assure the quality and performance of well fracturing fluids, minimize chemical impacts, and to prevent formation damage and difficult fluid removal caused by high viscosity fluids. Commercially available in-line rotational viscometer designs such as the Brookfield TT100 are delicate and do not to maintain performance in extreme temperature exposures, lose calibration after vibration experienced during transport to remote locations, foul due to particulates contained in variable water sources, and fail to provide consistent and accurate readings for challenging dynamic flow conditions. Alternative viscosity measurement techniques are discussed as possible solutions for a robust in-line process viscometer suitable in well fracturing applications. An in-line viscometer design is proposed as an accurate measurement device for guar gum solutions used in oil and natural gas well stimulation operations.

Presenter(s)-Major: **Dylan Ashby - Mechanical Engineering, Todd Henry - Mechanical Engineering, Samuel Yenchick - Mechanical Engineering**  
Title: STEAM POWER CYCLE  
Department: Mechanical Engineering  
Sponsor: Nathan McNeill

Abstract: A working steam power plant was designed and fabricated to demonstrate the principles of the vapor-power cycle. The design is a closed Rankine system, consisting of a pump, boiler, heat engine, and condenser. A four cycle gasoline engine was converted into a steam engine that turns a permanent magnet generator. A net output of 60 watts was desired in order to power an incandescent light bulb. The working fluid is heated by burning fossil fuels such as propane. The cycle works at a maximum gage pressure of 40 psi. The theoretical efficiency of the cycle was calculated from thermodynamics principals and compared to measured efficiency.

Presenter(s)-Major: **Auburn Ashley - Theatre Arts-Acting/Directing**  
Title: PRESENTATION OF MONOLOGUES FROM THE "FINAL ACT" AND "HOW I GOT THAT PART"  
Department: Theatre  
Sponsor: Jeremy Franklin

Abstract: This project prepares for future auditions and the real world of acting. An actress must be able to prepare and present her best work with passion and understanding while having multiple monologues prepared should the auditors want to see more contrast between pieces. The presenter will be performing two contrasting monologues that will show a wide range of skills while emotionally engaging in the story. The reason for the performance is to show acting range by performing one comedic monologue and one dramatic monologue. The first monologue is "The Final Act" by Rebecca Young, and focuses on a character dealing with her friend's suicide. In a comedic contrast, the second monologue is "How I Got That Part" by Robert Pridham.

Presenter(s)-Major: **Garren Atchley - Mfg Tech Cluster-Mach Tech, Jackson Shaw - Mfg Tech Cluster-Mach Tech, Dennis Tobin - Process Systems Technology, Angelica Wise - Mfg Tech Cluster-Mach Tech**  
Title: UNMANNED AERIAL VEHICLE (UAV) IN AGRICULTURE  
Department: Western Colorado Community College  
Sponsor: William McCracken

External Funding Source: Encana

Abstract: Use of Unmanned Aerial Vehicles (UAV) in agriculture is expected to increase dramatically in the next few years. They can be used to monitor property lines, fencing, and irrigation systems; to count livestock and to see crops and/or property in real time from the comfort of a vehicle or from home. This could be helpful to agricultural businesses with real time feedback reducing costs, losses of crops, livestock, time, and resources. The presenters were motivated to work

on this project by investigating something that has never before been done in Western Colorado. The goal is to raise community awareness about UAV and what they're capable of; not only for orchards and farms but also assist in the need for small businesses here and around the state. This technology will benefit all producers and consumers now and for generations to come.

Presenter(s)-Major: **Amy Austin - Bus Admin-Entrepreneurship, Mariah Bisson - Bus Admin-Marketing, Bradley Brandenburg - Pre-Business Administration, Amanda Conrads - Bus Admin-Entrepreneurship, Travis Roth - Bus Admin-Landman/Energy Mgt**  
Title: LEGEND BREWERY IMC  
Department: Business  
Sponsor: Deborah Parman

Abstract: An Integrated Marketing Communications (IMC) plan was developed to provide a promotional plan for a start up business - Legend Brewery located in Palisade, Colorado. This promotional plan was developed as part of an upper-division marketing class. Both the IMC written project and the corresponding presentation examines the target market, market size, and feasibility of various promotional approaches including advertising design, public relations, and media planning. The group's approach to this project is to provide a promotional plan that incorporates Colorado culture and local pride, which will provide the company with a competitive advantage.

Presenter(s)-Major: **Jody Bailey - Mechanical Engineering Tech, Austin Beswick - Sport Management, Gunnar Pagni - General Engineering, Tyler Raymond - Mechanical Engineering Tech, Jessica Valenzuela - Pre-Engineering**  
Title: MAGLEV TRAIN  
Department: Mechanical Engineering  
Sponsor: Frank Kustas

Abstract: The purpose of this project was to demonstrate the principals and practical uses of magnetics through the design and construction of a miniature train using magnetic levitation. A maglev train works off of the principles of magnetic levitation. The track and the train are lined with very powerful electromagnets. When electricity is introduced to these magnets it creates a repulsion force that causes the train to levitate in mid-air. A computer system switches the polarity of electrical coils that line the track creating an electromagnetic field that either pushes or pulls the train. The maglev train is a very efficient means of travel, as there is no friction between the train and rails, and only the coils in the area of the train need to be powered. To demonstrate these properties on a smaller scale, the team used a superconducting magnet as opposed to electromagnets. The team used a track lined with neodymium magnets and a high temperature superconducting magnet made of yttrium barium copper oxide frozen with liquid nitrogen. When the magnet was frozen it levitated 1/8" away from the magnetic track, and it remained levitated until it reached a temperature above -225° Fahrenheit. The team built a track that included altitude changes, curves, and a section where the magnet became inverted. This project demonstrated that magnetic levitation is an efficient means of travel and that a magnetic field can overcome the force of gravity while keeping the superconducting magnet in line on an intricate track.

Presenter(s)-Major: **Brittney Barks - Psychology-Counseling Psych, Erin Holl - Psychology-Counseling Psych, Sarah Zwetzig - Psychology-Counseling Psych**  
Title: ENGAGING IN ROMANTIC AND SEXUAL RELATIONSHIPS: INFLUENCING FACTORS FOR COLLEGE AGE ADULTS  
Department: Social and Behavioral Sciences  
Sponsor: Jake Jones

Abstract: Motivations for entering romantic and sexual relationships were investigated with a mixed methods research design. Three hundred and nineteen college students responded to an electronic survey that included sexual and romantic scripts. Results indicated short-term sexual and long-term committed relationship selections were most influenced by physical and emotional attributes respectively.

Presenter(s)-Major: **Brett Baroffio - Mass Comm - Media Strategies, Antonio Via - Mass Comm - Media Strategies**  
Title: SEEING AND BELIEVING: A STUDY OF COGNITIVE DISSONANCE  
Department: Languages, Literature, and Mass Communication  
Sponsor: Jessica Peterson

Abstract: Cognitive Dissonance is defined as the feeling of internal conflict, anxiety or discord one feels when faced with new information that is inconsistent with existing information, attitudes, opinions or values. The researchers are interested in finding if cognitive dissonance can be induced by specific stimuli regarding the nature of origin as presented in a persuasive format. The research will reflect select university students' reactions to the information presented in the February 2014 debate between Bill Nye "The Science Guy" and Ken Ham, Founder of the Creation Museum. The topic in debate was "Is creation a viable model of origins in today's modern, scientific era?" Through interviews, surveys and focus groups the presentation will show what specific points in the debate caused instances of cognitive dissonance, and relate those findings back to the students' own personally held beliefs to show any correlation.

Presenter(s)-Major: **Benjamin Bartell - Sociology**  
Title: AWARENESS AND PERCEPTIONS OF SUICIDE AMONG COLORADO MESA UNIVERSITY STUDENTS  
Department: Social and Behavioral Sciences  
Sponsor: Abigail Richardson

Abstract: This paper examines the self-reported awareness, perceptions, and attitudes toward suicide as a social problem among Colorado Mesa University students. This study examined variables such as gender, religious participation, marital status, residential status, and beliefs about the importance of family versus individual striving as well as controlling for experience with a suicide or suicide attempt. The first hypothesis was that awareness of the problem of suicide in Mesa County is correlated with residential status and other demographic variables when controlled for experiences with suicide attempts. The second hypothesis was that religious participation was correlated with beliefs and attitudes about suicide, which was similarly controlled. Methods: this study consisted of a 14 question survey of CMU students using a convenience sampling method with professor's permission to survey classes (N=577). The sample contained subjects from all years of college and from one of 5 major academic departments at CMU. Results: using a multivariate chi squared analysis, the data showed statistically significant relationships between awareness and residential status as well as other demographic variables. Analysis of the second hypothesis showed mixed results.

Presenter(s)-Major: **Kevin Beasley - Pre-Engineering, Tristan Close - Mfg Tech Cluster-CAD Technolog, Katherine Nettleton - Pre-Engineering, Joel Rosenstrauch - Mechanical Engineering Tech, Adam Shine - Mechanical Engineering Tech**  
Title: WATER GENERATED USB CHARGER  
Department: Mechanical Engineering  
Sponsor: Ruth Powell

Abstract: Many times when out in the back country, bikers, campers and backpackers don't have ways to charge electronics that may be vital to their trip. Some can carry a mini solar charger, however these have restricted use. This project was designed to use a different, less finite source to power those small electronics. The charger that was created harvests its energy from water (sources being near-by flowing streams, creeks, or rivers) to power a USB port that has the capability to power a phone, head light, etc. With flowing water as a power source, the time of day for when you can charge your device has no limit and will almost always be accessible. This project demonstrates how easy it is to get your energy from a source other than solar.

Presenter(s)-Major: **Steven Beaulieu - Mechanical Engineering, Skyler Ogden - Mechanical Engineering, Kristopher Sharpe - Mechanical Engineering**  
Title: MESA COUNTY ENERGY INITIATIVE  
Department: Mechanical Engineering  
Sponsor: Francisco Castro

External Funding Source: Mesa County and Department of Local Affairs (DOLA)

Abstract: The purpose of this project was to reduce the amount of money that Mesa County spends at certain facilities on monthly energy consumption. The main focus was the Fleet Management Building at 971 Coffman Rd, Whitewater, Colorado. Keeping in mind that the cheapest and cleanest energy is that which is not used, energy monitoring systems

were installed on four of the county's largest consuming buildings. These systems track live electrical consumption and temperatures throughout each building allowing the usage to be managed and minimized. The method used to optimize the energy usage for the Fleet Management Building will be used as a protocol that the county can use in the three other monitored building in the future. This project is estimated to reduce utility expenses by 15% – 30%, saving thousands of tax payers' dollars each month.

Presenter(s)-Major: **Oscar Beltran - Pre-Business Administration, Steven Garcia - Sport Management, Katherine McKenzie - Pre-Business Administration**  
Title: THE GREEN LIGHT ECO RESORT AND CASINO  
Department: Business  
Sponsor: Britt Mathwich

Abstract: Students created a new resort conceptual and operational plan for the Green Light Eco Resort and Casino to be located in DeBeque, Colorado. There is currently a real plan to construct a casino in this area to boost DeBeque's economy, which provides a solid foundation for the project. Three phases of the plan will be presented. The first phase is resort concept, which includes target market, competitive analysis, and key differentiators. Second, resort offerings entail accommodations, food/beverage and entertainment outlets, banquets, retail space, and modes of transportation. Lastly, resort design includes the layout, environmental concerns, ADA considerations, and the marketing plan. The resort uses a unique financing proposal in that green cards will be offered to immigrants that qualify and the the developers will invest a large amount of capital into the resort. The Green Light Eco Resort and Casino has the potential to be economically sustainable as well as very environmentally friendly.

Presenter(s)-Major: **Ashley Bernal - Mass Comm - Media Strategies, Donovan Haynie - Mass Comm - Media Strategies**  
Title: CULTIVATION OF MASCULINITY  
Department: Languages, Literature, and Mass Communication  
Sponsor: Eric Sandstrom

Abstract: Inspired by findings under the cultivation theory and "mainstreaming" in media, researchers looked deeper into the impact television has on reinforcing ideas about differentiation. Cultivation theorists make the claim that television exposure has long-term effects that are significant to self-concept. Understanding that images are the most powerful messaging tool in mass communication, television has a great influence on an individual's perception. This study looked at commercial portrayals of men to address the media's message as disproportional to reality. Research showed how these representations shape masculinity with expectations of behavior for each gender. By deconstructing the Old Spice "Smell Like a Man, Man" campaign, viewers were asked if they admire or strive to be like the hyper-masculine figure portrayed. The popular cultural text was analyzed to determine whether exposure to this character, "a real man's man", influenced both men and women ages 18-24. This campaign was promoting a product for men, yet it targeted women. In order to further support for this theory, the study also pulled in other contemporary examples that claim if you do anything remotely "feminine," it must be counteracted by an extreme behavior of manliness. Without direct knowledge of the subject for those who absorb information predominately through television, preconceived notions and stereotypes become a stronghold for women and men to understand what a "real man" should look or act like.

Presenter(s)-Major: **Hilary Berner - Kinesiology-Fitness and Health, Paul Schlafly - Pre-Business Administration**  
Title: BARLEY BEAR BREWING COMPANY INTEGRATED MARKETING PLAN  
Department: Business  
Sponsor: Emma Fleck

Abstract: This presentation demonstrates a student researched and designed Integrated Marketing Communications(IMC) plan for a fictitious beer company, Barley Bear Brewing Company. The project was designed to give students an opportunity to build a full promotional marketing plan using a new business created by the students. Extensive research was done by students in order to create corporate and brand strategies, promotional opportunity analysis, communications objective, as well as advertising plans and sample materials. Presenters will communicate not only what they learned through building an IMC plan, but the presentation will also be aided by the promotional materials that they designed and built for the project including a commercial, print ads and sample product packaging. Information provided will give viewers a closer look at what it takes to successfully promote a new product in the business world.

Presenter(s)-Major: **Richard Bingley - Geology**  
Title: PALEOCURRENTS IN THE TIDWELL MEMBER OF THE MORRISON FORMATION IN WESTERN COLORADO  
Department: Physical and Environmental Sciences  
Sponsor: Andres Aslan

Abstract: The Tidwell Member of the Morrison Formation represents a lacustrine environment with lake, beach, and deltaic deposits. This study will focus on sandstones within the Tidwell that contain evidence of paleocurrents, primarily channel deposits. In order to help interpret the Tidwell, paleocurrent measurements of sandstones in the overlying Salt Wash Member of the Morrison Formation will also be taken. Paleocurrents will help determine the direction that the sediments came from. By comparing the mineralogy and paleocurrents of the Tidwell and the Salt Wash Members, it will be possible to determine if they share the same provenance, and whether or not the periods of deposition overlap. The gathering of paleocurrent data will be significant in determining the overall extent of the Tidwell lake system in western Colorado.

Presenter(s)-Major: **Katelynn Binkley - Bus Admin-Management, Jillian Hayes - Accounting-Public Accounting, Rosa McCarver - Accounting-Public Accounting, Jennifer Phillips - Accounting-Public Accounting**  
Title: NON-PROFIT ORGANIZATIONS: HOW DO THEY DECIDE WHO AND HOW TO HELP?  
Department: Business  
Sponsor: Suzanne Lay

Abstract: The most common ethical dilemmas involve the choice between good and evil. The presenters investigated how non-profit organizations choose between one or more positive outcomes. An example at the forefront of the local community is a hero, Delaney Clements, and the foundation that was created in light of her devastating diagnosis of Neuroblastoma at the age of 8. Donations for Delaney was established to help Delaney's family in this time of hardship following the diagnosis. When Delaney's health was stabilized, she decided it was her turn to help other children battling cancer. The foundation then changed its scope, and Delaney Donates was formed to help other cancer patients with ties to Mesa County. Recently, after an unexpected turn of events, Delaney's cancer has progressed and she is currently undergoing much more aggressive treatments. The foundation is facing the ethical dilemma of how to help Delaney's family while still honoring Delaney's desire to help others. Though one decision is no more correct than the other, the Delaney Donates foundation, with limited resources, is now in the position of more carefully deciding who to help, and how to best utilize funds and efforts since they cannot help everyone.

Presenter(s)-Major: **Sean Bizer - Mechanical Engineering, Oscar Madrid - Mechanical Engineering, Ty Sickels - Mechanical Engineering**  
Title: BSM IN-LINE VISCOMETER  
Department: Mechanical Engineering  
Sponsor: Francisco Castro

External Funding Source: Halliburton

Abstract: A mechanical engineering student team was given the task of designing an in-line viscometer capable of measuring the viscosity of fracturing fluid for Halliburton operations. The viscometer currently in use by Halliburton has been prone to technical malfunctions. Due to these technical malfunctions, inaccurate viscosity measurements are recorded. The team has applied fundamental laws of fluid mechanics into designing a viscometer capable of producing high accuracy viscosity readings at a fraction of the current market price. The project will provide Halliburton with a product that combines high accuracy with exceptional durability.

Presenter(s)-Major: **Sean Bizer - Mechanical Engineering, Terence Haley - Mechanical Engineering, Cole Hanson - Mechanical Engineering, Robert Lueck - Mechanical Engineering, Ty Sickels - Mechanical Engineering**  
Title: SOLAR POWERED VAPOR CYCLE  
Department: Mechanical Engineering  
Sponsor: Nathan McNeill

Abstract: Today, the majority of electrical power is generated by burning fossil fuels. This project presents an alternative to burning fossil fuels by utilizing the power of the sun to generate electricity. A vapor power cycle uses superheated steam to turn a turbine and generate electricity. By using a Fresnel lens to focus the sun's energy to a point, a high



enough temperature can be reached to boil water and subsequently create steam. This steam is used to drive a turbine and generate 60 W of power to light a light bulb. If the sun's energy can be used more efficiently, fossil fuels can become obsolete.

Presenter(s)-Major: **Stacy Bjerk - Geology, Environmental**  
Title: MAGNETISM OF ROUND MOUNTAIN, CASTLE VALLEY, UT  
Department: Physical and Environmental SciencesP  
Sponsor: Verner Johnson

Abstract: Ascending magmas of the La Sal Mountains appear to have exploited a pre-existing kink in the structural boundary which separates the two parts of the late Paleozoic Paradox Basin. Based on  $^{40}\text{Ar}/^{39}\text{Ar}$ , K/Ar, and fission-track geochronology magmatic activity in the La Sals ranges from 25.1 to 27.9 Ma., Round Mountain is an igneous plug consisting of a hornblende plagioclase trachyte in contact with the contorted cap rock of the salt diapir in the Castle Valley. This sedimentary/igneous contact is brecciated due to forceful emplacement of magma or the release of volatile-rich fluids. This is consistent with what is seen throughout the La Sal range. Previous vertical magnetic survey of Round Mountain indicates that the mountain is an igneous plug which was fed vertically from the underlying pluton. With better technologies mapping of the total magnetism of Round Mountain is performed. This allows for greater penetration into the subsurface and may indicate the presence of a lateral feeder from the main body of the La Sals. If this feeder is not present, then one may conclude that the main stock of the Round Mountain is being fed vertically from underneath.

Presenter(s)-Major: **Eric Black - Mechanical Engineering, Austin Burns - Mechanical Engineering, Alice Kebein - Mechanical Engineering**  
Title: HYDRAULIC FRACTURING IN-LINE VISCOMETER  
Department: Mechanical Engineering  
Sponsor: Francisco Castro

Abstract: The Halliburton Challenge course consists of teams designing, fabricating, and testing skills to produce a viscometer used in measuring the viscosity of hydraulic fracking fluid. The reason a viscometer is used in hydraulic fracturing operations is to maximize proppant carrying capacity as necessary while minimizing formation damage during operation. The main goals for the design of a viscometer are durability, accuracy, affordability and ease of calibration. This viscometer needs to be durable in order to withstand the harsh environments it will be subjected to. Viscometers will be transported in the bed of a pickup truck and therefore must be robust. The new design should need minimal recalibration for operation. The viscometer should also integrate seamlessly into Halliburton's existing software. To do so, the system needs to be able to work with a 12 or 24 V power supply and also output data in the range of 4-20 mA. Halliburton requests that the system samples at least one data point per second. Lastly, the viscometer needs to be affordable. The project budget involves both the capital and maintenance costs. The budget is limited to \$1000. The design focus for this viscometer is to use pressure differentials over a given length of pipe. Further calculations will determine the design constraints.

Presenter(s)-Major: **Eric Black - Mechanical Engineering, Austin Burns - Mechanical Engineering, Alice Kerbein - Mechanical Engineering, Jesse Talley - Mechanical Engineering, Scott Taylor - Mechanical Engineering**  
Title: ELECTRIC GENERATION FROM STEAM POWER PLANT  
Department: Mechanical Engineering  
Sponsor: Nathan McNeill

Abstract: The purpose of this project is to apply the fundamentals of thermodynamics to the generation of electricity in a steam power plant. The goal is to power a 60 Watt light bulb by the use of a steam turbine, while investigating the efficiency of the system. The four major components are a boiler, turbine, condenser and pump, and the system must be assembled on a budget of \$300. The working system will be displayed, and the workings of a steam power plant will be explained to the audience. This project will demonstrate the fundamentals of a steam power cycle.

Presenter(s)-Major: **Clarissa Blackmer - Mass Comm - Media Strategies, Brianne Ghosh - Kinesiology-Exercise Science, Brandon Gracey - Physics, Corey Jimerson - Pre-Business Administration, Alexandra Price - Geology**  
Title: THE VIRTUES OF ALPHA CHI IN THE LIVES OF ITS MEMBERS  
Department: Social and Behavioral Sciences  
Sponsor: Adam Rosenbaum

Abstract: The Alpha Chi National College Honor Society is a member in good standing of the Association of College Honor Societies, a group containing 67 different societies. Members of Alpha Chi are identified and elected by school faculty members as ranking in the top ten percent of juniors and seniors. These members represent the best student scholarship in all academic fields at their institutions. The name of the society itself is composed of the initial letters of the Greek words for Truth and Character. At the heart of inducting members into this honor society is the assumption that they should uphold both of these values, Truth and Character. This Student Showcase presentation will revolve around various members' interpretations of these values within their own lives and academic disciplines such as Kinesiology, Business, Mass Communication, Geology, and Physics. The presentation will take the form of a panel discussion highlighting each discipline's take on the values of Alpha Chi. "You shall know the truth, and the truth shall set you free."

Presenter(s)-Major: **Clarissa Blackmer - Mass Comm - Media Strategies, Nickolas Patton - Mass Comm-Broadcasting**  
Title: SPIRAL OF SILENCE IN COLLEGE SPORTS  
Department: Languages, Literature, and Mass Communication  
Sponsor: Jessica Peterson

Abstract: NFL draft prospect Michael Sam's recent decision to "come out" publicly has created a media storm, prompting reporters and individuals to question athletes about how they would feel or react to having an openly gay teammate. Within the field of mass communication, the spiral of silence theory refers to how people tend to remain silent when they feel their views are in the minority. So, is this tendency stronger among male athletes than females ones? To what extent does the spiral of silence affect male college athletes as opposed to their female counterparts, in regards to expressing homosexuality? In an attempt to answer these questions on a small scale, research will be conducted with male and female athletes at Colorado Mesa University via surveys, focus groups and interviews. Findings will be presented via Prezi, including graphics comparing results between male and female athletes. These will include survey results, and comments from focus groups and interviews.

Presenter(s)-Major: **Jesse Blagg - Computer Science, Paul Jensen - Computer Science, Chrystal Keane - Computer Science**  
Title: THERMABOT - REMOTE TEMPERATURE MONITOR SYSTEMS  
Department: Computer Science, Mathematics & Statistics  
Sponsor: Warren MacEvoy

Abstract: This is a presentation on an embedded systems project that remotely monitors temperatures. The ability to remotely access and monitor temperature data is important in many fields. This project requires that the use of embedded systems in order to retrieve temperatures from type K thermocouple units and store them in a database on a website. The data is then available to be monitored remotely by a qualified user and is displayed graphically in real time. The user also has the ability to graph static temperature data over time. Adding and removing qualified users and hardware units is implemented through the web application. The ability to communicate through a private chat interface is implemented as well. The future implementation of a webcam is being considered if time allows. This project is being developed with expansion in mind in order to provide an interface that monitors extreme high or low temperatures to a multitude of companies in a secure manner.

Presenter(s)-Major: **Molly Blakslee - Accounting-Public Accounting, Eric Johnson - Bus Admin-Management, Alexander Knepp - Pre-Business Administration, Shelagh O'Kane - Accounting-Public Accounting, Cade Reynolds - Pre-Accountin**  
Title: ETHICAL BEHAVIOR IN CHARITABLE FUNDING  
Department: Business  
Sponsor: Suzanne Lay

Abstract: This research focuses on accounting ethics within charities in the United States. The researchers will investigate how different charities use the funds that they generate. Giving to charities is rewarding, but people should be concerned with how the dollar they donate is used. This research will also look into the transparency of business processes within organizations such as United Way, The Red Cross, and Goodwill to verify the effectiveness of their cause. Charities receive a substantial amount of money from many places. Accountability for the dollars they receive is important. The effectiveness of their cause can be directly correlated to this.

Presenter(s)-Major: **Benjamin Blandina - Mechanical Engineering, Megan Brown - General Engineering, Isaac Koch - General Engineering**  
Title: A NOVEL METHOD FOR CALCULATING EFFICIENCY OF A HEATING MACHINE  
Department: Mechanical Engineering  
Sponsor: Farzad Taghaddosi

External Funding Source: Certek Heating Solutions

Abstract: The objective of this project is to provide an accurate measurement of efficiency for the DPNG12 Mobile heating unit used by Certek Heating Solutions, Inc. Efficiency is based on the energy output, represented by the change of temperature of glycol to the energy input due to fuel consumption. Using a glycol flow meter, the team will be able to accurately measure the flow rate of the glycol accurately. The flow of diesel will be measured by a flow meter mounted inline. A unique solution to the inaccurate temperature gauges is the use of a digital gauge that connects to the preexisting temperature sensor. The total cost of parts for the project will be \$752. The three devices will be used to manually record the given readings into an excel spreadsheet every 20 seconds for 10 minutes.

Presenter(s)-Major: **Giuseppe Bonanno - Animation and Motion Graphics**  
Title: HIGH STAKES, LOW STANDARDS, AND LOWER STUDENT MORALE: AMERICA'S TESTING CULTURE  
Department: Languages, Literature, and Mass Communication  
Sponsor: Rhonda Claridge

Abstract: A research analysis covering a wide span of studies and argumentative pieces finds some troubling trends in public education's testing and curricula. A mounting body of scholarly evidence from educational authorities indicates that U.S. K-12 institutions' reliance on standardized testing is shaping curricular activities directly around tests, creating a detrimental learning environment that impairs higher-order student competence. Although a significant base of knowledge clearly indicates that children learn and perform best when intrinsically motivated, interested, and challenged, American education continues to reinforce a test-centric, narrow approach. In an oral presentation of this research, the author will explain why teaching methods at most public schools seem to be undermining vital academic capacities, including holistic learning and active problem solving, and may even be de-motivating students, resulting in apathetic, even hostile attitudes towards the concept of education. The conclusion of this research is that America's "testing culture" over-emphasizes otherwise useful empirical metrics, creating an environment that impairs students' capacity to grow into creative, motivated individuals with necessary life skills. Educational conventions must be challenged if significant damage to generations of learners is to be avoided.

Presenter(s)-Major: **Eryn Bond - Nursing, AAS, Joanne Carter - Nursing, AAS, Ravelle Celaya - Nursing, AAS, Nick Wasser - Nursing, AAS**  
Title: BEDSIDE REPORTING AND PATIENT EDUCATION  
Department: Health Sciences  
Sponsor: Genell Stites

Abstract: This presentation presents the benefits of bedside reporting. Reporting at the patient's bedside is the necessary communication between nurses changing shift and it includes the patient. Many healthcare facilities do not stress this method of reporting, but research shows patients included in their own report show a higher degree of participation in their own health care and a healthy degree of questioning; therefore, patient education also naturally happens here. Also, patient-centered approaches can improve patient safety, experience, overall outcome including emotional health, functioning and pain control. This project will discuss how this model of relaying information can implement patient education into the same time frame, as well as improve communication between nurses to decrease hospital-acquired complications. It informs the patient about possible treatments, goals and preventative care or lifestyle changes that they can implement themselves. It is better for the patient's needs. It is much quicker to do the report behind closed doors, but not necessarily more efficient or in the best interest of the patient.

Presenter(s)-Major: **Christine Bongar - Accounting-Public Accounting, Joshua Brady - Accounting-Public Accounting, Daniel Clark - Accounting-Public Accounting**  
Title: SEGREGATION OF DUTIES: DETERANCE OF FRAUD  
Department: Business  
Sponsor: Suzanne Lay , Craig Fossett

Abstract: Fraud is a common occurrence in the workplace that often goes unnoticed. Fraud not only affects the perpetrators of the fraudulent acts but also the stakeholders and society at large. One main reason that fraud occurs is the lack of segregation of duties in the work place. Segregation of duties is a function of internal control that prohibits one person from having too much control or power over the activities of the company. Incorporating role playing and direct presentation, the presenters will strive to prove the importance of having this certain control in many if not all financial institutions worldwide. It is hoped that the audience will gain an understanding of the definition and the importance of segregation of duties in the workplace through this presentation. This newly obtained knowledge can be effectively used and implemented in different workplaces and professions across the globe.

Presenter(s)-Major: **Marisa Boraas - Geology**  
Title: PALEOGEOGRAPHY AND DETRITAL ZIRCON AGES OF OLIGOCENE FLUVIAL SYSTEMS IN THE SOUTHERN GREEN RIVER BASIN, WYOMING  
Department: Physical and Environmental Sciences  
Sponsor: Andres Aslan

External Funding Source: National Science Foundation Grant EAR-1119635

Abstract: Investigations in the southern Green River Basin, Wyoming document the poorly understood transition from internal drainage by Eocene fluvial systems into Lake Gosiute, to the present-day integrated Green River system, which exits the Green River Basin through the Uinta Mountains at Lodore Canyon. Field work south of Green River, WY revealed evidence of two interrelated fluvial systems mapped as a single unit: the Oligocene Bishop Conglomerate. The Uinta Mountain Group facies (UMG), is characterized by; 1) predominantly cobble- to boulder-sized clasts of red quartzite and gray limestone, 2) paleocurrents indicating deposition by northward flowing rivers, and 3) an abundance of detrital zircon ages >700 Ma attributable to the Uinta Mountain Group. The second facies, Firehole Canyon (FC), is characterized by 1) predominantly pebble- to cobble-sized clasts of chiefly non-red quartzite and minor volcanic clasts, 2) paleocurrents indicating deposition by southwesterly flowing rivers, and 3) an abundance of detrital zircon grains <40 Ma. These young grains are likely syndepositional ash fall from volcanic sources in the Basin and Range province. The two facies are interpreted as tributary streams and rivers (UMG facies) flowing from the Uinta Mountains into an axial river (FC facies) flowing west-southwest into the remains of Lake Gosiute.

Presenter(s)-Major: **Rachel Boschen - Biological Sciences-Biology**  
Title: PAST PLACES: PERSONAL STORIES OF THE YOUNG AMERICAN  
Department: Languages, Literature, and Mass Communication  
Sponsor: Rhonda Claridge

Abstract: A twenty-three-year-old, non-traditional student revisits her former life through Creative Non-fiction that explores her home among homeless youths, sexuality, love and drug-addiction in essays on physical places, from the desert Southwest to Mississippi. In a reading of three pieces, this student will share her personal examination of past places and the redeeming properties of art. Imagery, tone, dialogue, and rhythm are the primary techniques this writer uses to convey with harsh honesty and linguistic artistry truths that so many American youths know but cannot express.

Presenter(s)-Major: **Brittany Bosshardt - Graphic Design-Visual Design, Brad Bullard - Graphic Design-Visual Design, Ajalique Chapman - Animation and Motion Grapics, Sutton Frey - Graphic Design-Visual Design, Edgar Lamas - Graphic Design-Visual Design, Candace Marolf - Graphic Design-Visual Design, Studio Art; Jamie Page - Animation and Motion Graphics, Graphic Design-Visual Design; Jessica Smith - Graphic Design-Visual Design**  
Title: CO2 GLOBAL POSTER BIENNIAL  
Department: Art  
Sponsor: Suzie Garner, Stephanie Gibson, Eli Hall

Abstract: In a world of growing digital art, visual design has become more of a technological process. This poster exhibition strives to preserve the art of the printed poster, and hand done style often forgotten by modern designers. Designers were contacted from all over the world and asked to send printed posters; with no prompt, many different cultural responses were received. This presentation will exhibit selected examples of the posters received, and the process in creating a letter pressed thank you poster to give back to the designers who participated. In addition to experiencing cultural diversity, this project brought student designers together to work in a creative collaborative effort, a skill needed for graphic designers in the industry.

Presenter(s)-Major: **Hanna Bowden - Sport Management**  
Title: DEVIANCE IN SPORT THROUGH THE MEDIA  
Department: Kinesiology  
Sponsor: Elizabeth Sharp

Abstract: The purpose of this study is to discover the perception of how deviance in sport is portrayed in the media. This study is being conducted to discover more about sport culture through the eyes of the spectators and media. The methods currently used to collect data for this project include surveys and interviews. Surveys will be given to media personnel, coaches, players and fans of sport. Surveys include both open-ended and Likert scale questions. Responses will be analyzed for patterns and in-depth interviews will be used to interpret survey responses. This project will add information to the literature on perceptions of how media portrays deviance in sport.

Presenter(s)-Major: **Keith Boyer - English-Literature**  
Title: FLESHING OUT COMMODIFICATION IN LATE CAPITALISM  
Department: Languages, Literature, and Mass Communication  
Sponsor: Jennifer Hancock

Abstract: The presentation will focus upon Charles McLeod's debut novel, *American Weather*. Through his expansion of the supernatural elements at play in satire, his focus upon the exhaustion of the standard market, and his demonstration of the systems by which the advertisement industry influences modern culture McLeod demonstrates how further exploration of early Roman satirist Juvenal's theories provide a means to directly address the commodification of the individual, common in the late capitalist mindset.

Presenter(s)-Major: **Keith Boyer - English-Literature**  
Title: MARRIAGE AND IDENTITY IN EDWARD ALBEE'S *WHO'S AFRAID OF VIRGINIA WOOLF?*  
Department: Languages, Literature, and Mass Communication  
Sponsor: Randy Phillis

Abstract: Edward Albee's play, *Who's Afraid of Virginia Woolf?*, premiered in New York City on October 13, 1962, elevating Albee to a new level of critical and commercial success. In the tradition of absurdist drama, the work raises questions of identity, differing perceptions of reality, and the damaging effect of social institutions upon the individual. Unlike his predecessors, Albee is willing to take focus upon one very standard institution in a realistic setting in order to craft a clear and cohesive message. The presentation will focus upon Albee's suggestion that marriage is an institutional means of constructing identity, whereby two individuals with differing perceptions of a common experience struggle against one another in order to define an ambiguous past.

Presenter(s)-Major: **Alisha Bradley- Nursing, BSN, Shannon Svege - Nursing, BSN, Samantha Wiseman - Nursing, BSN**  
Title: THE IMPACT OF UNPLANNED CESAREAN SECTION OF OBESE NULLIPAROUS WOMEN  
Department: Health Sciences  
Sponsor: Bridget Marshall

Abstract: The prevalence of obesity in women of all age groups has dramatically risen in the United States population. The evidence that this epidemic has contributed to ill health and decreased well-being is overwhelming. The rise in obesity has attributed to a combination of genetic factors, an increase in high-fat consumption and a decrease in physical activity. This health issue affects nurses in their role and care for the patient who suffers from obesity. Obstetric nurses, in particular, focus on the best possible outcome for both mom and baby. Maternal obesity presents several risk factors compared to the non-obese pregnant women. The purpose of this proposal is to determine what nursing interventions would decrease the risk of unplanned cesarean sections in nulliparous pregnant females with obesity.

Presenter(s)-Major: **Nicole Bradt - Biological Sciences-Biology, Jean-Marie Gargan - Biological Sciences-Biology, Tyler Hutchinson - Biological Sciences-Biology, Austin Lee - Biological Sciences-Biology, Jacob Wood - Biological Sciences-Biology**  
Title: THE PIGEON PROJECT  
Department: Biological Sciences  
Sponsor: Susan Longest

Abstract: Pigeons were originally introduced into this country as a domesticated bird developed from the European rock dove. Over time, these birds escaped captivity and formed flocks of feral populations. Today, pigeons are considered one of the largest pests in urban areas where roosting birds have become a nuisance. Beneath pigeon nests and roosts (i.e., the rafters of a parking garage), large amounts of pigeon waste accumulates. Pigeon feces contain a variety of viruses and parasites and large accumulations of their feces are a known human health hazard. Furthermore, pigeons have acidic feces that eat away at concrete, thus devaluing buildings. In order to control bothersome pigeons in the campus parking garage, Colorado Mesa University implemented a raptor call from a loudspeaker to deter pigeons from roosting. This study investigated the effectiveness of the raptor call via behavioral observations of the pigeons' responses to the call. Alternative and complimentary solutions for pest control were evaluated with emphasis on practicality for the university campus. The results of this study will provide useful data regarding the effectiveness of methods for pigeon control, which can be applied more broadly to the control of nuisance species.

Presenter(s)-Major: **Samantha Brandt - Computer Science, Samuel Coca - Computer Information Systems, Emily Nunn - General Accounting**  
Title: HELPING THE COMMUNITY ONE DATABASE AT A TIME!  
Department: Business  
Sponsor: Gayla Slauson

Abstract: The purpose of this project is to fix, update, and improve a local non-profit organization's database. When the database was received, it was filled with numerous errors, causing the organization to revert to paper forms for storing data. The organization was unable to verify assistance records for clients, update records, or input new client data. The students will present a completed, fully functional, problem free Access database that will be used in the local community to assist those in need. The revamped database will resolve the data storage issues, as well as help prevent future problems within the database. The corrections decrease the size of the database, making it more accurate and efficient, while maintaining all relevant, necessary information.

Presenter(s)-Major: **Samantha Brandt - Computer Science, Jenna Hayes - Bus Admin - Hospitality Mgt, Louange Mbala - Bus Admin-Management, Elizabeth Wheelock - Hospitality Management**  
Title: SOLACE RESORT AT RAINBOW LAKE  
Department: Business  
Sponsor: Britt Mathwich

Abstract: A preliminary conceptual resort plan was created in order to understand the resort development process. The project involves six different stages of resort development from start to finish, three of which will be discussed. The first phase discussed will be the resort concept that outlines the idea, target market, and the competitive analysis. The second phase will be resort offerings that detail the type of facilities available along with transportation and dining. The last phase that will be discussed is space design, which will go through layout, environmental, and ADA considerations. The resort is called Solace Resort at Rainbow Lake and will be located in the Gunnison National Forest on Rainbow Lake. The resort will be secluded and will provide guests with a real Colorado mountain experience in contrast to their daily lives in urban areas.

Presenter(s)-Major: **Anthony Brayton - Tech Integr Clust-Network Tech, Paul McCormick - Mfg Tech Cluster-Mach Tech, Dillon Nicholas - Mfg Tech Cluster-Mach Tech**  
Title: KALEL 007 SUPER UAV  
Department: Western Colorado Community College  
Sponsor: William McCracken

External Funding Source: Encana

Abstract: Exploring but a few of the possibilities the fixed wing aircraft is capable of performing, these presenters are thinking outside of the box with improvements such as weight savings and solar in-flight charging to extend flight times, surveying plots of land and control either by preprogramming flight path and real-time remote flight control. These

improvements may be made by possibly implementing solar charging cells and recreating parts using a 3D printer able to hollow out parts to the needed specifications. Some further uses include search and rescue, agricultural tracking, surveillance of poachers, wildfire hotspot location, and sport filming.

Presenter(s)-Major: **Taylor Breske - Liberal Arts, Elem Teaching**  
Title: TEACHING AS A PROFESSION  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: The purpose of this project was to investigate what the teaching profession is like. Three teachers were interviewed about the challenges and pleasures of teaching. Much of a teacher's career goes beyond just the classroom and the lesson plans. A teacher must be a positive role model and motivator to help guide students along the path to success. A teacher must act professionally in all situations, whether dealing with students, parents, or the community. This project is intended for future educators interested in expanding their knowledge of what the teaching profession is like.

Presenter(s)-Major: **Michelle Brink - English-Literature, Jason Rhea - English-Writing, Margaret Siligo - English-Literature**  
Title: WHAT IS AMERICAN ABOUT AMERICAN LITERATURE?  
Department: Languages, Literature, and Mass Communication  
Sponsor: Maureen Neal

Abstract: Each presenter in the panel will offer a unique and unconventional response to the question: "What is American about American Literature?" The presentation will include brief explanations/demonstrations of the many ways in which this question can be answered. This presentation is meant to display the multiple ways in which critical thinking can manifest into different forms of expression while maintaining a focus on the importance of the literature, specifically from 1900-present. American literature is inspiring, diverse, nuanced, and deserves attention—much of the nation's history is told by some of the best American poets and writers—it is a pleasure to pay these authors homage and promote literacy in the community.

Presenter(s)-Major: **Amber Brown - History**  
Title: DIVINE DOCTRINE OR COMPLIANT BONDAGE: A LOOK AT THE DEVELOPMENT OF MORMON POLYGAMY AND ITS EFFECT ON WOMEN  
Department: Social and Behavioral Sciences  
Sponsor: Erika Jackson

Abstract: The word polygamy is often associated with the Mormon religion and the state of Utah. These broad associations however do not take into account the history of how the idea and practice of polygamy spread or how men, and more importantly women, reacted to the practice. This project takes a feminist approach in examining the historical significance of polygamy and how it affected Mormon women. Through the analysis of newspapers, journals, and other writings, this project looks at the spread of polygamy and how individual Mormons and non-Mormons reacted to the practice. These documents were published from the 1820s when the Church of Jesus Christ of Latter-Day Saints was founded through the 1860s- ten years after the migration to Salt Lake City began. For many men and women, polygamy was in opposition to the traditional Victorian monogamous marriages that they had grown up surrounded by. Polygamy was not a practice that was easily accepted by many in the Mormon community. Though polygamy in the Mormon community appeared to be beneficial for women, it instead challenged the traditional beliefs regarding marriage that they held as well as took a toll on their emotional well-being.

Presenter(s)-Major: **Jack Bryan - Chemistry, Jake Chiddix - Pre-Engineering, Daniel Lionberger - General Engineering, Cesar Reyes - Pre-Engineering, Cameron Seele - Pre-Engineering**  
Title: AUTONOMOUS MULTI-ROTOR SUPPORTS UNMANNED VEHICLE APPLICATIONS  
Department: Mechanical Engineering  
Sponsor: Frank Kustas

External Funding Source: Bank of America Home Loans

Abstract: The goal of this project was to design, build, and demonstrate an unmanned aerial vehicle (UAV) that would fly to three programmed waypoints using an autopilot and GPS system. The intent was to develop a futuristic technology that demonstrated long-range tasks and prevented the risk of human life. A few such tasks include wildlife control, search and rescue, agriculture assistance, and research. Beyond these long-term goals, the group had a more down-to-earth intent. A radio-control kit outfitted with the technology to test and enact the GPS system was used to demonstrate autonomous flight. Of major concern was flight stability while loaded with electronics; the UAV carried the electronics to power the multi-rotor, plus electronic gear to record and transmit live video. The result was a fully-functional auto takeoff/landing UAV that hit a minimum of three separate waypoints sent through a wireless link and programmed from a laptop.

Presenter(s)-Major: **Alain Bucio Barrios - General Engineering, Keenan Jewkes - General Engineering, Jack MacDonald - General Engineering, Lance Matosky - Pre-Engineering, Joshua McGarity - General Engineering**  
Title: MINI STEAM POWER PLANT  
Department: Mechanical Engineering  
Sponsor: Ruth Powell

Abstract: Boilers used to make steam and generate power have been around for many years. However, most people do not know how they work. The purpose of this project was to create a working, easily understandable scale model of a steam power plant to demonstrate the thermodynamics of this type of plant on a basic level. A boiler heats the water in the system, which then turns to steam and flows through the pipes and spins a turbine. The steam is then re-condensed and returned to the boiler. The model is ideal for public viewing due to its small size and simplicity, but still demonstrates the basic idea to someone who has little or no background knowledge of steam power plants.

Presenter(s)-Major: **Christopher Buell - Tech Integr Clust-Network Tech, Michael Deleff - Tech Integr Clust-Network Tech, David Smith - Tech Integr Clust-Network Tech**  
Title: LIVE ANIMAL TRAP  
Department: Western Colorado Community College  
Sponsor: John Sluder

Abstract: These students were tasked with modifying a live animal trap designed by Bob Wilson by adding the necessary electronics to release the trap once an animal has entered the cage. The cage door cannot close until the animal has completely cleared the door, to prevent harming the animal. The steel door must be remotely triggered and be self contained as it will be in remote areas unattended for long periods of time. A system was designed to trigger the door release once the animal has triggered an infrared sensor. The release will hold for 3 seconds before locking the door in place, keeping the animal from escaping. The circuit will be powered by a 12 volt battery recharged by a solar panel, keeping the entire unit self contained.

Presenter(s)-Major: **Chelsea Bullock - Liberal Arts, Elem Teaching, Tabitha Butterbaugh - Liberal Arts, Elem Teaching, Amy Hurshman - Liberal Arts, Elem Teaching, Erin Richards - Liberal Arts, Elem Teaching**  
Title: SEEDS ON THE MOVE  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: The implementation of a STEM lesson (science, technology, engineering, and mathematics), was created to provide students with a better foundation of learning. In this research project, the presenters sought to find out whether it is more beneficial to teach subjects separately, or integrate all STEM components. Before starting the experiment the presenters created one lesson plan that contained all STEM components, along with an assessment. In order to test the importance of all components, the presenters separated them into the four sections, and each taught one component to a group of students. The students were still expected to take the assessment at the end of the lesson, even though they



were not taught all the components. The second time, the presenters combined all components and taught the lesson, and then had the students take the assessment. Findings will be shared as to whether or not it is important to integrate all components of STEM in science. This project is intended to help future educators and schools see the importance of including STEM in their curriculum.

Presenter(s)-Major: **Kelsey Burns - Mass Comm - Media Strategies, Stephanie Cochran - Mass Comm - Media Strategies**  
Title: CINEMATIC COMIC CULTURE & CULTIVATION THEORY  
Department: Languages, Literature, and Mass Communication  
Sponsor: Jessica Peterson

Abstract: This cultivation study examines the effects of cinematic hero culture in today's society. Does a heavy watcher of superhero entertainment have a more glorified idea of society than a light watcher? From 1992-2002; Dark Horse Comics, DC Comics and Marvel Comics released 14 comic-based live action films. From 2003-2013, 46 comic-based live action films were released from the same three companies. Has this 228% increase in superhero movies affected society's perception of the good of their own culture? This research questions the effects of live action superhero films on consumers of varying consumption levels and the differences in their perspectives on society as a whole. Participants surveyed will be questioned on their consumption level to identify them as a heavy or a light viewer. Further, they will answer questions on society and their perceptions of good and bad. Through focus groups, participants will view movie clips and documentary clips to collect information on comparison between real life culture and hero movie culture. This research is intended to find a correlation (or connection) between the superhero culture in recent films and consumers' varying levels of how good the world around them actually is.

Presenter(s)-Major: **Trevor Burrell - Geology**  
Title: PROCESSES OF SLOT CANYON FORMATION; BANG'S CANYON, WESTERN COLORADO  
Department: Physical and Environmental Sciences  
Sponsor: Andres Aslan

Abstract: The formation of slot canyons on the Colorado Plateau is a dynamic process. Many geologic factors such as sandstone properties, tectonic joining and channel gradient are essential for producing runoff and large stream flows or floods. In high runoff situations, hydraulic processes such as abrasion, hydraulic wedging and cavitation begin to abrade, wedge, weaken and erode bedrock. These erosional processes sculpt flutes in canyon walls and are responsible for waterfalls, potholes and knickpoint migration in the beds of the canyons. The dangers of flash flooding make modeling the best way to study these processes and to better understand how they form slot canyons. The above-mentioned processes will be addressed and applied to studying potholes in the Entrada Sandstone of Rough Canyon Falls in Bang's Canyon, located southeast of Grand Junction, Colorado.

Presenter(s)-Major: **Amelia Bussell - Biological Sciences-Biology**  
Title: COCAINE'S EFFECT ON FETAL ORGAN DEVELOPMENT IN MUS MUSCULUS  
Department: Biological Sciences  
Sponsor: Richard Dujay

Abstract: A better understanding of how cocaine affects the development of fetal organs and the functionality of those organs is important. A study using organs of mice whose mothers ingested cocaine prenatally were analyzed to determine if cocaine affected fetal organ development of the offspring. The results of this study were: (1) Overall decreased organ size in the affected offspring as compared to the control group, except in the heart; and (2) histological landmarks indicating decreased organ functionality. This study suggests that prenatal use of cocaine has the ability to cause offspring's organs to underdevelop during embryogenesis.

Presenter(s)-Major: **Amelia Bussell - Biological Sciences-Biology**  
Title: USING THE INFRARED THERMOMETER (IRT) TO PREDICT DECOMPOSITION  
Department: Social and Behavioral Sciences  
Sponsor: Melissa Connor

Abstract: An infrared thermometer (IRT) is capable of sensing the infrared radiation emitted from the surface of a tissue. As corpses undergo decomposition they experience a variety of changes that affect their temperature. The IRT may be able to detect important decompositional changes associated with insect activity (such as maggot masses), or bacterial and viral colonization. This project recorded IRT readings on the head, abdomen, extremities and orifices of decomposing pigs and humans on a regular basis during the early stages of decomposition. Control temperatures were taken from the ground. Decomposition of the pigs and humans were scored on a total body score (TBS) (Megysi et al., 2005), which rates decomposition on, among other things, color changes related to the processes of autolysis and putrefaction. Notes were taken on observed maggot activity. This study examined the difference between the control temperatures and the body temperatures and attempts to determine if there is a correlation with increased surface body temperature and more active decomposition or maggot activity.

Presenter(s)-Major: **Tabitha Butterbaugh - Liberal Arts, Elem Teaching, Karlie Euler - Liberal Arts, Elem Teaching, Amy Hurshman - Liberal Arts, Elem Teaching**  
Title: THE ANALYSIS AND ASSESSMENT PROCESS OF LITERACY  
Department: Teacher Education  
Sponsor: Cynthia Chovich

Abstract: The Assessment Process and Analysis Learning Study project is designed to assist future teacher candidates to analyze student assessment data. The teacher candidate examines student performances on various research-based assessments to experience the assessment process and better understand appropriate next steps based on developmental stages. The motivation behind this project is to observe and experience student growth by utilizing formative and summative assessments to progress monitor focal students. Assessment selections were chosen based off of the literacy concepts and skills pertaining to the strengths and weaknesses of the focal students. By using the varied assessments, candidates will expand their background knowledge of how to conduct assessments successfully while learning how to select next steps to improve student growth. The significance of this project's results will either confirm or negate the role assessment, progress monitoring, and data analysis has on student growth for educators. This project is important because today's classroom teacher is required to develop instructional strategies based on assessment data to effectively meet the needs of their students who are at varying development levels.

Presenter(s)-Major: **Sused Cabrera - Spanish-Applied Professional**  
Title: TRANSLATION THEORY AND THE DIFFERENCE BETWEEN LITERARY TRANSLATION AND SPECIALIZED TRANSLATION  
Department: Languages, Literature, and Mass Communication  
Sponsor: Mayela Vallejos-Ramirez

Abstract: The importance of translation is essential for good communication and understanding between cultures that speak different languages. One would think translation is simple with good management of two languages, but there is much more that goes into the translation of a document. The goal is to portray the same meaning, message and emotion. A certain translator's characteristics, history, and investigating techniques are part of translation theory that comes into play to make a good translation. The literary and specialized theories are the two most prominent methods used in the world of translation. Applying these two theories will help with the translation of two poems, one in English and one in Spanish, and one short article in English. The objective of this presentation will be to present the theory of translations and the process that is related to a good translation and to provide some samples of the work that was done on the project.

Presenter(s)-Major: **Brian Calkins - General Engineering, Neisha Kaho'opi'i - Pre-Engineering, Tyler Stewart - General Engineering, Casey Williams - Pre-Engineering, Paul Yanowich - Pre-Engineering**  
Title: HIGH ALTITUDE BALLOON OBSERVATION AND MEASUREMENT  
Department: Mechanical Engineering  
Sponsor: Scott Kessler

Abstract: High altitude balloons are a cost efficient way to study weather, the curvature of the earth, and the effect of space on the human body. This is why high altitude balloons continue to be useful in unmanned studies of the universe. For this project, a weather balloon was launched to approximately one hundred thousand feet above sea level, which

gathered data and pictures throughout the flight. On the ascent, the project recorded the balloon's flight path and rate of ascent. At altitude, the balloon recorded the curvature of the Earth as well as obtained a vacuum seal in a container. The balloon stopped ascending around 100,000 feet and slowed to a safe landing speed by the deployment of a parachute. The project complied with FAA regulations, as it is the governing body for launching high altitude balloons and has strict standards for such projects. The payload was located by a GPS system. The data retrieved includes: photographs, video, and flight information. This information was processed, which allowed the team to describe the flight of the small craft. This demonstrates how balloons continue to be one of the most effective unmanned methods of collecting space research data.

Presenter(s)-Major: **Shane Calomino - Culinary Arts, Katie Davini - Culinary Arts, Kevin Klepzig - Culinary Arts, Briana Thorne - Culinary Arts**  
Title: SUSHI 101  
Department: Western Colorado Community College  
Sponsor: Dan Kirby

Abstract: The motivation for this project was to push people to try new and exotic foods and to try to get people to realize the difference between fresh, high quality foods and processed foods. The presenters also aim to educate people about the various misconceptions about sushi, such as the difference between maki sushi, sashimi, and nigiri, and that sushi is not just raw fish. Japan is surrounded by water, thus making it harder for them to raise all of the land animals that westerners are used to in their diets. They cultivate everything they can from the ocean to have a well-rounded diet. The presenters will serve the audience freshly prepared Yellow Miso Soup, nigiri and hand roll platters, along with three different types of maki sushi rolls, prepared on the station. Who's hungry?

Presenter(s)-Major: **Abigail Calvert - Theatre Arts-Music Theatre**  
Title: A PERFORMANCE OF "THEY JUST KEEP MOVING THE LINE" BY MARC SHAIMAN  
Department: Theatre  
Sponsor: Jeremy Franklin

Abstract: When watching performers on stage or television it is easy to forget that success didn't just happen overnight. The performer will be singing "They Just Keep Moving the Line" from Bombshell with music and lyrics by Marc Shaiman. This song is based on Marilyn Monroe's struggles toward success in her life. Just when she thinks she is making her way in the cut-throat performance world, she takes one step forward and two back. The performer performs this song because, like Marilyn, it is every actor's nightmare to be so close to the dream and not reach it.

Presenter(s)-Major: **Courtney Carlton - Mass Comm - Media Strategies, Kirsten Smith - Mass Comm - Media Strategies**  
Title: EXAMINING THE CULTIVATION EFFECTS OF GRAND THEFT AUTO  
Department: Languages, Literature, and Mass Communication  
Sponsor: Eric Sandstrom

Abstract: The controversy over whether or not violence in video games leads to an increase in aggression and violent thoughts, behaviors, and acts in the individuals who are exposed to them remains unsettled. Cultivation theory traditionally refers to the misconstrued perceptions of reality caused by watching television, but the same theory can be applied to video games. The highly interactive games of today are designed with complex story lines that deeply engage the players; these story lines allow the players to identify with the characters they play. Through the administration of surveys and focus groups, this study will analyze the cultivation effects resulting from exposure to violent video games. Specifically, this study will analyze how those who play the violent video games identify with the violent characters, and the effects of that identification with regards to cultivating aggression and violent thoughts, behaviors, and acts. Results will be presented through short video installments and through oral communication.

Presenter(s)-Major: **Jonathan Carr - History**  
Title: SAGEBRUSH SERENADE OR FAREWELL TO PARADISE? WESTERN MYTH AND POPULAR MUSIC LYRICS OF TWENTIETH CENTURY AMERICA  
Department: Social and Behavioral Sciences  
Sponsor: Steven Schulte

Abstract: During the twentieth century, music constituted an enormous part of American popular culture and very often reflected and embraced the popular mythology of the West. After cultural upheavals of the 1960s, many musicians embraced Western myths yet quite soon began reflecting disillusionment with many of these distorted views of the past in much of their lyrics. This paper will offer an overview of the importance of popular music in perpetuating common myths of the American West. The primary focus will be on the changing nature of rock music lyrics regarding Western myth from the 1960s through the 1990s, showing that although some musicians continued to embrace parts of these myths, many began to challenge traditional social memory and present new, far less optimistic interpretations of the American West. The examination of the evolution of popular music lyrics throughout 20th century America provides valuable insights into changing social currents and deserves more attention as a significant component of American social history.

Presenter(s)-Major: **Michael Carroll - Liberal Arts, Elem Teaching, Max Miller-Ridgeway - Liberal Arts, Elem Teaching, Rikki Sours - Liberal Arts, Elem Teaching**  
Title: STEM: A WELL-ROUNDED SCIENCE LESSON  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: A group of three teacher candidates designed, implemented, and assessed student performance through the STEM model (Science, Technology, Engineering, and Math), each one teaching a component of the STEM model, then synthesizing them into a single lesson. The project's value is two-fold; first, to determine the efficacy of the STEM lesson model, and more importantly, to determine the value of multiple components within lesson planning. Each lesson was assessed using identical criteria, quantifying the student's understanding and allowing the data to be compared objectively. The results suggest that multiple approaches to a single lesson are more effective than the one-dimensional model. The intended audience would be educators open to new methods of lesson planning.

Presenter(s)-Major: **Michael Carroll - Liberal Arts, Elem Teaching, Max Miller-Ridgeway - Liberal Arts, Elem Teaching**  
Title: CONCEPTUAL TRAJECTORIES: AN APPROACH TO LESSON PLANNING  
Department: Teacher Education  
Sponsor: Lisa Friel

Abstract: Two Elementary Teacher candidates will apply research on mathematical conceptual development into respective two-part lessons. Extensive research on the developmental learning process, as well as collection and analysis of assessment data preceded the planning; the lessons will be designed around research regarding conceptual development trajectories in accordance with pre-assessment data and within the content of multiplication and division for the purpose of providing activities and strategies so that all student needs were met. The expected comparison of pre- and post-assessment data should illustrate the efficacy of the feedback loop within the planning process.

Presenter(s)-Major: **John Carter - Bus Admin-Finance, William Chambers - Bus Admin- Human Resources Mgt**  
Title: ENERGY SERVICES  
Department: Business  
Sponsor: Morgan Bridge

Abstract: The presentation will show the direction of two different energy companies and the strides they have taken in order to further advance their mission statements in very different ways. The first, a traditional energy company modifies traditional exploration techniques to make the process more effective. The second, a biotech company uses science and technology to develop new ways to increase a finite resource.

Presenter(s)-Major: **Cory Castaneda - Bus Admin-Economics, Kent Olsen-Stavrakas - Bus Admin-Finance, Jordan Rothe - Bus Admin-Finance, Allison Scott - Bus Admin-Finance, Peter Zollner - Pre-Business Administration**  
Title: FINANCIAL STRATEGIES FOR PHARMACEUTICAL COMPANIES  
Department: Business  
Sponsor: Morgan Bridge

Abstract: This presentation will explore the different financial strategies that some of the leading pharmaceutical companies adopt in order to help them achieve their long-term goals. This will include an examination of the general funding of operations, as well as an assessment of capital structure and other relevant financial information. There will also be a brief overview of the pharmaceutical industry followed by a discussion of what the future holds for each company under analysis. Ultimately, the goal is to show how a firm's financial strategies are relevant to the future of the company.

Presenter(s)-Major: **Mitchell Castillo - Pre-Business Administration, Russell Hector - Pre-Business Administration, Joshua Hulse - Bus Admin-Entrepreneurship, Lizeth Reyes - Bus Admin-Finance, Shaleen Walz - Pre-Business Administration**  
Title: FINANCIAL ANALYSIS OF THE TOP AUTOMOTIVE COMPANIES  
Department: Business  
Sponsor: Morgan Bridge

Abstract: Financial analysis provides insight into the automotive industry and helps to develop an understanding of the top five competitors within the industry. Through research of financials, markets, economics, individual comparisons, and the industry as a whole, there is an inherent opportunity in understanding the automotive industry. With knowledge of these fundamentals, company strategies become clearer providing greater confidence in establishing accurate future projections.

Presenter(s)-Major: **Victoria Chavez - General Engineering, Gavin Downey - General Engineering, Justin Edmonds - General Engineering**  
Title: A NOVEL METHOD FOR CALCULATING EFFICIENCY OF A HEATING MACHINE  
Department: Mechanical Engineering  
Sponsor: Farzad Taghaddosi

External Funding Source: Certek Heating Solutions

Abstract: Certek Heating Solutions Inc. is a leading competitor in revolutionary hydronic heating solutions for construction and oil industries. With technology that makes oil and construction projects possible during harsh winter and fall seasons, the efficiency of these "Heat Machines" is important to their clients and parent office in Canada. The focus of this project is to analyze the efficiency of the "Heat Machine," which will be accomplished using a system which will conduct thermodynamic analysis of the machinery under standard operating conditions. The objective of the project is to provide Certek with a standard system that will provide clients with efficiency data and analysis under different ambient conditions allowing for machine optimization.

Presenter(s)-Major: **Scott Childers - Computer Science, Christopher Jones - Computer Science, Jared Sharpe - Computer Science**  
Title: EWASTE INVENTORY MANAGEMENT SYSTEM  
Department: Computer Science, Mathematics & Statistics  
Sponsor: Warren Macevoy

Abstract: E-Waste Recyclers of Colorado specializes in electronics disposal on a large scale. It receives hundreds of disposed electronics from various organizations and individuals. These electronics are then sorted for what can still be used; these are then wiped and prepared for sale and then finally sold on Ebay. Electronics not sold or suitable for selling are disposed. For tax reasons, organizations need to know their electronics have been appropriately disposed. The goal is to create a simpler and more efficient tool to assist E-Waste in keeping track of their inventory. Employees will be able to use mobile phones or handheld scanners to scan printed Quick Response (QR) codes. These QR codes contain information on what is stored inside the container or on the object to which the code is attached. This information is stored on a database maintained by E-Waste. A manager will be able to scan a QR code, have the information loaded onto their workstation, and then edit the properties of the scanned object.

Presenter(s)-Major: **Adam Childs - Pre-Engineering, Gavin Downey - General Engineering, Urian Gonzales - Pre-Engineering, Brady Hanas - Mechanical Engineering Tech, Kaitlyn Knight - Pre-Engineering**  
Title: MANUAL WATER FILTRATION  
Department: Mechanical Engineering  
Sponsor: Scott Kessler

Abstract: Nearly one billion people in the world lack access to potable water, mainly those living in third world countries. More than 3.4 million people die from water hygiene-related causes. Of that 3.4 million, approximately 1.4 million are children. The other 2 million are adults that die from water-related disease. The purpose of this project was to develop a filtration system that could easily be used in third world countries. The manual device cycled dirty water through a filter to create safe, usable water that emptied into a separate container. The members of the design team demonstrated the functionality and user-friendliness of their filtration system in hopes that it could be adopted and used as a way to provide an improved water source to those who lack access.

Presenter(s)-Major: **Erika Chirdon - Accounting-Public Accounting, Kelli Jessop - Pre-Accounting, Dorian McPherson - Pre-Accounting, Kade Robinson - Bus Admin-Finance, James Sharp - Pre-Accounting**  
Title: CYBER ECONOMY: THE GROWING THREAT AND EFFECTS OF FRAUD  
Department: Business  
Sponsor: Suzanne Lay

Abstract: In today's global internet economy, the occurrence of external fraud has skyrocketed. Brick and mortar walls are no longer enough to keep out prying eyes as more and more companies rely on technology to store and protect their financial information. And yet, even as more U.S. companies are becoming aware of the threat of cyber-crime, they are still unaware of the costs to their bottom line when external fraud occurs. The Global Economic Crime Survey 2014, prepared by Steven Skalak of PricewaterhouseCoopers, shows the statistical breakdown of different companies throughout the world that have been victims of fraud, both internal and external, over the past two years. The scales are tipped significantly toward the U.S. in occurrence, which could be an indicator of overall lower ethical standards in this country. Because of the depersonalization of e-commerce, there is no longer a face to the victim of fraud. However, it is still unclear why U.S. companies are not taking steps to protect themselves from these threats. As the risks begin to outweigh the benefits, investors, accountants, and financiers need to be aware of cyber-crime and its effects on the global economy.

Presenter(s)-Major: **Prashant Choudhary - General Engineering, James Emery - General Engineering, Christopher Miller - General Engineering, Jeffrey Yanowich - General Engineering**  
Title: DOUBLE BARREL AIR PUMP APPLICATIONS ON H<sub>2</sub>O  
Department: Mechanical Engineering  
Sponsor: Ruth Powell

Abstract: The purpose of this project was to demonstrate how water reacts when in a vacuum. The project attempted to demonstrate the Ideal Gas Law first stated by Émile Clapeyron in the year 1834 which suggests that when water reaches an ideal pressure of less than 0.4 psi at room temperature the water will undergo a vapor phase change. The motivation for this project was to investigate the phenomenon of freezing water in a vacuum.

Presenter(s)-Major: **Jacob Cimolino - Exercise Science, Ryan Lendrum - Exercise Science**  
Title: EFFECTS OF INFLAMMATION AND/OR HEATING ON ULTRASOUND MEASUREMENTS OF THE HEEL  
Department: Kinesiology  
Sponsor: Kristin Heumann

Abstract: Osteoporosis is a major health concern that is well recognized. Much effort has been put into discovering a non-invasive approach to screening for bone quality and health. The Achilles Insight Plus is a device that does just that. The aim of this study is to address if the ultrasound readings from the Achilles Insight is sensitive to changes in the surrounding tissue of the heel. In this experiment, 50 subjects ages 18+ will be tested in a resting state. The subjects will then walk for 15 minutes barefoot, and another reading will be taken. A dependent t-test analysis will be used to determine if there is a significant change in the device's readings from before and after exercise. The effects of inflammation and/or heating of the surrounding tissue of the heel should not have an effect on the readings. If this is found to be true, it will help validate the usefulness of the Achilles Insight Device in screening for bone quality.

Presenter(s)-Major: **Roger Claeys - Psychology-Counseling Psych, Sarah Hays - Psychology, Andrew Meil - Psychology**  
Title: ROCKY MOUNTAIN HIGH: A STUDY OF THE EFFECTS OF AMENDMENT 64 ON THE USE OF MARIJUANA AND ATTITUDES TOWARDS MARIJUANA.  
Department: Social and Behavioral Sciences  
Sponsor: Jake Jones

Abstract: The attitudes, behaviors, and knowledge of marijuana use and Colorado's Amendment 64 were assessed. A survey was administered to 424 participants before and after recreational marijuana sales began. Results indicate knowledge is lacking, discrepancies between use and perceived use exist, and most people believe marijuana laws will not be enforced.

Presenter(s)-Major: **Jeremy Cleaveland - Mechanical Engineering, William MacDonald - Mechanical Engineering**  
Title: HYDRAULIC FRACTURING WATER MANAGEMENT SYSTEM  
Department: Mechanical Engineering  
Sponsor: Francisco Castro

External Funding Source: Capco Incorporated

Abstract: Hydraulic fracturing (frac) operations require up to two hundred 20,000 gallon reservoir tanks per job. At any given moment, five to fifteen frac tanks are connected in parallel to a manifold with short hoses. Industry sources claim that over 90% of frac jobs use unreliable manual tank gauging and valve control to monitor tanks. This project aims to increase the job reliability and worker efficiency of operations by automating the tank gauging and valve control systems. An automated scale model was developed to control the fluid levels within each tank. The project used an array of five gallon tanks to develop a computer controlled system that drains reservoir tanks sequentially while providing the desired flow rate. The control system will detect a clogged valve or wiring malfunction, alert the operator, and make the necessary adjustments to finish the job.

Presenter(s)-Major: **Tyler Collins - Pre-Engineering, Ross Fischer - Mechanical Engineering, Jaden Koos - General Engineering, Jaime Nevarez - Mech Eng Tech Prov Bacc**  
Title: VAN DE GRAAF GENERATOR  
Department: Mechanical Engineering  
Sponsor: Ruth Powell

Abstract: The Van De Graaff generator is a machine that uses a belt turned by a motor to create static electricity. A grounding wire removes negative static charge on the bottom of the belt, and the positive charge moves up and charges the metal sphere. The designers demonstrated the properties of static electricity through interactive presentations.

Presenter(s)-Major: **Matthew Cooper - Mechanical Engineering, Jose Morales-Carballo - Mechanical Engineering Tech, Jeffrey Pike - Mechanical Engineering, Justin Robbins - Mechanical Engineering**  
Title: PLASMA ELECTROLYTIC OXIDATION (PEO)  
Department: Mechanical Engineering  
Sponsor: Francisco Castro

External Funding Source: Engineered Coatings Incorporated, Spendrup Fan Company, Lewis Engineering, and Calphalon

Abstract: Plasma Electrolytic Oxidation (PEO) is a new, one step conversion coating process for lightweight metals, similar to traditional anodizing, yet produces harder and denser coatings. The process is also "greener" than traditional anodizing as it uses basic, biodegradable solutions compared to the acidic solutions used in anodizing. Proprietary combinations of PEO process parameters such as: duty cycle, voltage ratio, frequency, time, electrolyte type and electrolyte concentration are used commercially to produce unique coatings for the aerospace industry, mining equipment, and cookware. The parameters were varied on three different materials: 3003 Aluminum, A356 Cast Aluminum and Titanium (Ti-6AL-4V) to discover combinations which create coatings that achieved sponsor guidelines. The mechanical properties of the coating were assessed through measurements of micro hardness, thickness, wear and fatigue resistances as well as X-Ray diffraction.

Presenter(s)-Major: **Matthew Cooper - Mechanical Engineering, Skyler Ogden - Mechanical Engineering, Jeffrey Pike - Mechanical Engineering, Kristopher Sharpe - Mechanical Engineering**  
Title: WIND TUNNEL INVESTIGATION OF SEMI-TRUCK DRAG FORCE  
Department: Mechanical Engineering  
Sponsor: Timothy Brower

Abstract: Semi-truck add-ons have the implications of reducing aerodynamic drag and thus improving fuel efficiency. A model of a semi-truck/trailer along with drag reducing add-ons were designed using Solid Works and fabricated using a 3D printer. The add-ons were designed to be easily attached and detached to the base model. The add-ons designed for the model were trailer skirts, cab front end, cab fairing, and boat-tail. The model was scaled down to 45:1 for testing purposes in a wind tunnel. Statistical analyses were performed to show a significant reduction in the drag force experienced by the semi-truck at speeds ranging from 10 mph to 80 mph, which correlates with an increase in fuel economy.

Presenter(s)-Major: **Lindsey Cox - Nursing, BSN, Erika Winkenhofer - Nursing, BSN**  
Title: BENEFITS OF EARLY END-OF-LIFE EDUCATION: FAMILIES OF PEDIATRIC HEART TRANSPLANT RECIPIENTS  
Department: Health Sciences  
Sponsor: Courtney Kasun

Abstract: Pediatric heart transplantation has become a highly accepted form of treatment for most pediatric heart disease, however these conditions are still associated with high mortality rates. The nursing profession is on the forefront of providing end-of-life education to this population of patients and their families. Despite the apparent need for early and targeted end-of-life care, there has been no research investigating whether beginning end-of-life education at diagnosis of a terminal heart disease would be beneficial to this population. Pediatric palliative and end-of-life care is currently in the initial phase of implementation, therefore there is little research into the benefits. The purpose of this study is to determine if there are any perceived benefits of early end-of-life education to the families of pediatric heart transplant recipients. A qualitative phenomenological research design was used for this study. Participants for this study were selected by performing a database search at Children's Hospital in Aurora, Colorado. Participants were selected for invitation to this study if they had a child who either received a heart transplant or died awaiting heart transplantation. A 28 question survey was developed utilizing open-ended, dichotomous and Likert scale questions aimed at obtaining data on the experiences of the participants. The research was a pilot study used to determine the internal validity of this tool. Descriptive statistics were used to categorize the nominal and ordinal data obtained, and identify themes within the participants' answers.

Presenter(s)-Major: **Morgan Creekmore - Computer Science, Carson Snart - Computer Science, Orion Stanger - Computer Science**  
Title: PROJECT QOMAUTH  
Department: Computer Science, Mathematics & Statistics  
Sponsor: Warren MacEvoy

Abstract: With the ever increasing number of cyber threats, Computer Security is emerging as a necessity to protect precious data. To combat this, companies need a secure way of managing clientele. Project QOMAuth provides a secure login environment and a client management system for a security tool. It uses two-factor authentication as an added security layer to ensure all but the most ominous of threats are kept at bay.

Presenter(s)-Major: **Bobby Crigger - Accounting-Public Accounting, Mark Whitfield - General Accounting, Nicholas Cosgrove - Pre-Accounting**  
Title: COMPARISONS OF PUNISHMENTS AMONG MAJOR FRAUD CASES  
Department: Business  
Sponsor: Suzanne Lay

Abstract: A group of students will compare six major cases of fraud that have occurred in the United States and analyze the punishments given. Presenters will give a brief overview of each case and provide the details of how the people involved were punished. In addition, the presenters will discuss whether or not the punishment given fits the crime. Research suggests that some punishments were fair, lenient, or too severe.



Presenter(s)-Major: **Cullen Cripps - Computer Science, Christopher Orr - Computer Science**  
Title: THE POSITIVE MOVEMENT WEBSITE  
Department: Computer Science, Mathematics & Statistics  
Sponsor: Warren MacEvoy

Abstract: The presenters will create a front and back end website that adds dynamic content based on the events the Positive Movement does. The back end will give a user the ability to log in, create a new event, and add photos and details pertaining to these events. Additionally, this website will be utilized to contact Positive Movement and share dynamic feeds from social media.

Presenter(s)-Major: **Bryan Crocket-Goad - Hospitality Management, Robert Miller - Hospitality Management**  
Title: "AWAY" ECO RESORT  
Department: Business  
Sponsor: Britt Mathwich

Abstract: To increase tourism in The North Fork Valley, students designed a preliminary conceptual developmental and operational resort plan to develop an Eco-Resort near Paonia, Colorado. This presentation will cover three phases of the six phase resort development project. The first phase of the resort concept includes a short introduction to the resort theme, target market, and competitors. The second phase will provide a snapshot of resort offerings including facilities and activities. Finally space allocation and layout will be explained including additional considerations. With the help of business investors and community representatives, this resort will provide an increase in the local economy, as well as provide additional jobs, all while ensuring a sustainable, eco-conscious resort property.

Presenter(s)-Major: **Wendi Cummings - Nursing, Kelsey Delatorre - Nursing, Dena Dolson - Pre- Nurse Allied Health, Alexandra Egger - Nursing**  
Title: IMPROVED TECHNIQUE FOR HEALTHCARE COMMUNICATION  
Department: Health Sciences  
Sponsor: Genell Stites

Abstract: Since healthcare began, there have been advances in technology and attempts to improve ways of communication to prevent error and promote more adequate care. It would be more beneficial to have staffing reports saved on the computer system, so all medical staffing would have access to necessary information. The presenters want to improve lack of communication throughout medical departments and they believe to have found a helpful solution to solve this problem. The significance of this project is to prove more coordinated patient care, and fewer errors due to negligence from this improved communication method.

Presenter(s)-Major: **Philip Daughtry - Biological Sciences-Biology, Sam Jessen - Biological Sciences-Biology, Keila Utu - Biological Sciences-Biology, Maddison Wilson - Biological Sciences-Biology**  
Title: THE EFFECTS OF SALINITY ON LOCAL BIRD POPULATIONS  
Department: Biological Sciences  
Sponsor: Susan Longest

Abstract: The lakes and rivers of Western Colorado provide habitats for a variety of wildlife, including waterfowl. However, natural and man-made sources of salt runoff from salt flats, road salts, and hot springs can increase salinity in these water sources. Moreover, irrigation efforts and evaporation from rising temperatures can also have an effect, disturbing the habitats of the local water-dwelling birds. In order to study this effect, water samples were taken from lakes in the southwestern region of Colorado and analyzed for salinity. Bird counts were also conducted under similar weather conditions and times from the sampling areas. These two data sets were then analyzed to see if there was a correlation between lake salinity and the local bird populations of those areas, namely an inverse relationship in which populations of birds diminish if salinity levels rise. By studying this phenomenon, it may be possible to change behaviors affecting man-made sources of salination and thus stop unintended harm to the environment and local bird populations.

Presenter(s)-Major: **Chad Davis - Accounting-Public Accounting**  
Title: SHOULD CYBER-ATTACKS BE CONSIDERED ACTS OF WAR  
Department: Business  
Sponsor: Donald Carpenter

Abstract: Cyber attacks have become more widespread in recent years. Research conducted by the presenter through a literature review looks at cyber attacks from the perspective of whether they should be treated as acts of war. The presenter will begin with why cyber-attacks should be considered acts of war. This will be accomplished by first discussing cyber attacks and how they are conducted. The presenter will then discuss the ramifications of such attacks on critical infrastructure and will discuss the legal grounds by which such action could be taken. The presenter will then discuss why cyber-attacks should not be considered acts of war and the loss of rights that may occur by calling them acts of war. The discussion about why cyber-attacks should not be considered acts of war and will wrap up by considering the dangers of cyber-war. Finally, the presenter will discuss how there is precedence for calling such action acts of war, but how in so doing there will be major ramifications for both those involved and the civilian populace.

Presenter(s)-Major: **Chad Davis - Accounting-Public Accounting, Tyler Ellsworth - Pre-Accounting, Christopher Hedges - Accounting-Public Accounting, Jacob Raymond - Bus Admin-Finance, Xujing Zhang - Accounting-Public Accounting**  
Title: THE ETHICAL AND REGULATORY COMPONENTS OF THE 2008 FINANCIAL MELTDOWN  
Department: Business  
Sponsor: Suzanne Lay

Abstract: There were several key components that contributed to the financial meltdown of 2008 to include: government regulators, the real estate market, lenders, consumers, and rating agencies. Each of these offered some of the many parts that developed a massive synergy to envelop the entire financial market both here and abroad. This presentation explores the degree to which the United States government played a leading role in creating the conditions which led to the meltdown. Government regulators played a prominent role in the five following sectors of the finance industry. The real estate market was booming and as a result house prices were rising and real estate agents and appraisers benefitted greatly. The consumer also reaped the rewards of easy home ownership hurdles and the ability to qualify for more house than they were financially situated to occupy. Lenders were able to profit handsomely from loan origination fees and the resale of the mortgage backed securities. Rating agencies scrambled to cash in as well with rating all of these mortgage backed securities and giving the lenders the ability to resell their loans.

Presenter(s)-Major: **Rinnah Davis - Liberal Arts, Elem Teaching, Erin Richards - Liberal Arts, Elem Teaching, Michelle Thomas - Liberal Arts, Elem Teaching**  
Title: READING AND WRITING ASSESSMENT CASE STUDY  
Department: Teacher Education  
Sponsor: Cynthia Chovich

Abstract: This project addresses the question of how assessment is used in today's educational system, which is centered on data-driven instruction and best practices. Assessment knowledge is a motivating factor for educators already in the classroom and individuals working to enter the field of teaching. This project was done to demonstrate the developmental stages and learning strengths of elementary students identified by baseline, formative, and summative assessments. Data was collected using a series of formal and informal reading and writing assessments. Teachers need to determine the developmental progress of their students by progress monitoring student performance and continually adjusting instruction based on the results of their assessment information. To understand this project, one needs to know the importance of assessment and how it is used in the classroom. The intended audience for this project is anyone interested in understanding how to use assessments to analyze student learning and growth. The results of this project will be a comparison of three students from three different schools and over a period of three months. The significance of this study is to cast a reflective lens on assessment and determine the significance it may have on student development, instructional strategies, and/or educator knowledge related to assessment. The project is meant to show how a teacher can use data attained from assessment to direct student learning and growth.

Presenter(s)-Major: **Rinnah Davis - Liberal Arts, Elem Teaching, Karlie Euler - Liberal Arts, Elem Teaching, Michelle Thomas - Liberal Arts, Elem Teaching**  
Title: STEM LESSON STUDY: OBSERVING SHAPES AND BUBBLES  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: This project's purpose is to demonstrate that the components of STEM must be taught in conjunction with one another and not separately to help students develop a better understanding of the content taught. In order for the reader to comprehend the project's objective, they need to understand the concept of STEM and that the results were based on participating adults. From assessments, the presenters will be sharing what was discovered from teaching the components of STEM as separate entities and then as one lesson. The conclusion is that STEM is more effective when taught together than separately, because students can develop a deeper level of comprehension. The intended audience is any person who is interested in teaching a lesson that involves STEM (Science, Technology, Engineering, and Mathematics).

Presenter(s)-Major: **John Dawson - Exercise Science, Katherine Ruark - Exercise Science**  
Title: STANDARD METABOLIC RATE AND VO<sub>2</sub> MAX IN BROWN ANOLES UNDER DIFFERENT TEMPERATURES  
Department: Biological Sciences  
Sponsor: Paul Hampton

Abstract: Lizards are exposed to temperature changes both seasonally and daily. As poikilotherms, the physiology of lizards is dependent on the environmental temperature. VO<sub>2</sub> max is defined as the maximum rate at which an organism can consume oxygen. The standard metabolic rate and VO<sub>2</sub> of brown anoles (*Anolis sagrei*) will increase with increased temperatures, and differences will be seen in Q<sub>10</sub>. Using six brown anoles the standard metabolic rate will be measured through a closed respiratory system at temperatures of 18, 24 and 29 degrees centigrade. To push them towards VO<sub>2</sub> max the anoles will be run until exhaustion. Time until exhaustion will be monitored per test. It is also predicted that the oxygen consumption after maximal exertion will be increased.

Presenter(s)-Major: **John Dawson - Exercise Science, Keonimana Shigematsu - Exercise Science, Ryan Teal - Exercise Science**  
Title: THE EFFECTS OF AMBIENT TEMPERATURE ON OXYGEN UPTAKE IN SUBMAXIMAL CYCLING  
Department: Kinesiology  
Sponsor: Gerald Smith

Abstract: This study investigates the physiological responses to cycling at elevated ambient temperatures. The purpose of this study was to determine if oxygen uptake during submaximal cycling was greater at elevated ambient temperature compared to room temperature. Four male subjects with limited cycling experience each completed a VO<sub>2</sub> max test, and two submax tests on a cycle ergometer. The two submax cycling tests were completed at 60% of the subjects VO<sub>2</sub> max levels. A Parvo Medics metabolic cart collected heart rate, oxygen uptake, and power output data in room and elevated ambient temperatures. Results found that at elevated ambient temperature, oxygen uptake levels were 15% greater than at room temperature. Heart rate and rate of perceived exertion also increased at elevated ambient temperature. Cyclists consumed more oxygen when riding at elevated compared to room temperature. The higher oxygen consumption may be due to the increased superficial blood flow and higher heart rate. This research is beneficial for exercise enthusiasts who participate in activities that may take place in hot environments.

Presenter(s)-Major: **Anthony DeFeo - Pre-Engineering, Dane Dixson - General Engineering, Scott Foster - General Engineering, Steven Horbas - Pre-Engineering, Krysta Manzanarez - General Engineering**  
Title: BICYCLE CHARGER  
Department: Mechanical Engineering  
Sponsor: Ruth Powell

Abstract: The goal of this project was to create a bicycle charger designed to transfer energy through pedaling a bicycle, ultimately creating an electrical current for small charging needs. The charging-kit that was created was portable and compatible with most bicycle models. While the power was converted from pedal to charger, the energy output was measured and varies depending on each individual who is riding the bicycle. This will allow a charge to occur while pedaling or coasting on the bicycle.

Presenter(s)-Major: **Kiley DeSanto - Biological Sciences-Biology**  
Title: A PRELIMINARY STUDY OF POPULATION GENETIC DIFFERENTIATION IN A MARINE SPECIES: EVALUATING THE EFFECTIVENESS OF COASTAL RESERVES  
Department: Biological Sciences  
Sponsor: Aparna Palmer

External Funding Source: Saccomanno Higher Education Foundation

Abstract: Because coastal ecosystems are important biologically and economically, marine reserves have been established for their protection. One goal of marine reserves is the protection of species diversity within their boundaries. The survival of a species is enhanced when higher genetic diversity exists. Genetic diversity may be assessed by measuring genetic differentiation. The greater the genetic diversity, the higher the genetic differentiation. The present study assessed the level of differentiation between two populations of a single polychaete species, *Naineris quadricuspida*. The two populations are separated by 800 kilometers along the Pacific Northwest coast with the flume of the Columbia River located in between them. Eighteen 16S DNA sequences were obtained from each population. One population is located in a reserve while the other is not. Although a total of eight distinct haplotypes were found, most of the individuals shared one haplotype. The results from the Chi Square test of population subdivision and the AMOVA analysis of population differentiation showed that the two populations were not significantly different genetically. This is probably the result of intervening populations that allow for substantial gene flow between the two populations used in this study, keeping the populations genetically similar.

Presenter(s)-Major: **Parker Dotsey - Biological Sciences-Biology, Kelly Otto - Biological Sciences-Biology**  
Title: THE EFFECTS OF RATTLESNAKE VENOM ON COST OF DIGESTION IN SNAKES  
Department: Biological Sciences  
Sponsor: Paul Hampton

External Funding Source: Department of Biological Sciences Undergraduate Research Funds

Abstract: Little is known about the influence pitviper venom has on digestion in snakes. Studies have investigated the effects of envenomated prey on gut passage time and specific dynamic action (SDA), the increase in metabolic rate due to food ingestion. It has been shown that venom had no effect on digestion rate and SDA; however, it is known that rattlesnake venom has proteolytic characteristics. The researchers hypothesize that rattlesnake venom will reduce gut passage time and caloric cost of digestion in snakes. The Garter snakes (*Thamnophis marciianus*) will be fed dead mice weighing 10% of their body mass with and without injection of Western Diamondback (*Crotalus atrox*) venom. A single bead will be placed in the mouth of the mouse before ingestion and will locate the bead upon defecation to determine gut passage time. SDA will be determined via O<sub>2</sub> consumption rates through closed system respirometry. The temperature at which the experiment is conducted is vital to addressing the hypothesis therefore, a sub-optimal ambient temperature will be kept.

Presenter(s)-Major: **Isaac Dow - Mechanical Engineering Tech, Darah Garrett - Pre-Engineering, Jose Marin Garcia - Mechanical Engineering Tech, Ryan Moura - Pre-Engineering, Nathaniel Van Nimwegen - General Engineering**  
Title: THERMAL WATER PUMP  
Department: Mechanical Engineering  
Sponsor: Scott Kessler

Abstract: Water pumps are used for a variety of purposes including the moving of water through pipes to a higher elevation and circulating water throughout a closed system. Most water pumps operate via mechanical systems that often include pistons or rotating gears that force water through them. The purpose of this project was to design a water pump that would circulate water by creating a pressure difference between the water inside the pump and the water outside the pump. The benefits of thermal water pumps are that they have few to zero moving parts, making them very low maintenance. Also, thermal water pumps can be easily integrated into systems that in addition to requiring the circulation of water also need the water to be heated, such as hot tubs. The team created a water pump that also doubles as a water heater while simplifying the mechanics contained in the pump.

Presenter(s)-Major: **Ian Driskill - Mathematics**  
Title: INSULATORS AND HEAT TRANSFER  
Department: Computer Science, Mathematics & Statistics  
Sponsor: Daniel Schultz Ela

Abstract: Techniques will be presented for modeling heat transfer through walls of a building, including the differences and effects caused by a variety of insulators having different thermal conductivities. This modeling will be done by solving systems of partial differential equations for the heat flux in a body that depend in both time and space on varied sources of heat and boundary conditions. The results demonstrate how heat flows through the body, the rate of energy transfer, and how that transfer can be manipulated. Creation of a model for this system will suggest or confirm effective approaches to conserving energy with appropriate insulation and heating.

Presenter(s)-Major: **Kadin Dunham - Liberal Arts Pre-Elem Ed**  
Title: TEACHING AS A PROFESSION  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: The scope of this project was to look at current teachers and work with them to find out what teaching means as a profession for the presenter and other students currently looking at this as a viable career. The idea was to gather some general, yet invaluable information such as why people chose to become teachers, how did they prepare for teaching, why many leave teaching, and what encourages teachers to stay and to become leaders. In asking these questions the presenter will provide invaluable information for those looking at teaching as a profession and already on their way down this path. This will help them guide their way and to know if this is the right profession for them and to know what to expect down this road. The intended audience for this presentation is future education students.

Presenter(s)-Major: **Lisa Durden - Sport Management**  
Title: IDENTIFYING HOW FANS CHOOSE A TEAM TO BE LOYAL TO  
Department: Kinesiology  
Sponsor: Elizabeth Sharp

Abstract: This research focuses on how fans choose a team and demonstrate their loyalty. The results will assist sport administrators in creating a program that fans want to be loyal to and help fans identify with a team to stick by. Surveys are being distributed to fans to gain a better understanding of their reasoning and choice of a team. Select fans will also be interviewed to help interpret the surveys. Survey responses will be placed into categories that explain the reasoning of why a specific team has been chosen. Current literature on the topic of fan loyalty will also be examined and compared to the survey results. It is hypothesized that fans choose a team to be loyal to based on experiences, family background, tradition, culture and history in their lifetime.

Presenter(s)-Major: **Ryan Dusina - Computer Science, Connor Heaton - Computer Science, Robert VanMatre - Computer Science**  
Title: BIG BUSINESS ON SMALL DEVICES  
Department: Computer Science, Mathematics & Statistics  
Sponsor: Warren MacEvoy

Abstract: Successful businesses have never been known to stray far from the cutting-edge of technology. As technology becomes increasingly affordable and available, it becomes more useful in real world business solutions. As of late, mobile devices have risen to become a major player in modern business, taking up roles in both the front and back end of logistics. The Android application that is currently under development is being hand-tailored to fit the needs of the business side of an engineering company based in Pasadena, California. The application will become the mobile version of a complex business model that aids in contract pricing speculation. The engineering contracts are typically worth millions of dollars, ranging anywhere from 1 million to 1.5 billion dollars. The app will give the business executives the ability to make such estimations in the palms of their hands, in only a few minutes. Not only will this be a major convenience, the main intention of the app is to create a measurable decrease in wasted man-hours.

Presenter(s)-Major: **Michelle Dusterdick - Political Science**  
Title: STATE POLITICAL CULTURE, CURRICULUM STANDARDS, AND GOVERNMENTAL PERCEPTIONS  
Department: Social and Behavioral Sciences  
Sponsor: Justin Gollob

Abstract: This work tests two relationships related to state political culture, K-12 curriculum standards, American citizens' knowledge and perception of government. The first test measures whether a relationship exists between political culture and state K-12 curriculum standards. The second test measures whether American citizens' perceptions are influenced by their K-12 education. The hypothesis is that the culture of a state impacts their K-12 curriculum, and that the curriculum then shapes how individuals perceive their government. This work illustrates the role that state and local governments play in the development of curriculum standards, and how those standards then influence citizens' perceptions and knowledge of their governing system.

Presenter(s)-Major: **Nicholas Eardensohn - Biological Sciences-Biology, Shay Hoots - Biological Sciences-Biology, Joshua Scheuermann - Biological Sciences-Biology, Peter Szekely - Biological Sciences-Biology**  
Title: THE EFFECT OF THE MOUNTAIN PINE BEETLE ON BIRD NUMBERS AND HABITAT  
Department: Biological Sciences  
Sponsor: Susan Longest

Abstract: Research shows that mountain pine beetles destroy a variety of habitats as they erode their way to the center of trees. Mountain pine beetles damage pine trees, which are the natural habitat for both the Brewer's Sparrow and Rosy Finch. The negative effects that take a toll on the birds' habitat may be strongly correlated to the abundance of these two species of birds in the area. To address this issue, an investigation into the birds' habitats among its harmful enemy the mountain pine beetle was conducted. Habitat transects were used to determine the amount of pine beetle destruction of trees, as well as bird counts to determine the numbers of birds throughout the season. These results provide important insight into the level of destruction mountain pine beetles have on the habitat and its bird inhabitants in Colorado. This information will prove useful in addressing the effects of beetle infestations on other animals and the dynamics between the affected species.

Presenter(s)-Major: **Jacob Edmiston - Mathematics-Statistics**  
Title: AN INVESTIGATION INTO THE VALUE OF SPORT STATISTICS  
Department: Computer Science, Mathematics & Statistics  
Sponsor: Darren Gemoets

Abstract: Conventional wisdom in football is that "defense wins championships." The most recent Super Bowl is evidence that defensively oriented teams do indeed become champions. As in other professional sports, members of the National Football League (NFL) are employing the tools of statistical analysis to build better teams. This project uses multiple regression analysis to first determine which "box scores" (i.e., player and team data) are better indicators of team wins. Preliminary results show, naturally, points allowed per game as well as points scored per game as the most influential box scores. However, offensive yardage, defensive pass deflections, and sacks appear to also be rather influential. With the most influential box scores determined, the next phase is to evaluate whether a predominately defensive, or offensive strategy is preferred. The results of this phase will be presented.

Presenter(s)-Major: **Ann Ellinger - Nursing, Tina Gallegos - Nursing, Teresa Hamilton - Pre- Nurse Allied Health**  
Title: PATIENT CENTERED CARE - HISPANIC CULTURE  
Department: Health Sciences  
Sponsor: Genell Stites

Abstract: This project will attempt to provide answers concerning how caregivers can better understand the Hispanic community and their needs in order to provide more complete, holistic, patient-centered care with the best outcomes possible. Hispanic people are an integral part of the presenters' community. A personal lack of information about their culture and views concerning medicine can create a distance between us as practitioners and them as recipients. This distance creates room for misunderstandings, mistrust, and the possible delivery of misinformation. Culture, language, family diversity, major religious influences, and the pressures of adapting to a new culture are all pieces of the puzzle which must be assembled in order to provide more appropriate, patient-centered care. This presentation will benefit not only those in the medical profession, but all who crave a better understanding of Hispanic culture.

Presenter(s)-Major: **Jacqueline Ellis - Biological Sciences-Biology, Jessica Gorley - Medical Laboratory Technician, Jigchen Tso - Medical Laboratory Technician**  
Title: ERADICATING METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS (MRSA)  
Department: Health Sciences  
Sponsor: Tracy Matthews

Abstract: Methicillin resistant Staphylococcus aureus (MRSA) is a major concern in health care today. MRSA is being studied due to its resistant abilities toward the antibiotic methicillin. Various bacteria can develop a resistance to certain antibiotics, which poses a problem for the public. An infection caused by MRSA is not easily curable with typical antibiotics. MRSA is considered a superbug, which is a strain of bacteria that have become resistant to antibiotic drugs. How does MRSA become resistant? The MRSA bacteria carry an extra gene (mecA) that encodes a penicillin binding protein (called PBP2a) that replaces the usual penicillin binding protein which would bind to penicillin causing destruction of the bacteria. Research is focusing on how the organism developed resistance, who it affects, current methods to treat MRSA. The research of the positive and negative effects of these drugs, and how investigation is developing gives us more insight into the process of resistant Staphylococcus aureus and how this knowledge can be used to better patient care.

Presenter(s)-Major: **James Emery - General Engineering**  
Title: VENTURI APPLICATIONS ON A SUPER SOAKER  
Department: Mechanical Engineering  
Sponsor: Ruth Powell

External Funding Source: Todd Kraines

Abstract: The Venturi Effect is a jet effect. The purpose of this project was to integrate a meaningful design that represented the laws of fluid dynamics. A direct relationship between pressure difference and fluid velocity was adapted. This formula was conducted with various pipe diameters, which guided significant results. Three dimensional prototypes of the model were constructed on SolidWorks and printed out using a 3D Printer. Useful data was collected, which educated the next standard for Super Soaker designs.

Presenter(s)-Major: **Jared Emmert - Environmental Science and Tech, Tyge Larson - Env Sci & Tech-Env Science, Tyra Monger - Environmental Science and Tech, Danielle Wolff - Environmental Science and Tech**  
Title: RESTORATION OF URANIUM MINES IN SOUTHWESTERN COLORADO  
Department: Physical and Environmental Sciences  
Sponsor: Deborah Kennard

Abstract: In the 1900's uranium mining represented a large part of the economy in southwestern Colorado. Material was extracted from the area and transported to uranium mills in Grand Junction, Colorado. The mine sites were left un-reclaimed with unstable abiotic and biotic conditions. The goal of this project is to develop methods to successfully re-vegetate uranium mine waste dumps in southern Mesa County. This site is low on the list of funding priorities for the Division of Reclamation: This agency could potentially use the findings of this reclamation plan if funds become available. The impacts of mining activities on soil properties and analyze bedrock materials will be assessed. Soil water holding capacity will be analyzed on soil samples collected. Native vegetation in the area will be evaluated based on adjacent sites. The researchers will evaluate the mined site in order to determine what physical factors most significantly limit re-vegetation potential. They will also evaluate the growth media needed to successfully grow vegetation. The products will be recommendations for successful re-vegetation techniques to mine sites as well as Geographical Information Systems (GIS) maps of the study site. This project will aid in creating a more stable, properly functioning ecosystem of old uranium mines.

Presenter(s)-Major: **Marco Escobar - Computer Science, Cullen McDevitt - Computer Science, Alexandra Shepard - Computer Science**  
Title: BOOK CHECK  
Department: Computer Science, Mathematics & Statistics  
Sponsor: Warren MacEvoy

Abstract: Using a unique 5-digit code assigned to each book, this application will check books in and out to students, depending on each student's reading level. This software demonstrates a possible tool to help elementary teachers at the Dual Immersion Academy, a dual language school.

Presenter(s)-Major: **Michael Feil - Geology**  
Title: PALEO GEOGRAPHY AND PROVENANCE OF ANCIENT RIVER SEDIMENTS OF THE UNCOMPAGHGRE PLATEAU, WESTERN COLORADO  
Department: Physical and Environmental Sciences  
Sponsor: Andres Aslan

External Funding Source: National Science Foundation Grant EAR-1119635

Abstract: The Uncompahgre Uplift of western Colorado is a northwest trending wedge of Precambrian rocks uplifted by tectonics during the Ancestral Rockies and Laramide Orogeny. The recent use of U/Pb detrital zircon age dating of sediments has provided new insight into the ages and provenance of Colorado Plateau sediment. The purpose of this research is to determine the provenance and paleogeography of ancient river sediments located on the Uncompahgre Plateau. This goal will be accomplished by the use of detrital zircons sampled from three locations on the Uncompahgre Plateau and then compared with detrital zircons sampled from the modern Gunnison and Uncompahgre Rivers. Following the format of previous work, using detrital zircon age comparisons and paleogeographic data, the origin and sediment dispersal paths can be derived. The results will provide a better understanding of the paleogeographic changes over the last several million years in western Colorado.

Presenter(s)-Major: **Ashlee Fisher - Nursing, AAS, Jolene Gunter -Nursing, AAS, Jeslyn Hamer - Nursing, AAS, Kelsey Haynie - Nursing, AAS**  
Title: TECHNOLOGY IN HEALTHCARE  
Department: Health Sciences  
Sponsor: Genell Stites

Abstract: Technology has been shown to be beneficial due to resources being easily accessible on phones and tablets. These resources could be medication books, or text books. The reason this is a vital topic to be addressed is because medical facilities may not allow the use of cell phones or internet. The presenters plan to address the benefits of having resources on cell phones and being able to access and trust them at work, the risk for increased Health Insurance Portability and Accountability Act (HIPAA) violation with increased cell phone and technology use, benefits of having electronic orders versus written orders (legibility, clarity, guidelines for physicians), and safety benefits of electronic medication administration systems and risks of transitioning to new systems. The final product will emphasize the benefits of increased technology in healthcare and how the benefits outweigh the risks.

Presenter(s)-Major: **Maureen Foster - Mechanical Engineering Tech, Jeremy Skoog - Mechanical Engineering, Conrad Sweat - Mechanical Engineering**  
Title: MECHANIZED ASSISTIVE EXOSKELETON  
Department: Mechanical Engineering  
Sponsor: Scott Bevill

External Funding Source: Eric Skoog

Abstract: As of 2013, there were 1.7 million Americans who relied on wheelchairs or scooters for mobility. Paraplegics and people with mobility impairments may wish to purchase an assistive exoskeleton, but such devices cost \$80,000 or more. The purpose of this project was to design and build a concealable exoskeleton which can be marketed at a price of \$10,000 or less, using a patent held by Eric Skoog. A working prototype was manufactured using simple but robust mechanical and electrical components, which allow for a lower cost than other comparable devices.

Presenter(s)-Major: **Erinn Fought - Geosciences-Env. Geology**  
Title: IMPLICATIONS OF THE GRADIENT CHANGE BETWEEN THE MODERN COLORADO RIVER AND ITS ANCESTRAL TERRACES: A LOOK AT TECTONIC AND CLIMATIC FORCES.  
Department: Physical and Environmental Sciences  
Sponsor: Andres Aslan

External Funding Source: National Science Foundation Grant EAR-1119635

Abstract: Eleven ancestral Colorado River terraces have been mapped in the Grand Valley, Colorado. Mapping, age dating, and correlation of these terraces has been conducted by CMU students and faculty for a number of years. Climate cycles and tectonic activity are recognized as major variables in the creation of terraces and influences on gradient of long



profiles. Typically the gradient of ancestral terraces roughly mirrors that of the modern river, unless there has been some change in controlling factors. A long profile of the modern river and correlated terraces based on previously collected data, shows a difference in gradient of  $\sim 0.0003$ . The gradient of the 20-meter terrace is steeper than that of the modern river, indicating there has been a change in climate, tectonics or both, along the path of the river since deposition of the 20-meter terrace around 60,000 years ago. By compiling previous field data on local terraces and literature review of studies done on rivers and terraces around the world, the researchers hope to gain insight into the question of whether the change in gradient is due to climate, tectonics or some combination of these forces.

Presenter(s)-Major: **Matthew Friesen - Bus Admin-Finance, Allie Henderson - Bus Admin - Insurance, Matthias Westenberger - Business Administration, Cody Wise - Bus Admin-Finance, Ryan Zentmeyer - Bus Admin-Finance**  
Title: AN IN DEPTH ANALYSIS OF COMPANIES WITHIN THE ELECTRONIC EQUIPMENT INDUSTRY  
Department: Business  
Sponsor: Morgan Bridge

Abstract: Research and analyses were conducted to compare and contrast companies within the electronic equipment global industry from a financial perspective. Five corporations within the industry were selected for analysis. By comparing the corporations to each other and to the industry, key factors and tendencies within the market were discovered.

Presenter(s)-Major: **Zachary Gardner - Biological Sciences-Biology**  
Title: A COMPARISON OF MITOCHONDRIAL MORPHOLOGY IN BREAST CANCER MODELS  
Department: Biological Sciences  
Sponsor: Kelly Jean Craig

Abstract: Breast cancer is the second most prevalent form of cancer in society and many questions remain to address how diagnostics and therapeutics can improve patient survival. Mitochondrial dynamics, the process by which mitochondria undergo fusion and fission into longer and shorter organelles, respectively, may be an important step in the development of cancer. The role of mitochondrial dynamics in breast cancer tumorigenesis, the ability to form tumors, is not well characterized. As such, this study investigated the dynamic nature of mitochondria and its role in breast cancer cells to determine how fusion (joining of mitochondria into a larger mitochondrion) and fission (the division of a mitochondrion into smaller mitochondria) events influence cellular death, including apoptosis (programmed cell death) and mitophagy (lysosomal-dependent degradation of mitochondria), and survival. A common characteristic of all forms of cancer is the ability to evade apoptosis. Because mitochondrial fusion is linked to apoptosis inhibition and fission is essential for apoptosis, it was hypothesized that the breast cancer models, HTB-22 adenocarcinoma cells and HTB-126 invasive ductal carcinoma cells, must exhibit longer mitochondrial phenotypes, which are associated with apoptotic resistance in other human cellular models. Using confocal microscopy, mitochondrial phenotypes and cell death (apoptosis and mitophagy) were examined in the in vitro breast cancer models. After examining mitochondrial length, it was determined that the HTB-22 cells displayed more fission events when compared to the HTB-126 cells. It was inferred that the difference in the level of mitochondrial fission is the result of differences in tumorigenicity between the two cell lines. Confocal microscopy also revealed that the HTB-22 cells showed increased mitophagy. Neither cell line displayed apoptosis in the form of nuclear fragmentation as indicated by the nuclear DAPI stain. All analyses of HTB-22 and HTB-126 cells were compared to non-tumorigenic myoepithelial HTB-125 cells of the breast. To summarize, the hypothesis was not supported because HTB-22 cells did not display elongated mitochondria of a pro-fusion phenotype. In other in vitro human models it has been shown that longer (pro-fusion) mitochondrial phenotypes resist cell death, both apoptosis and mitophagy, and encourage proliferation and survival of cells. Future studies will focus on the HTB-22 cell line to examine the downstream apoptotic signaling mechanisms that follow mitochondrial fission controlled by dynamin-related protein 1 (Drp1). Expression of Drp1 and other pro-apoptotic proteins will be examined via immunocytochemistry using confocal microscopy and Western blotting to further investigate the relationship between mitochondrial dynamics and apoptotic resistance in breast cancer. Additional student contributor(s): Emily R. Roberts

Presenter(s)-Major: **Geoffrey Gardner - Pre-Engineering, Bradley Hayden - Pre-Engineering, James Prescott - Pre-Engineering, Josie Rossi - General Engineering, Peter Ward - Pre-Engineering**  
Title: HOVERCRAFT  
Department: Mechanical Engineering  
Sponsor: Ruth Powell

Abstract: The purpose of this project was to design a moving hovercraft. Supporting the hovercraft via compressed air and a fan to maneuver it across a surface, the team's design was very straightforward. The team was able to create a moving object using small fans and batteries along with a skirt that held most of the air underneath the hovercraft. The team concluded that the center of mass was a very important piece along with the area to weight ratio.

Presenter(s)-Major: **Clancy Garoutte - General Engineering, William McDonald - Mechanical Engineering**  
Title: A NOVEL METHOD FOR CALCULATING EFFICIENCY OF A HEATING MACHINE  
Department: Mechanical Engineering  
Sponsor: Farzad Taghaddosi

Abstract: Certek Heating Solutions Inc. uses a "Heat Machine" to heat glycol for hydraulic fracturing during the winter months. The efficiency of this machine is important to the company and is a major selling point. This project is aimed at determining the steady state efficiency with respect to ambient temperature of the "Heat Machine." To reach this goal, a thermodynamic analysis of the heat machine has been performed that utilizes both manual and automatic data acquisition and processing.

Presenter(s)-Major: **Daniel Gatt - Mechanical Engineering, Britton Humphrey - Mechanical Engineering, Derrell Lindsey - Mechanical Engineering**  
Title: HYDRAULIC DRIVELINE RETARDER  
Department: Mechanical Engineering  
Sponsor: Francisco Castro

External Funding Source: Bryce Wynne, Mike Wyckoff

Abstract: Auxiliary brake systems assist the primary braking system on a vehicle to reduce primary brake wear and reduce brake-related accidents. Heavy-duty trucks have a variety of auxiliary brake system options. However, auxiliary brake system options are limited for light-duty trucks with gross combined vehicle weight (GCWV) of 31,000 lbs or less. Calculations revealed that 180 braking horse-power (HP) is needed to maintain a speed of 60 miles per hour (MPH) on a 6% grade with 31,000 lbs GCWV and 290 HP is required to slow the vehicle by 25% in 30 seconds. Research and testing was conducted to determine whether an auxiliary braking mechanism for light duty trucks could produce enough braking power by using the shear force created by thin-film viscosity between two plates moving in relative motion. The auxiliary brake system is designed geometrically to mount to the back of the transmission or transfer case depending on vehicle configuration and spline to the driveshaft. A scaled prototype was constructed for a 16 HP motor. The results of the scaled prototype will be used to determine if a full-scale prototype is capable of producing the required 180 to 290 HP.

Presenter(s)-Major: **Tyler Geerdes - Pre-Business Administration, Laurel Kasel - Bus Admin-Management**  
Title: ELEMENTS OF COLORADO WINERY  
Department: Business  
Sponsor: Deborah Parman

Abstract: Students were given a hypothetical promotional budget of \$350,000 to create an integrated marketing plan for a conceptual winery or brewery. Aiming to create a new market for wine drinkers in the younger millennial generation, the presenters created an ecologically and economically friendly winery concept called Elements of Colorado Winery. Marketing and public relations projects for the first year of the company's existence were planned using the \$350,000 budget. The target market, competitors, and promotional opportunities associated with creating Elements of Colorado Winery were identified. This plan is extremely realistic and innovative and any new winery could be started and developed using this project as a guide.

Presenter(s)-Major: **Ivan Genkov - Mechanical Engineering Tech, Brandon Goyette - General Engineering, David Hale - General Engineering, MaKayla Kovac - General Engineering**  
Title: KITTY INFINITY WALL  
Department: Mechanical Engineering  
Sponsor: Ruth Powell

Abstract: According to a study in 2008 by the Association for Pet Obesity Prevention about 57 percent of cats are overweight. The purpose of this project was to build a never ending Kitty Infinity Wall, which is a scratcher for house cats that also provides a way of excise. This wall was created by making a rotatable wall out of carpet for cats to be able to scratch and climb. The carpet belt sits on two pairs of sprocket gears and is on an adjustable axis that allows the consumer to adjust the incline. The speed of the belt is controlled using a sixty RPM motor. This design would be a great product for families with cats, and also veterinarian offices.

Presenter(s)-Major: **Hazel Gibson - Theatre Arts-Acting/Directing**  
Title: A DAY IN THE LIFE OF A STAGE MANAGER  
Department: Theatre  
Sponsor: David Cox

Abstract: A stage manager for a theatrical production functions much like the captain of a ship. The objective is to make the rehearsal process and show run as smoothly as possible. This is achieved through preparedness, organization, documentation, leadership, and confidence. The presenter will mark her four years in the theatre department as a Design/Technology major acting as Stage Manager for the spring CMU production of "Eurydice." This project is a challenge mentally and physically meeting the demands of a director and the production. The outcome is evaluated by how the show runs from curtain up to curtain down. The presenter will be physically displaying the methods and results via her prompt script, her stage manager's kit, a rehearsal and production report, and a video detailing a day in the life of a stage manager.

Presenter(s)-Major: **Hazel Gibson - Theatre Arts-Acting/Directing**  
Title: SELECTION FROM PAUL SARTE'S "NO EXIT" AND REINA HARDY'S "ERRATICA"  
Department: Theatre  
Sponsor: Jeremy Franklin

Abstract: For the Student Showcase, the presenter will be performing two contrasting contemporary monologues. The first piece will be a cutting from Jean-Paul Sartre's "No Exit." Sartre was a well known philosopher of the 20th century and is considered the father of existentialist philosophy. In his works he defined existential as "existence precedes essence." Therefore, humans exist and then define and choose their essence. The 1944 play grippingly reveals a conflict around three damned souls sent to a room in hell and examines issues such as freedom and self deception. The second monologue comes from the play "Erratica" by Reina Hardy and will contrast the seriousness of the previous work.

Presenter(s)-Major: **Jeffrey Goodrich - Mechanical Engineering Technology, Nicholas Pajor - Pre-Engineering, Daniel Salazar- Mechanical Engineering Technology, Justin Shaver - General Engineering, Zachary Winemiller - Pre-Engineering**  
Title: OPEN SOURCED LOW WIND TURBINE  
Department: Mechanical Engineering  
Sponsor: Ruth Powell

Abstract: This project focused on two main technological issues with power generation using wind turbines. The first was the lack of wind turbines designed for areas with low wind. The second was the continued growth of 3D printing in manufacturing and personal use. The team designed a free open source wind turbine design that could be downloaded, printed, and built by anyone with a 3D printer. This allows them to generate their own clean energy at a relatively cheap price. The turbine created is small enough to generate energy from a low wind and to be placed in residential areas. The team optimized the blade design for low wind conditions. This demonstration of a low wind turbine showed the functionality of 3D printing and provides another option for clean, renewable energy to a large number of people that live in areas where wind energy would otherwise be inapplicable.

Presenter(s)-Major: **Walter Green - Geology**  
Title: A STUDY OF RETROGRADATIONAL SLUMP BLOCKS IN THE NORTH AND SOUTH LANDSLIDE BENCHES OF GRAND MESA, WESTERN COLORADO  
Department: Physical and Environmental Sciences  
Sponsor: Rex Cole

Abstract: Grand Mesa is capped by a sequence of Miocene (10 Ma) lava flows that has a present-day footprint of about 155 km<sup>2</sup>. Through continuous slump block movement and general mass wasting, the lava field has degraded to its present "Y-shaped" outline, with Crag Crest forming the stem, and the Palisade and Flowing Park lobes forming the branches. Because of the low mechanical strength of the underlying sedimentary rocks (Goodenough Formation), a number of retrogradational slump blocks have formed east-west trending landslide benches on the north and south flanks of the Mesa, and research indicates there is continuous movement. Most likely formed during the Pleistocene Epoch, these benches encompass 327 km<sup>2</sup> and consist of more than 240 slump blocks. The largest block measures nearly 13 km long by 0.7 km wide, whereas the smallest is about 25 m by 10 m. Vertical block rotation ranges from a few degrees to near 90°, and linear movement ranges from a few meters to nearly 2 km. During the course of the study, each slump block was mapped (PowerPoint and TOPO software) and its dimensions measured. Subsequently, each block was digitally moved to its original position, and the total amount and direction of dislocation was recorded. Study of these landslide benches and retrogradational slump block movement will help prepare for future landslide events.

Presenter(s)-Major: **Heidi Gruber - Bus Admin - Manag Informatics**  
Title: SHOULD BUSINESSES ELIMINATE PAPER?  
Department: Business  
Sponsor: Donald Carpenter

External Funding Source: S.M. Stoller Corporation, A subsidiary of Huntington Ingalls Industries

Abstract: Since the creation of the Internet, companies have viewed going paperless as a new frontier. Companies are able to reduce cost and become more efficient by doing so. Yet, going green presents security challenges as businesses attempt to secure private information on the network. This paper examines some of the issues involved with going paperless and provides some considerations for companies wanting to forge this frontier.

Presenter(s)-Major: **Heidi Gruber - Bus Admin - Manag Informatics, Ruth Schramm - Computer Information Systems**  
Title: MOVIN' ON DATABASE  
Department: Business  
Sponsor: Gayla Slauson

Abstract: If your company finds itself with too much data to sort through, here is a solution that can help your business. Movin' On is a company that provides storage and moving services for both residential and commercial customers. The objective of this project is to develop a database for the company to track data about customers, employees, operations and all other pertinent data necessary for Movin' On to provide better customer service. The system will utilize Microsoft Access software, which will allow users to ask questions about the data and develop information to make key business decisions. Employees could use it to communicate results to top management.

Presenter(s)-Major: **Austin Hadley - Biological Sciences-Biology, Katharyn Woodard - Biological Sciences-Biology**  
Title: MOLECULAR IDENTIFICATION OF *CONIATUS* SPP. POPULATIONS USING CYTOCHROME OXIDASE I DNA SEQUENCING AND INSIGHT INTO ITS LIFE CYCLE  
Department: Biological Sciences  
Sponsor: Zeynep Özsoy

Abstract: Tamarisk (*Tamarix* spp.), is a deciduous shrub that was introduced to North America in the early 1900s as a potential solution to erosion control in riparian areas; however, because the plant lacked natural predators, it outcompeted native plants and increased the frequency and severity of fires, drought, and salinity. The biological control agent *Diorhabda carinulata* was extremely successful in defoliating and killing tamarisk in some areas, making biological control an inexpensive addition to other methods of tamarisk control. In 2011, the Colorado Department of Agriculture- Palisade Insectary discovered the presence of another natural predator of tamarisk: tamarix weevil, *Coniatus* spp. *Coniatus* spp. has also been found in eastern Colorado, California, Arizona, New Mexico, Nevada, Texas, and Oklahoma although the origins of the species, as well as its full range, or effectiveness, are still unknown. The researchers' preliminary studies shed light

into the life cycle of this weevil. In addition we, and others, have observed different morphological colorings and unique pupal casings. By genetically comparing the Cytochrome Oxidase I gene of beetles native to Italy, Kazakstan, Uzbekistan, and Turkey, with those found in North America, the researchers hope to construct a phylogeny to determine with what population the Colorado weevils are most closely related to in order to predict the full potential range of *Coniatus* spp.

Presenter(s)-Major: **Danielle Hale - Visual Communications, AAS, Jennifer Lyles - Visual Communications, AAS**  
Title: "THE STORM'S SECRET" AND "POPE LICK, A SOUND TO DIE FOR"  
Department: Western Colorado Community College  
Sponsor: Daniel McClintock

Abstract: This presentation will demonstrate two different scripts created by Visual Communications students. The script for "Pope Lick, A Sound to Die For" by Jennifer Lyles will demonstrate the use of Photoshop when creating a digital storyboard. The steps used by professional filmmakers and producers through the early stages of film development will be discussed. Shot lists consist of, but are not limited to, birds eyes, extreme long shot, mid-shot, close up and extreme close up. To create the storyboard each shot with the characters and background was "roughed sketched," which helped to provide a visual of how the movie would flow on screen. The presenter drew each shot using a draw tablet and the program Photoshop. Each shot contains information from the script, which scene it is from, the shot or camera angle to be used, and the actors' script. The final product shows how the story will play out on the big screen. The script for "The Storm's Secret" by Danielle Hale will demonstrate the use of the Photoshop layers inside Premiere Pro in order to create an animatic. Hale's script shows that digital storyboards are incredibly efficient. Drawing the storyboards in Photoshop allows the artist to produce more faster, and allows the backgrounds, or the characters, of storyboards to be duplicated so that the artist does not have to redraw it over and over again. Each element of the storyboard can be broken up into separate layers and folders in order to keep organized. The artist can use the separate layers in Premiere Pro to create an animatic, which is a moving storyboard. The animatic helps with presentations to show what will happen within the movie or scene.

Presenter(s)-Major: **Derek Hamilton - Pre-Engineering, Sergio Lara - Pre-Engineering, Osman Niazi - Pre-Engineering, Alix Peltier - General Engineering, Thomas Tawata - Pre-Engineering**  
Title: GYRO-MAV  
Department: Mechanical Engineering  
Sponsor: Ruth Powell

Abstract: Many private organizations and the military are now using gyroscopes to simulate the feeling of being in an aircraft. The gyroscope is a device that maintains orientation based on the principles of angular momentum. The purpose of this project was to see if the team could mimic that concept on a smaller scale. The gyroscope that was created was four feet by four feet in dimension with a rider in the center and a crank on the side. The crank was used to jump start the gyroscope and then the momentum of the rider provides the same feel as a pilot going through a flight simulation. The designers demonstrated what would be considered a worst-case scenario in a flight simulation where the pilot lost control of the aircraft.

Presenter(s)-Major: **Ryan Hampton - Geosciences-Geology**  
Title: EXTENSIONAL FEATURES OF COLORADO: IMPLICATIONS FOR THE NORTHERN CONTINUATION OF THE RIO GRANDE RIFT  
Department: Physical and Environmental Sciences  
Sponsor: Andres Aslan

Abstract: The Rio Grande Rift extends across the southern Rocky Mountains southward into a broad collapsed vault, in southern New Mexico. Whether manifested by horsts or grabens, primarily extensional strain is involved which increases in magnitude southward. How Rio Grande Rift initiation and evolution are related to development of the Rocky Mountains is still widely debated. To understand the effects of rifting on the Rocky Mountains it is necessary to constrain the most northern boundary of the rift. The Gore Range and Blue River Valley of central Colorado seem to represent the northernmost significant fault-related manifestations of the rift. However, when looking at northwest-to southeast-trending faults in Colorado the effects of extensional strain can be seen as far west as Grand Junction and as far north as Yampa Valley. Study of these northwest to southeast trending faults in western and northern Colorado will be used to constrain the northern boundaries of the Rio Grande Rift and characterize the extent to which rifting has influenced the development of the Rocky Mountains.

Presenter(s)-Major: **Liam Harrell - Nursing, AAS, Paige Markley - Nursing, AAS, Colleen Thliveris - Nursing, AAS**  
Title: THE IMPORTANCE OF PROPER AND EFFICIENT NURSE-NURSE SHIFT REPORT  
Department: Health Sciences  
Sponsor: Genell Stites

Abstract: As a nurse, communication can be a problematic process in which errors can occur. If information is not conveyed properly, treatments, medications, and diagnoses can be missed, potentially causing harm to patients. Effective communication is vital in providing the best quality of care for a patient. Shift report is extremely important because this is where a nurse first hears of the patient's status. It is necessary to know what the previous nurse did (possibly medication administration for pain). Communication between shifts allows for accurate patient care, especially when the same routine is kept for the patient. If this does not happen, it could possibly lead to discrepancies between co-workers. This project will focus on examples of effective and proper shift report for the oncoming nurse. The project will focus on common miscommunication problems. There will be a focus on the effects of a negative tone and mood, which can cause problems with shift report. Finally, this project will demonstrate how these issues can be resolved with proper mind set and clarity on how the information should be presented to the oncoming nurse, ensuring the best care for the patient. By illustrating how important nursing communication is during shift change, the presenters hope to educate experienced and novice nurses with key components for effective communication strategies when a change of shift occurs.

Presenter(s)-Major: **Nellie Hellyer - Psychology-Counseling Psych, Selah McMath - Psychology-Counseling Psych, Rita Schenkelberg - Psychology-Counseling Psych**  
Title: PROMOTING LEADERSHIP SKILLS THROUGH CLUB AND HONOR SOCIETY PARTICIPATION  
Department: Social and Behavioral Sciences  
Sponsor: Susan Becker

Abstract: Psychology majors are often expected to develop skills which contribute to leadership in their subsequent careers (Kuther, 2012). While these skills are very desirable to potential employers of psychology graduates, psychology programs have not necessarily developed coursework to enhance leadership. Leadership skills include those of communicating clearly to groups of individuals, being able to build consensus among group members through listening, linking and conflict management, supporting group or team members' accomplishment of goals, and developing shared goals in a team or group environment. Results from 200 undergraduate participants and 20-30 alumni participants will show a comparison of student skills to the skills used in the workplace. This research applies to individuals who are interested in developing leadership skills while attending Colorado Mesa University.

Presenter(s)-Major: **Kahlin Capwell - Mechanical Engineering Tech, Kirby Gamble - General Engineering, Matthew Gundt - Pre-Engineering, Andrew Hendricks - Pre-Engineering, Ian Von Rock - Pre-Engineering**  
Title: BREAKING WIND  
Department: Mechanical Engineering  
Sponsor: Frank Kustas

Abstract: Harnessing the natural power of wind and converting it into power is still a relatively young technology. Wind farms have been constructed to harness this virtually unlimited supply of energy, but this type of technology is rather inefficient and an obsolete way of generating power. The team has developed a test-bed to study wind-power by creating a set of control factors to test the output efficiency and limitations of different styles of wind-turbine blades. Using a versatile platform for testing, test data for different types of blade designs was obtained. The platform incorporated a small electric motor to generate electric current, which enabled the calculation of efficiency as a function of blade configuration. Both horizontal and vertical blade orientations were tested under conditions of varying wind speed. Design concepts were ranked in terms of maximum output and highest efficiency. In addition to blade shape, blade size, weight, surface roughness, and construction materials were observed to influence the efficiency. A considerable amount of work was performed to eliminate independent variables to enable an objective comparison of the different blade concepts. The results of this effort were extremely enlightening, and provided the team with a clear understanding of the most important factors for blade designs that can be used for real world energy production on a large scale.

Presenter(s)-Major: **Todd Henry - Mechanical Engineering, Oscar Madrid - Mechanical Engineering**  
Title: TORNADO ROOF DESIGN  
Department: Mechanical Engineering  
Sponsor: Timothy Brower

Abstract: A low-speed wind tunnel analysis was performed for a variety of roof designs to determine which roof design would render the lowest coefficient of lift (CL) in tornado-like wind conditions. In this laboratory experiment the lowest coefficient of lift indicates which roof design had the lowest vertical forces generated on the house in tornado-like wind conditions. The pressure distributions created on the roofs by the horizontal winds at the various orientations were used to determine which orientation generated the maximum upward force for each roof design. The vertical lift forces were used to determine a coefficient of lift for each different geometry of a gable, mansard, hipped, gambrel and shed roof design.

Presenter(s)-Major: **Edgar Hernandez - Pre-Accounting, Kaylee Knosala - Accounting-Public Accounting, Leah McFall - Pre-Accounting, Janna Rice - General Accounting**  
Title: THE IMPORTANCE OF ETHICS IN MANAGEMENT  
Department: Business  
Sponsor: Suzanne Lay

Abstract: Ethics in accounting is important because stakeholders put their trust in accountants to provide accurate information about the financial data for all public businesses. Starting at the top and working its way to the bottom, management's actions are vital to creating an ethical corporate culture. Research shows that the way management follows their code of ethics dictates how most of their employees will behave. When ethics is a low priority, accountants report feeling more pressure to "fix the books" and essentially give stakeholders misrepresented information. The way that a code of ethics is implemented is much more significant than what it says. In order for the accounting field to improve their image and be seen by the public as trustworthy, strong ethical leadership is the key.

Presenter(s)-Major: **Cody Herrick - Computer Science, Kyle Parker - Computer Science, Sophat Sem - Computer Science, Samuel Van Pelt - Computer Science**  
Title: LISTER  
Department: Computer Science, Mathematics & Statistics  
Sponsor: Warren MacEvoy

Abstract: From the simple use of pen and paper to electronic notes, there are many methods to storing your grocery list. Due to the nature of shopping lists being unique between individuals, the presenters' application is designed to create, store, and suggest shopping lists for users. LISTER can gather information about a product by scanning a barcode or by manual insertion. This information can then be sent to a unique shopping list database within the application. LISTER is also designed to learn from users shopping history and will be able to generate a shopping list depending on the items the user shops for the most. LISTER can also send and receive data from the iCloud allowing users to have their lists on multiple devices. The smooth and simple user interface of the application also allows users to be able to navigate and enjoy LISTER without frustration. The developers hope that with LISTER, users will be able to keep their shopping lists organized, easily accessible, and keep the hassle of grocery shopping to a minimum.

Presenter(s)-Major: **Kelli Highman - Bus Admin-Finance, David Martinez - Bus Admin-Finance, Bonnie Masters - Bus Admin-Finance, Management, Natalie Whitmore - Bus Admin-Finance**  
Title: GLOBAL FINANCIAL MANAGEMENT APPLICATION IN THE BREWING INDUSTRY  
Department: Business  
Sponsor: Morgan Bridge

Abstract: The presenters will compare and contrast leverage in the brewing industry comparing Anheuser-Busch, Boston Brewing, Diageo, and Molson Coors Brewing.

Presenter(s)-Major: **Jaelee Hillman - Liberal Arts Pre-Elem Ed**  
Title: WHAT IT MEANS TO BE A TEACHER  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: What does it mean to be a teacher? The presenter want to find out what inspires teachers to keep their passion for their students and their career. The presenter will provide some insight into the motivation of teachers by interviewing teachers. The information is intended for future teachers to understand what it means to be a teacher.

Presenter(s)-Major: **Jennifer Hilts - Nursing, AAS, Valerie Kilpa - Nursing, AAS, Lindsey Lewis - Nursing, AAS**  
Title: SAFETY OF PATIENTS AND HEALTH CARE ACQUIRED INFECTION PREVENTION  
Department: Health Sciences  
Sponsor: Genell Stites

Abstract: Research has shown bacteria and other viruses can live on scrub tops and lab coats within the healthcare settings. Comparing studies, a list will be compiled to provide tips to those who wear uniforms in the healthcare setting and others who wear uniforms not in the healthcare setting and have the potential to be exposed to bacteria or viruses. The presenters will provide research showing that scrub tops and uniforms such as lab coats have been swabbed for organisms at various times during a shift, especially after a day's worth of work and frequently have traces of Methicillin-Resistant Staphylococcus Aureus (MRSA), and Vancomycin-Resistant Enterococci (VRE) on them which are very contagious. The influenza virus, and many other potentially deadly organisms have also been found on these articles of clothing after work. This topic will help educate and protect nurses and their families from getting these illnesses. But most importantly, it will ultimately keep patients safer and will aid in the prevention of spreading bacteria from one room to another, or from the healthcare setting to public places.

Presenter(s)-Major: **Chi-Lan Hoang - Accounting-Public Accounting/Master of Business Admin, Eric James - Master of Business Admin, Allison Samuels - Master of Business Admin**  
Title: SHOULD ORGANIZATIONS PLACE A GREATER EMPHASIS ON STRESS?  
Department: Business  
Sponsor: Donald Carpenter

Abstract: This work looks at whether the emphasis placed on stress within the typical organization is sufficient to address its importance and prevalence. Although the subject of frequent discussion and attempts at redress, a true examination of the factors involved in stress and the associated outcomes has received relatively little academic attention. The manifestations of stress are felt by workers in varied industries in every industrialized nation, and it takes a toll on employees and the companies they work for. This paper examines stress and its role in organizations. Stress has traditionally been viewed as a negative and harmful aspect of the business world, yet new research shows that it may have a number of benefits; both sides are presented and discussed. The authors conclude that while an emphasis should be placed on stress, businesses need to utilize appropriate measures, as attempts to fully eliminate stress are detrimental because it can stimulate and challenge people. Building a large body of knowledge and more thorough understanding of the issue could have a myriad of benefits for managers, leaders, and workers alike. Research for the paper was conducted via scholarly means utilizing available peer-reviewed papers.

Presenter(s)-Major: **Kelsey Hoffmann - Geology**  
Title: DETRITAL ZIRCONS OF MODERN AND ANCIENT COLORADO RIVER SAMPLES AND IMPLICATIONS FOR CHANGES IN THE PALEOGEOGRAPHY OF WESTERN COLORADO  
Department: Physical and Environmental Sciences  
Sponsor: Andres Aslan

External Funding Source: National Science Foundation Grant EAR-1119635

Abstract: Detrital zircon studies provide an opportunity to evaluate how the provenance and paleogeography of the Colorado River Basin have changed during the late Cenozoic. Zircon grains separated from detrital material such as sandstone can be analyzed to determine the age of the source rock. This information can then be used to identify possible areas of sediment provenance. Detrital zircon age dates come from the uranium-lead dating of zircon grains. The purpose of this research project is to focus on the detrital zircons of modern and ancient Colorado River samples, to document their similarities and differences, and to interpret what this can tell us about how the landscape of western Colorado has changed.



Presenter(s)-Major: **Amy Hollingsworth - English-Literature**  
Title: GRAPPLING WITH DEATH: MORTALITY IN THREE EPICS  
Department: Languages, Literature, and Mass Communication  
Sponsor: Jason Reddoch

Abstract: One problem a modern audience has when approaching ancient epic poetry is difficulty in connecting to the central heroic characters like Gilgamesh, Achilles, and Beowulf. These men fight monsters, call on the favor of the gods, and rush into battle with other heroes of supernatural strength. Despite the distance of time and culture, however, modern readers can find common ground with these characters. This presentation explains the central role of mortality in the Mesopotamian *Epic of Gilgamesh*, Homer's ancient Greek *Iliad*, and the Anglo-Saxon *Beowulf* as a shared theme as each man endeavors to find a place for himself in a violent and fleeting world. By examining this connection, a modern audience can relate to these remote heroes and empathize with their struggle to come to grips with mortality.

Presenter(s)-Major: **Jordan Hoyle - Theatre Arts-Acting/Directing**  
Title: EXCERPTS FROM "THE VAGINA MONOLOGUES"  
Department: Theatre  
Sponsor: Jeremy Franklin

Abstract: Silence is the number one perpetuator of domestic violence, which occurs in the lives of 1 in 3 women and 1 in 10 men. Women aged 18-24 are more at risk of domestic violence than women from any other age group. Out of 9,482 students, over half of CMU's student population is female. Of those, nearly 37% are between 18-24, making CMU an extremely appropriate audience for the topics presented in "The Vagina Monologues." Eve Ensler traveled the world and conducted interviews with women about their vaginas, a subject usually taboo. Through these interviews she created a show entitled "The Vagina Monologues." Encompassing many eye opening subjects the show seeks to empower women, raise awareness and increase prevention of domestic violence. The proceeds from the full performance will benefit The Latimer House, a shelter, advocacy, and counseling center for adults and children who are survivors of domestic violence and sexual assault.

Presenter(s)-Major: **Jeffrey Hrcir - Geology**  
Title: ALKALIC EPITHERMAL GOLD MINERALIZATION, SOUTHWESTERN PLATORO CALDERA, CO  
Department: Physical and Environmental Sciences  
Sponsor: Andres Aslan

Abstract: The 29.7-28.4 Ma Platoro-Summitville caldera complex is host to a diverse class of polymetallic ore deposits, including the world-class gold deposit at South Mountain. To these deposits are added a previously unrecognized gold deposit class hosted within subtle alteration facies at the distal end of an auriferous hydrothermal system. Andesitic units have been subjected to epigenetic alteration and mineralization across a broad region in the southwestern portion of the caldera. The anatomy of this epithermal system is examined through integration of field mapping and geochemical data. Highly anomalous values of gold, tellurium, antimony, arsenic, and halogens up to 6,000 times background abundance are juxtaposed with remarkably low base metal concentrations and total sulfide content. Together, these metal associations comprise a diagnostic trace element geochemical suite genetically related to low sulphidation epithermal deposits and specifically, the alkaline subclass. Pervasive K-metasomatism, chloritization, and hematization within the mineralized rocks provide additional support for the existence of a hydrothermal system dominated by neutral, low salinity aqueous fluid or vapor contributed from a mafic alkaline magmatic source in the subvolcanic environment. Predictive exploration criteria developed through an examination of regional petroectonism suggest broadly favorable environments for further alkaline gold discoveries within this metallogenic province.

Presenter(s)-Major: **Laken Hyson - Biological Sciences-Biology, Andrzej Ogrodny - Biological Sciences-Biology, Andreas Schmalz - Biological Sciences-Biology**  
Title: SELF AWARENESS IN AVIAN SPECIES  
Department: Biological Sciences  
Sponsor: Susan Longest

Abstract: The ability to recognize oneself in a reflective object has always been a characteristic that has been considered unique to several species of mammals. However, it has recently been discovered that European magpies (*Pica pica*) are a species of bird capable of recognizing themselves in a mirror. Domesticated parakeets (*Melopsittacus undulates*), zebra finches (*Taeniopygia guttata*), and society finches (*Lonchura striata*) were tested to determine their abilities to recognize themselves in reflective objects. Each species was contained in a large cage with several small 4x4 inch mirrors and their behaviors towards the mirrors were recorded. It is anticipated that the results of this study will shed light on the cognitive abilities of different bird species.

Presenter(s)-Major: **Carlos Ibarra - Pre-Engineering, Eric Jacobs - General Engineering, Leandro Lara - General Engineering, Matthew Rea - General Engineering, Ryland Richart - General Engineering**  
Title: HYDRO-KNOWLEDGE  
Department: Mechanical Engineering  
Sponsor: Ruth Powell

Abstract: Many people have heard the word hydraulics, but they do not have a solid understanding of how hydraulics work. Hydraulics are often used to allow heavy machinery to lift larger amounts of weight than otherwise possible. Hydraulics are defined as the science of channeling liquids through channels or pipes. This project demonstrated this science using an interactive hydraulic system, allowing individuals to explore and learn. Using a variety of cylinder diameters, users experienced the power of hydraulics.

Presenter(s)-Major: **Christy Jersin - Psychology-Counseling Psych**  
Title: PERFECTIONISM AS IT PERTAINS TO RELATIONAL VARIABLES  
Department: Social and Behavioral Sciences  
Sponsor: Nikki Jones

Abstract: Literature is rife with suggestions that perfectionism—a multifaceted personality variable marked by high standards of performance (Chang et al., 2012) is associated with negative relationship outcomes (Habke et al., 1999). Perfectionistic individuals are likely to be difficult mates, emotionally distressed, and have a lack of quality intimacy (Habke et al., 1999). Emotional intimacy is an immense factor in determining relationship satisfaction. Without intimacy, distress occurs. This study focuses on the interactions between self-oriented perfectionism and relationship perfectionism, and their impact on variables such as relationship satisfaction, emotional intimacy, and sexual satisfaction. Prior research concludes there are negative associations between perfectionism and various emotional variables (Habke et al., 1999). Therefore, the hypotheses for the study are: (1) Those who score higher on levels of perfectionism will report lower relationship satisfaction, (2) Females will score higher on levels of perfectionism than males, (3a) Self and other-oriented perfectionism will predict relational satisfaction, (3b) Self and other oriented perfectionism combined will be a better predictor of relational satisfaction than either alone, (4) Self-perfectionism will account for more variance in sexual dissatisfaction than other-perfectionism. Recruitment took place via a snowballing technique, and participants completed an electronic survey. Correlational and regression analyses will be conducted.

Presenter(s)-Major: **Christy Jersin - Psychology-Counseling Psych, Sarah Zwetzig - Psychology-Counseling Psych**  
Title: THE EFFECT OF IN-GROUP AND OUT-GROUP BIAS ON ATTITUDES TOWARD THE HOMELESS  
Department: Social and Behavioral Sciences  
Sponsor: Susan Becker

Abstract: Access to resources for homeless populations is often limited by stereotyped attitudes and prejudice. The interaction of high/low empathy and in-group/out-group bias was examined to determine the effect on attitudes toward homelessness. Participants were randomly assigned to read vignettes that varied levels of empathy and in-group/out-group status. The purpose of the vignettes was to prime participants and act as an independent variable before responding to two different measures. Participants then responded to the Attitudes Toward Homelessness Inventory (ATHI) and the Questionnaire for Cognitive and Affective Empathy (QCAE). These measures were meant to act as dependent variables to measure the effect of empathy and in-group/out-group bias on attitudes toward the homeless. Results suggest that in-

group status and empathy independently interact to produce positive attitudes. Correlations between attitude, empathy, and the total exposure measure revealed a correlation between total exposure and the cognitive subscale of the QCAE and total exposure and attitude. Gender was also shown to have a significant effect on the independent variable when attitude was measured.

Presenter(s)-Major: **Travis Johnson - Environmental Science and Tech, Drezden Kinnaird - Environmental Science and Tech, Jonathon Roberts - Environmental Science and Tech, Whitney Wilson - Environmental Science and Tech**  
Title: INVASIVE SPECIES REMOVAL AND RIPARIAN RESTORATION AT RIVERBEND PARK IN PALISADE, COLORADO  
Department: Physical and Environmental Sciences  
Sponsor: Verner Johnson

Abstract: Riverbend Park, located in Palisade, Colorado, is a popular recreational area where visitors can enjoy spectacular views of the surrounding mountains, the Colorado River, and wildlife. Unfortunately, large sections of the riverbank are overgrown with tamarisk (*Tamarix* spp.) and Russian olive (*Elaeagnus angustifolia*) trees, which obstruct views and provide poor habitat for wildlife. This infestation has drastically altered the structure and composition of this ecosystem and is preventing it from functioning at its full capability. Russian olive and tamarisk are classified as class-B noxious weeds (35-5.5 CRS) and public land managers are required to control or eradicate these species. An active restoration plan is needed that will re-establish lost values from degradation and restore the site to its highest functional capability. A GIS platform was used for this project and geospatial data referencing removal of exotic species, assessment of stream bank stability, revegetation with beneficial native species, and monitoring plots and transects were arranged into a structured geodatabase for analysis and presentation.

Presenter(s)-Major: **Erika Jordan - Criminal Justice, Psychology**  
Title: ANALYSIS OF THE SEX OFFENDER REGISTRATION AND NOTIFICATION LAWS  
Department: Social and Behavioral Sciences  
Sponsor: Shanell Sanchez

Abstract: Media coverage of sex crimes is rampant and specifically focused on violent sexual offenders. This has prompted the researchers' interest in the role and effectiveness of the sex offender registry and notification (SORN) policies. The sex offender registry makes personal information regarding sex offenders available to the public. The literature on SORN shows little to no effect on the recidivism rates of known sexual offenders and could end up having a negative effect on the offender. This study seeks to answer what influence the media has over SORN, how the policy should be changed, and what is preventing the social integration of offenders. This was done by conducting semi-structured interviews with criminal justice professionals whose job functions require various levels of interaction with sex offenders. While analyzing the content of the interviews, several themes began to emerge. The themes that presented themselves in the majority of the interviews are media perception of sex offenders, one size fits all punishment, disparity among offenders, credibility of registration, and public abuse of registration. The findings presented will be a discussion of these themes with quotes from these interviews for support. Based on past research and the findings of this study, it is concluded that a less stringent registry needs to be put into place, which can distinguish between offenders. Distinguishing between offenders means allowing for the registry to address the differences between the offenders and the crimes they have committed, allowing it to take into consideration: the seriousness of the offense, the heinousness of the offense, and the criminal history of the offender. Ideally, the sex offender registry would allow for diversity especially considering the diverse group of sex offenders.

Presenter(s)-Major: **Andrew Katen - Geosciences-Geology**  
Title: CROSS-SECTIONS ALONG THE COLORADO NATIONAL MONUMENT  
Department: Physical and Environmental Sciences  
Sponsor: Richard Livaccari

Abstract: The NW-SE striking Redlands monocline and reverse fault is a Laramide-age structure found in the Colorado National Monument (Scott and others, 2001). Examination of faulting along the northern Colorado National Monument suggests the Redlands Fault splits from a single narrow fault zone in the Gold Star Canyon area into multiple faults northward towards Monument Canyon. Monoclinical width is measured perpendicular to the strike of dipping strata in the center of the monocline, from the lower to upper monoclinical hinge (or exposed reverse fault if the upper hinge is eroded away). In Gold Star Canyon the Redlands monocline is narrow (200 ft) and strata are overturned (dips of 50 to 85° SW). The monoclinical structure widens northwestward into Monument Canyon (1,000 ft wide according to Scott and others, 2001 map) and dips of strata are moderate (70 to 25° NE). The wide to narrow strain pattern may be the result of a change from a single fault in the Gold Star Canyon to multiple, closely-spaced reverse faults in Monument Canyon. This study applies field methods to produce a 1:4,000 geologic map to: 1) revise the A-A' cross-section of section of (Scott and others, 2001) and 2) develop a single-to-multiple fault hypothesis.

Presenter(s)-Major: **Claire Kempa - History**  
Title: THE PROJECTED FRONTIER: THE DEVELOPMENT OF THE WESTERN FILM  
Department: Social and Behavioral Sciences  
Sponsor: Steven Schulte

Abstract: In 1919, film trade journalist Randolph Bartlett, marveling over the enduring popularity of the western, claimed that "the camera found the West a somewhat boisterous and formless region and showed it how to behave." Despite this early recognition, contemporary scholars of film and history focus primarily on the classic sound western. Rarely mentioned is the fact that commercial film made its American debut at the 1893 Chicago World's Fair alongside Frederick Jackson Turner's essay "The Significance of the Frontier in American History," or that many of the subsequent earliest commercial films were westerns. Born alongside the discipline of Western history as created by Turner, the western film came to embody many of his ideas through the course of its early development. Initially documentary in nature and then purely composed of sensationalist entertainment, western film was consciously shaped into its classic form by Progressive reformers of the early twentieth century. These reformers sought to infuse the medium with distinctly American morality to educate the largely urban, immigrant film audience. Thus, film became a metaphorical frontier in which immigrants were transformed into Americans.

Presenter(s)-Major: **Aaron Kennedy - Music-Performance, Cole Kirby - Pre-Business Administration, Daniel Somerville - Music-Performance**  
Title: A PERFORMANCE OF *OLD SCHOOLHOUSE* AND *HALLOW GROUND*  
Department: Music  
Sponsor: Eric Nohe

Abstract: In today's modern society there is a legitimate need for live musical performances, especially those of high-level original pieces. This presentation will benefit the community by speaking to their hearts and souls. A Music major at Colorado Mesa University composed the music and lyrics to the songs *Old Schoolhouse* and *Hallow Ground*. These works of art were written about life growing up here on the Western Slope of beautiful Colorado. The presenter would like to make these lovely lyrical pieces accessible to the public by performing them (approximately 8 minutes) accompanied by Cole Kirby on bass guitar and Dan Somerville on drums. The performance will include: vocals, six-string guitar, bass guitar, and drums, all played by currently enrolled CMU students. These songs are wonderful examples of original composition and skillfully written in standard sheet music format. The presenter would like to explain some of the interesting stories and history behind the music.

Presenter(s)-Major: **Drezden Kinnaird - Environmental Science and Tech**  
Title: AN EVALUATION OF UTILIZING LANDSAT 8 IMAGES FOR A COASTAL APPLICATION OF THE SOCIAL VALUES FOR ECOSYSTEM SERVICES (SoIVES) TOOL  
Department: Physical and Environmental Sciences  
Sponsor: Gigi Richard

Abstract: Undoubtedly, there are benefits that people gain from the environment that money can't buy. Environmental values are not easily quantified, but quantification is often necessary when making decisions about land use that fairly

balance economic activities and protect ecosystem services. Researchers are working to quantify and map cultural ecosystem services in Sarasota Bay, Florida, by using a public domain tool developed by the USGS called SolVES, short for Social Values for Ecosystem Services. SolVES is a geographic information system application that helps assess, map and quantify environmental benefits people gain from the environment. It has been shown that combining bathymetric elevation data with digital elevation models for the land surface improved the functionality of the SolVES application for this coastal area. In an attempt to further optimize this tool for use in coastal areas, Landsat 8 satellite imagery will be evaluated by comparing the use of different bandwidths of the satellite imagery and evaluating the quality of the results given by the SolVES tool.

Presenter(s)-Major: **Andrea Kinterknecht - English, Pre-Teacher Ed**  
Title: TEACHING AS A PROFESSION  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: Teaching is one of the most important professions because it is one that has the best opportunity to better the future. Through interviews, the presenter learned many things from a variety of teachers such as: paths that teachers take to become successful, the joys and the hardships of teaching, and what encourages teachers to stay in education, as well as what causes them to leave. After the interviews, the presenter found that there are many different views about education, but there is always the common ground that teaching as a profession is a passion that one must have to become successful in the classroom.

Presenter(s)-Major: **Christian Klaiber - Geology**  
Title: MIOCENE BROWNS PARK CARBONATES AND STABLE ISOTOPES RELATING TO PALEOCLIMATES AND PALEOALTIMETRY  
Department: Physical and Environmental Sciences  
Sponsor: Andres Aslan

External Funding Source: National Science Foundation Grant EAR – 1119635

Abstract: The Miocene Browns Park Formation in northern Colorado, southern Wyoming, and eastern Utah is a key formation in the debate of recent Rocky Mountain uplift. This study will encompass previous paleoaltimetry studies related to stable non-marine isotopes (both carbon and oxygen), and ultimately apply this methodology to carbonate samples collected from Browns Park to address the question of renewed Rocky Mountain uplift. Patterns in  $^{18}\text{O}$  values of precipitation and rivers can be used to study paleotopographic relief in continental settings. This application takes advantage of the relationship between  $^{18}\text{O}$  and elevation. Orographic cooling of air masses as they are forced over mountains preferentially moves  $^{18}\text{O}$  into the resulting precipitation. This relationship is termed the lapse rate and can be used to estimate the amount of relief associated with any mountain range. By looking at both  $^{18}\text{O}$ , and  $^{13}\text{C}$  values, and comparing them to present values, the two can be contrasted to see if there has been any change in relief over time and therefore infer any uplift that has occurred since that time.

Presenter(s)-Major: **Ethan Knowles - Theatre Arts-Music Theatre**  
Title: "LIKE IT HERE"  
Department: Theatre  
Sponsor: Jeremy Franklin

Abstract: Of the many life threatening variables that are afflicting young people, suicide is the most preventable. However, suicide is the third leading cause of death to people ages 10-24. Of that, 81% of suicides are male. With the rate of young adult suicides rising each day, many questions arise in the minds of those left behind: Why would my son do this?, What was going on in her life?, or What will they miss? The song "Like it Here," from The Hinterlands composed by Danny Larsen, puts us in the shoes of a boy who is contemplating suicide. After suffering hurt and humiliation from the other kids at school about his apparent sexuality, he visits the grave of a boy his age from the next town over who took his own life under the same circumstances. By the end of the song he comes to the conclusion that even though it's tough right now he is still worthy of life, and there's so much more for him. Suicide is a thought that traces through one's mind. For some it sticks, and can be a desperate struggle against oneself. By performing this song, the presenter wants to give hope and show people that there is a life full of beautiful opportunity waiting at the end of the tunnel.

Presenter(s)-Major: **Edward Kobylarz - History**  
Title: DANGER WITHIN: REPUBLICAN IDEOLOGY AND THE CONTINENTAL ARMY  
Department: Social and Behavioral Sciences  
Sponsor: Justin Liles

Abstract: The American Revolution championed republican ideology and created an independent nation. While republicanism allowed for the growth of personal liberties and freedoms, they also harbored deep mistrust of standing armies, and because the leaders of the Revolution steeped themselves in this republican tradition they relied strongly on militias to protect and defend the new United States. However, Continental soldiers and not the militia played the crucial role in defending the colonies from the British. The rejection and mistrust of professional armies jeopardized the freedom and success of the Revolution and ultimately left Continental soldiers undermanned, underfunded, and unable to consistently hold back British forces. Competent military commanders allowed the army to fight a long war of attrition that enabled peace talks to officially end the war on favorable terms for the fledgling nation. This presentation will explore the specific difficulties that nearly caused disaster to strike the Continental army and how these issues had a long term impact on the outcome of the war.

Presenter(s)-Major: **AJ Labrum - Theatre Arts-Dance**  
Title: 420  
Department: Theatre  
Sponsor: Melonie Buchanan Murray

Abstract: Recently Colorado has become the first state to legalize marijuana and open shops for recreational marijuana use. In fact, marijuana is the third most used recreational drug in America following alcohol and tobacco. However many Americans are extremely unfamiliar with the physical, mental, and political benefits of marijuana and are thus frightened or angered by its legalization. This presentation will bring to light the stereotypes, benefits, and history of marijuana and its legalization through dance vocabulary and movement; performed in a "Ted Talk" fashion. The presentation will make use of five dancers, a couch, and an oral presentation accompanied by select songs. Through this presentation, the general public may gain a better understanding of marijuana and the impact it has made in America.

Presenter(s)-Major: **Emily Lackner - Theatre Arts-Acting/Directing**  
Title: PRESENTATION FROM "TITUS ANDRONICUS" AND "KEELY AND DU"  
Department: Theatre  
Sponsor: Jeremy Franklin

Abstract: The goal of theater is to shine a light on society. More importantly, it is to show the audience subjects they try to avoid and ignore. Ms. Lackner will be presenting two dramatic monologues from different centuries featuring women trying to escape their realities. These two pieces spotlight themes of power. When women are pushed up against a wall, it is surprising what they will do to obtain control. The first monologue, from William Shakespeare's "Titus Andronicus," showcases Queen Tamora using her sons as tools for her quest to ultimate power. The second selection will be from Jane Martin's "Keely and Du," featuring Keely battling to regain control of her body after being forced to go through her pregnancy kidnapped and handcuffed to a bed.

Presenter(s)-Major: **Robert Lambert - Computer Science, Roselle Milvich - Computer Science, Edmon Sebit - Computer Science, Craig Smith - Computer Science**  
Title: INVENTORY ANDROID APPLICATION  
Department: Computer Science, Mathematics & Statistics  
Sponsor: Warren MacEvoy

Abstract: This presentation will demonstrate an Android application created to streamline the inventory process for a client at a local restaurant. The application provides an easy and paperless way to keep track of inventory and to calculate certain statistics such as number of products in the inventory. The project is a handheld application that utilizes a database to manage categories of items and has specialized queries to help make those items readily available for analysis. In the interest of making the inventory list available and secure at all times, a cloud service is utilized so that the database is safe in the event of hardware problems or transitions from the users end. The design criteria was met, and the client is satisfied with the results.

Presenter(s)-Major: **Chase Li - General Engineering, Kara Obrien - Chemistry, Jenna Short - Chemistry**  
Title: THERMAL DECOMPOSITION OF ISO-ALPHA ACIDS  
Department: Physical and Environmental Sciences  
Sponsor: Tim D'Andrea

Abstract: Hops, a flower added to beer in attempt to balance its sweet flavors, contain alpha acids that isomerize throughout the brewing process into iso-alpha acids. Iso-alpha acids are largely responsible for the complementary bitter taste and are measured in IBU (International Bitterness Units), which is the part per million concentration of iso-alpha acids present. It is also known that iso-alpha acids degrade over time due to temperature and light exposure, which ultimately changes the flavor profile of beer. The exact mechanisms and reaction rates of iso-alpha acid decomposition, however, are not fully understood. As a result, the research consists of determining the rates of degradation of standard samples of iso-alpha acids at different temperatures in order to determine rate constants. This is accomplished using high-performance liquid chromatography (HPLC) and the method of internal standard. Once rate constants are determined at several temperatures, an activation energy can be calculated. This research will benefit both beer enthusiasts and breweries everywhere by obtaining a better understanding of beer shelf life and the ever-changing chemical composition of a bottled beer.

Presenter(s)-Major: **Brooke Lucas - Master of Business Admin, Tela Robinson - Master of Business Admin**  
Title: SHOULD ORGANIZATIONS DEAL WITH SUBCULTURES?  
Department: Business  
Sponsor: Donald Carpenter

Abstract: Two MBA students researched the current business issue regarding the relationship between an organization and its subcultures. A literature review examined whether management should actively deal with subcultures. Twenty professional sources were used to present the pros and cons of subculture management. The evidence suggests, and these authors conclude, that subcultures should be acknowledged and controlled to some extent, but management should not be overly controlling as that can produce negative repercussions. Managers could use this information to increase innovation, problem solving, and employee engagement while minimizing subcultural conflict within their organizations.

Presenter(s)-Major: **Lizbeth Luna - Pre-Accounting, Brittney Miller - General Accounting, Imelda Rodriguez - Accounting-Public Accounting**  
Title: ETHICS IN ACCOUNTING: DILEMMAS IN THE HOUSING MARKET  
Department: Business  
Sponsor: Suzanne Lay

Abstract: The core of accounting is complying with rules and regulations in a conservative manner to ultimately fulfill duties and obligations of the profession. The research is intended to illustrate the importance of ethical decision making in the profession of accounting. The housing bubble of 2008 created the opportunity for many policies and procedures to be reevaluated. These policies and procedures are essential to meet specific obligations owed to employers, customers, and to the society as a whole. The purpose of this research is to further analyze the policies and procedures that were in effect before the housing crash. The results of the research are expected to demonstrate how these rules have changed and how they are being implemented now to prevent unethical actions.

Presenter(s)-Major: **Jennifer Lyles - Visual Communications, AAS**  
Title: WOLF IN THE WOODS  
Department: Western Colorado Community College  
Sponsor: Arn McConnell

Abstract: This student will present a visual short story called "Wolf in the Woods" in an original comic book style named "Scary Tales of Terror". The student based her style of drawing off of a 1982 movie called "Creepshow," written by Stephen King and directed by George A. Romero. "Creepshow" consists of five short horror stories based on the comic book "Creepshow." This project will be one of the horror comic strips contained in this fictional comic book. This comic strip is about a boy who pretends to go to bed but stays up late to read his comic book, knowing his mother would not approve. The boy falls asleep and becomes part of the story. When he wakes in pure terror it leaves the viewer asking if the comic book story came to life or if the boy was just dreaming. This project uses skills covered in the course "Animation Drawing and Design," including perspective, human anatomy, animal forms, dynamic movement, scenery, shading for dramatic effect, and character development. These principles were used to draw the viewer in and hook them with the story. The final comic book short story will be presented via pencil drawings on paper.

Presenter(s)-Major: **Betsy MacDonald - Nursing, AAS, Michael McGowan - Nursing, AAS, Susan Milin - Nursing, AAS**  
Title: ADVERSE EFFECTS OF PUSHING I.V. MEDICATIONS TOO RAPIDLY  
Department: Health Sciences  
Sponsor: Genell Stites

Abstract: Even though pushing intravenous (I.V.) medications saves time for healthcare professionals, reduces medical costs, and offers ease in administration for home use, it can pose significant risks if not administered via proper, evidence-based technique. If some medications are given too quickly, the recipient may experience infiltration/extravasation, speed shock, and possible death. According to the Food and Drug Administration between 44,000 and 98,000 deaths may result from hospital medication errors each year. In an attempt to promote quality and safety education for nurses, fuel public awareness regarding personal health safety, and reduce medication errors, this project will concisely exhibit the dangers of rapidly administering I.V. "push" medications and visually enlighten viewers to the adverse effects of neglecting proper administration protocol. The sources used to convey this message will be medical journals, federal data bases, federal guidelines, and nursing textbooks. Anyone could fall prey to adverse effects related to improperly administered I.V. "push" medications so it is critical that healthcare professionals and the public alike be vigilant when it comes to medication administration.

Presenter(s)-Major: **Kayln Madaris - Sociology**  
Title: GENDER IN FILM: EXPLORING HEGEMONIC MASCULINITY IN TODAY'S TOP-GROSSING ACTION FILMS  
Department: Social and Behavioral Sciences  
Sponsor: Brenda Wilhelm

Abstract: Gender norms and stereotypes are perpetuated in nearly all facets of modern life, but one of the most influential facilitators is the film industry. The nature of corporate capitalism pushes Hollywood to produce films which appeal to the greatest number of consumers in order to incur the greatest amount of profit. In turn, many of the films seen today are intended to be non-offensive, and as a result, often conform to existing notions of gender roles and norms. Research shows that the complex issues of masculinity have been a significant theme in the majority of action blockbuster films throughout history. However, research on these films is lacking a quantitative account of hegemonic masculinity. The following research attempts to fill this void by quantifying traditionally masculine characteristics exhibited in today's top-grossing action films as a mode for understanding gender stereotypes within the larger society.

Presenter(s)-Major: **Brittany Madigan - Mass Comm - Media Strategies, Lindsey Plambeck - Mass Comm - Media Strategies, Amanda Pfeifly - Liberal Arts**  
Title: CELEBRITY OBSESSION  
Department: Languages, Literature, and Mass Communication  
Sponsor: Regis Tucci

Abstract: Mass Communication theories assist in explaining the obsession with celebrities and the questions raised by obsession. Mass Communication is a collection of commercial entities and must generate profits to remain in business, and celebrities generate paying audiences directly and indirectly. Mass Communication theories point out the reasoning behind the obsession. Mass Communication theory highlights the attractions of money, fame, and the perception of the power of celebrity. In addition, Mass Communication theory points out the fleeting nature of celebrity and the fickleness of audiences. The intended audiences for the presentation are those interested in the power of media to create celebrity.

Presenter(s)-Major: **Emilia Madison - English-Writing**  
Title: POST-MODERN POETRY  
Department: Languages, Literature, and Mass Communication  
Sponsor: Randy Phillis

Abstract: Post-Modern poetry is not something that has been easy to define but according to the research, postmodern poetry allows the poet to work with classic themes in new and inventive ways. In this presentation, the postmodern poetry is contained within the realm and voice of an American, 1950s housewife. The research done on the era of the fifties in America showed an era of change and strict social norms, with the majority of people moving towards the suburbs instead of cities. The postmodern style works well with this era because although the subject matter is from the past, the ways it is expressed through poetry bring it to life in a way that make it identifiable no matter what time period it is read in. Books of poetry from William Carlos Williams and Frank O'Hara are inspiring examples of post modern poetry from past generations which help build and define postmodernism for the poets of today.



Presenter(s)-Major: **Justin Malloy - Pre-Business Administration, Jason Parise - Bus Admin-Finance, Emily Pritchard - Bus Admin-Finance, Kade Robinson - Bus Admin-Finance, Landon Vermeer - Pre-Business Administration**  
Title: THE DICHOTOMY OF CAPITAL STRUCTURES IN THE GLOBAL SPORTS EQUIPMENT & APPAREL MANUFACTURING INDUSTRY  
Department: Business  
Sponsor: Morgan Bridge

Abstract: The sports equipment and apparel manufacturing industry has evolved into a multi-billion dollar industry, but to reach this point companies have had to use unique sources of financing. The goal of this presentation is to determine the reason why individual companies within the industry choose to use different sources of financing as well as what type of capital structure gives the best chance for success. Financial ratios and financial statement analysis will be used as a basis for the research and this data will be interpreted through technical modeling. The companies that will be used in this analysis are as follows: Callaway Golf Company, Under Armour, Inc., Johnson Outdoors Inc., Head NV, and Black Diamond Inc.

Presenter(s)-Major: **Jessica Malone - Visual Communications, AAS**  
Title: TESS AND SAGE DESTROY A CITY  
Department: Western Colorado Community College  
Sponsor: Daniel McClintock

Abstract: The presentation shows the pilot of a cartoon that has been in development called "Copycat Comics." In the episode, Tess is having an epiphany of who or what has stayed with her during the years. This who or what, Sage, is a demon-like creature with powers of warping time and matter. This leads to the episode in which they transform Tess's dog Suzy into a giant monster that destroys the city. The point of the cartoon is to have a good laugh and have a bit more basic understanding of the characters. They are human, and have just as much of a dark soul as everyone else. A concern with the project is that it may be too cartoonish. However, though it is cartoony, it is done well because of the cartoon likeness. The cartoon buildings, lasers, fire, and intro all add to the humor of the project, but the episode is still quite dark. The point is to have fun, so please, have a laugh and enjoy.

Presenter(s)-Major: **Rachel Marohn - History**  
Title: *TOMBSTONE: AT THE CROSSROADS BETWEEN OLD AND NEW WESTERN DRAMATIZATION*  
Department: Social and Behavioral Sciences  
Sponsor: Steven Schulte

Abstract: The shootout at O.K. Corral was immediately immortalized as a bone-chilling legend that was later reconstructed by Hollywood into a typical Wild West dramatization. However, the true details behind the legend can be accurately woven together by historians to present an equally fascinating account. Separating myth from history may not always leave behind a dull tale; rather, this distinction may credit it. In the case of the 1993 movie *Tombstone*, directed by George P. Cosmatos, the old western genre of dramatization is mixed with the new; facts are mixed with fiction to create entertainment that would attract a large audience. The purpose of this paper presentation is to enlighten such an audience as to how old and new westerns have influenced this film, while stripping away erroneous depictions of history. The dynamic truth behind *Tombstone* and what occurred at O.K. Corral can be unveiled with proper application of primary and secondary sources.

Presenter(s)-Major: **Rachel Marohn - History**  
Title: *ELIZABETH: RECTIFYING A MODERN INTERPRETATION OF THE VIRGIN QUEEN*  
Department: Social and Behavioral Sciences  
Sponsor: Vincent Patarino

Abstract: In the 1998 movie *Elizabeth*, directed by Shekhar Kapur, Queen Elizabeth was deliberately presented as a fragile, emotional, and dependent woman rather than the eloquent, powerful, and independent ruler that is portrayed in history. As Kapur himself freely admitted, the historical events were changed, purposely, to conform to particular aesthetic forms. In doing this, he obscured the view of a great monarch and, if anything, with his portrayal of naïve female sexuality, missed the mark toward attracting a modern female audience. The purpose of this paper is to rectify errant history in the eyes of a media inundated society, using primary and secondary sources to support it. Historians are often consulted in creating historical films, however, for the sake of drama and attracting a broad audience, facts are often intentionally distorted. History should be presented accurately, especially through the media, considering its ubiquitous influence over young and old alike. If not, then why create historical films? Veracity is neither pedestrian nor mundane but, rather, quite satisfying; there is a majestic truth behind the story of the Virgin Queen.

Presenter(s)-Major: **Matthew Martinez - Accounting-Public Accounting, Master of Business Admin, Scott Rust - Accounting-Public Accounting, Master of Business Admin**  
Title: SHOULD MERIT PAY BE UTILIZED AT THE EXECUTIVE LEVEL?  
Department: Business  
Sponsor: Donald Carpenter

Abstract: This presentation examines the usefulness and appropriateness of merit pay in the compensation packages provided to almost all executive level employees. These presenters conclude that merit pay needs to be reconsidered because of its inability to motivate, mitigate the agency problem, or increase firm performance as well as merit pay's tendency to cause unintended, unethical or illegal actions. Each board of directors or individuals responsible for setting executive compensation are encouraged to develop new compensation packages that completely exclude or utilize merit pay on a case by case basis after careful evaluation of the executive and the company's financial situation.

Presenter(s)-Major: **Tess Matsukawa - Mass Comm - Media Strategies, Michelle Starke - Animation and Motion Graphics**  
Title: MEDIA RICHNESS AND ONLINE DATING  
Department: Languages, Literature, and Mass Communication  
Sponsor: Jessica Peterson

Abstract: Today, 40 million Americans are using online dating services and 54 percent of online daters have claimed to be deceived during the course of their online interactions. Does the medium used (messaging, audio, etc.) affect the way the messages are conveyed and perceived? Are relationships that are only communicated through media sources, excluding face-to-face interaction, more prone to deception? Do these relationships lack the richness of communication carried outside of the virtual world? Through the research of first hand experience, interviews, and surveys, the results will provide an insight into the value of online communication. A personal dating account will be created to gather an understanding of the qualities in a typical online profile. Interviews and surveys will also be administered to gather quantitative data about candidates with experience in online dating. The final presentation will provide or disprove a higher correlation between use of online media and individual deception.

Presenter(s)-Major: **Nathan May - History**  
Title: MONUMENTS TO THE UNKNOWN: TRENCH ART, THE FIRST WORLD WAR, AND MODERN MEMORY  
Department: Social and Behavioral Sciences  
Sponsor: Sarah Swedberg

Abstract: This research paper examines a piece of trench art from the First World War by examining the material culture of the war as well as social implications of the war that led to the development of such trench art pieces. The social impact that death had on the generation that experienced the war firsthand is evident behind the economic and social reasons that made the demand for trench art so prevalent. Poetry and war letters will be used to explain how, in the face of war, certain soldiers embraced the prospect and ascribed to a universal desire to be remembered.

Presenter(s)-Major: **Samantha Meinrod - Exercise Science**  
Title: THE EFFECTS OF PHYSICAL ACTIVITY THROUGH THE LIFESPAN ON BONE DENSITY IN POST-MENOPAUSAL WOMEN  
Department: Kinesiology  
Sponsor: Gerald Smith

Abstract: Bone health is an important factor affecting quality of life for people of all ages. Women begin to rapidly lose bone mass after menopause and continue to decline in a relatively linear fashion. Current research suggests that exercise during childhood and continued exercise throughout life can prevent large amounts of bone loss (Greene et al., 2006). PURPOSE: To determine if physical activity throughout the lifespan was related to bone mineral density in post-menopausal women. METHODS: In this experiment, 17 post-menopausal women ( $71 \pm 7$  yrs) reported their physical activity during childhood, throughout adulthood and specific activity within the past 12 months using bone-specific physical activity questionnaire (BPAQ). These data were then given numeric values using a specialized calculator and were compared with results from a dual energy x-ray absorptiometry (DXA) scan. The DXA scans were performed on a Discovery QDR® Series, Hologic Scanner. The patient's left hip and lower spine were scanned and analyzed resulting in a BMD score, T-score, and Z-score. RESULTS: In comparing femoral neck and lumbar spine (l-spine) BMD, positive correlations were seen ( $R^2=0.7$ ), with mean femoral neck BMD at  $0.872 \pm 0.2$ , and l-spine BMD at  $0.975 \pm 0.2$ . Mean values for femoral neck T-score was  $-0.476 \pm 1.4$ , and a mean l-spine T-score of  $-0.518 \pm 2$ . The results of the BPAQ test were not seen to have

strong correlations with bone characteristics; however, the values did provide insight into each subject's history. The mean current BPAQ was  $0.4 \pm 0.3$ , mean past BPAQ was  $29 \pm 30$ , and mean total BPAQ was  $16 \pm 0.3$ . No significant correlations were found between BPAQ scores and bone density with R squared values of 0.08 and below. CONCLUSION: The study found no relationship between physical activity as measured by BPAQ and bone mineral density. It is likely due to many extenuating factors that affect bone density and limitations of the BPAQ's ability to measure certain activities during specific times of the lifespan.

Presenter(s)-Major: **Ryan Menapace - Mechanical Engineering Tech, Clinton Pruitt - Process Systems Technology**  
Title: USING PROGRAMMABLE LOGIC CONTROLLER FOR INDUSTRIAL PROCESSING  
Department: Western Colorado Community College  
Sponsor: Martin Chazen

Abstract: The object of this project is to demonstrate a Programmable Logic Controller (PLC) in a manufacturing environment. A programmable logic controller is a specialized computer used in many industries such as manufacturing and oil refineries. The goal of this project is to sort a variety of colored balls into separate containers. This will be accomplished by writing a ladder logic computer program for the PLC and building a miniature crane that will utilize two servos, vacuum pump, color sensors, and handmade circuits. The final solution will be able to sort colored balls without human interaction.

Presenter(s)-Major: **Rebecca Miller - Chemistry**  
Title: THE TOTAL SYNTHESIS OF 4'-DESMETHYLPIPLAROXIDE, A POTENTIAL INSECT DETERRENT ISOLATED FROM PIPER MELANCLADUM.  
Department: Physical and Environmental Sciences  
Sponsor: Joe Richards

Abstract: A concise, stereoselective synthesis of 4'-desmethylpiplaroxide, a naturally occurring compound isolated from Piper melancladum, was accomplished using a convergent synthetic approach. The heterocyclic moiety of the compound was prepared via the enantioselective synthesis of tedanalactam, a key step of which involved Sharpless asymmetric dihydroxylation. The resultant lactam was coupled with the appropriate acyl derivative. Final deprotection produced the natural product.

Presenter(s)-Major: **Bryce Moglia-MacEvoy - Liberal Arts**  
Title: "HER"  
Department: Theatre  
Sponsor: Jeremy Franklin

Abstract: "Her" will be a live performance of Bryce MacEvoy's original concept album about the evolution and intricacies of being in love. The album tells a story about the relationship between a boy and a girl, from "hello" to "goodbye." In collaboration with Shannon Foley and Doug Morrow, "Her" is a half-hour of pop, rock and alternative acoustic music. For the student showcase, he presents two songs from the full-length album: "Reflection" - a piano ballad - and "Cigarette" - an acoustic rock song.

Presenter(s)-Major: **Joseph Moher - Music-Performance**  
Title: CARBON - FOR PERCUSSION ENSEMBLE  
Department: Music  
Sponsor: Darin Kamstra

Abstract: In writing *Carbon* for percussion ensemble, the original goal was not necessarily to create something out of the ordinary. It was born out of researching the complex polyrhythms of Swedish band Meshuggah. After some experimentation with the concepts in their music and the discovery of the excitement of creating such simple-looking, but difficult to play, rhythms, the piece became a genre-defying percussion ensemble composition. The melodies are folk-inspired (though not folk-derived) and the rhythms are inspired by Meshuggah and, more loosely, African world music. The piece sounds like a celebratory kick-in-the-gut, almost primordial in nature. The drumset is from heavy-metal influences, and some parts of the work are inspired by hip-hop grooves. With this in mind, it can be hard to hear it and reconcile such details with the end product. The CMU percussion ensemble premiered *Carbon* on April 7th 2014. The performance is for anyone with an interest in percussion, jazz, and music in general and is a function of the CMU Music Department.

Presenter(s)-Major: **Brandi Moore - Medical Laboratory Technician, Kristen Reed - Medical Laboratory Technician, Jessica Ruiz - Medical Laboratory Technician**  
Title: "GROW YOUR OWN"  
Department: Health Sciences  
Sponsor: Tracy Matthews

Abstract: There are a total of 121,253 people currently on the organ transplant list. Seventy-nine people are added to the organ donor list and 18 people die daily waiting for an organ transplant. Instead of waiting for donor organs, patients can have new ones grown in vitro using one's own stem cells extracted from their bone marrow. Only 60 years ago, the first successful kidney transplant was performed. Fast forwarding 57 years to the year 2011, the first successful bronchial windpipe and blood vessels were transplanted by growing stem cells on a primitive structure. Since the stem cells that are used are from one's self, there is less likely a chance of transplant failure. One of the most beneficial aspects of stem cell organ transplantation is that, ideally, patients would not need to use anti-rejection medications, which normal transplant recipients must take for the rest of their lives. While stem cell transplantation is still in its early stages, researchers, doctors and clinicians are making remarkable advances every day to save more lives.

Presenter(s)-Major: **Isaac Morales - Mass Comm-Public Relations, Stanley Schrock - Mass Comm-Journalism**  
Title: SELECTIVE PERCEPTION AND THE EFFECT OF BRAND PREFERENCE ON ATHLETE PERFORMANCE  
Department: Languages, Literature, and Mass Communication  
Sponsor: Eric Sandstrom

Abstract: Selective perception is a phenomenon that occurs when individuals process messages differently. According to this theory, consumers who typically wear Nike footwear are more likely to notice Nike advertisements, and willingly consume Nike products instead of Adidas advertisements and products, and vice versa. This project will apply the theory of selective perception to show that athletes have a loyal affinity to specific performance footwear brands, and will test the effect of loyalty on confidence, which could affect performance. Two forms of research will be conducted to test the selective perception theory. A survey of 50 CMU athletes will quantify their consumption of advertisements with relation to their preferred brand, and will question confidence levels in their performance while wearing the different brands. Athletes' performances will be tested while wearing different brands. A video will analyze and show the impact of the favored and non-favored brands. The research is expected to reveal that the athlete's performance will not be hindered by the change of brand. If this is the case, the findings could cause athletes to reexamine their choice of footwear brand that is based solely on their loyalty regardless of the quality of the shoe.

Presenter(s)-Major: **Jose Morales-Carballo - Mechanical Engineering Tech**  
Title: HYBRID ENERGY SYSTEM  
Department: Mechanical Engineering  
Sponsor: Scott Bevill

External Funding Source: Atlasta Solar Center, Unconventional Energy Center

Abstract: Due to the declining cost of natural gas, a hybrid natural gas generator/solar energy system was studied in order to prove its feasibility and performance in powering a small office-like setting for further marketing.

Presenter(s)-Major: **Thomas Morrison - Physics**  
Title: USING MAGNETO-HYDRODYNAMICAL COMPUTATIONAL METHODS TO SIMULATE THE INTERSTELLAR GAS CLOUD G2 AS IT ENCOUNTERS THE SUPER MASSIVE BLACK HOLE AT THE CENTER OF OUR GALAXY.  
Department: Physical and Environmental Sciences  
Sponsor: Jared Workman

Abstract: In 2011, the interstellar cloud "G2" was observed, to be approaching the Super Massive Black Hole (Sagittarius A\*) at the center of the Milky Way galaxy. The cloud is on a highly eccentric orbit with a pericentre passage sometime in 2013. This rare event makes it an exciting time to investigate the physics of the galactic center. This research uses ATHENA, a finite volume code for compressible Magneto-Hydrodynamics to computationally simulate the interaction of G2 with Sagittarius A\*. The simulation results are used to predict various physical characteristics of the accretion disc formed around Sagittarius A\*. The simulations produce reasonable visual outcomes for the interaction between Sagittarius A\* and G2.

Presenter(s)-Major: **Sabrina Nelson - Criminal Justice**  
Title: BENEFITS OF OUTDOOR RECREATION: AN ANALYSIS OF THE ATTRIBUTES OF THE SETTING  
Department: Social and Behavioral Sciences  
Sponsor: Brian Parry

Abstract: Researchers have identified a wide range of potential benefits for recreating outdoors; however, limited research has been done to determine which types of people desire certain benefits, where these individuals prefer to recreate, or which features of a setting permit a person to achieve desired benefits. Without an understanding of the applicability of these benefits, managers cannot attempt to provide for the community of recreationists in their respective locations. In an effort to identify the most common core benefits individuals seek when they recreate outdoors, a study has been conducted to ascertain which attributes of recreation settings attract recreationists to or deter recreationists from spending time at a particular outdoor setting.

Presenter(s)-Major: **Kristen Neumann - Sport Management**  
Title: "MY" TEAM: THE STUDY OF FAN IDENTITY  
Department: Kinesiology  
Sponsor: Elizabeth Sharp

Abstract: The purpose of this research was to explore the relationship between how spectators identify with a team and their resulting behavior. This study gives an overview of why fans are more engaged at some events than others and how team identity plays into that engagement. Previous research has shown that when a spectator or fan has a higher identity with a team, they are more involved with fan spirit, socialization, and the end result of a game. Data collection methods included observations of spectator behavior at games and interviews with fans and coaches. Data analysis revealed that behavior differed according to sport, level of competition, home field advantage, and other variables. This study adds to the literature of why fans behave the way they do at sporting events. Research in this area is significant to studying the atmosphere and behaviors at particular sporting events which can help administrators understand how spectators identify with particular games and teams.

Presenter(s)-Major: **Abby Ney - Kinesiology-Teaching (K-12)**  
Title: TEACHING AS A PROFESSION  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: The purpose of this project is to illustrate a clear view and to interview three to five teachers to gain a further understanding of what it means to be an educator. Asking specific questions helped to deepen knowledge of what it means to be an educator. The presenter aspires to be a physical education teacher. The presenter interviewed two physical education teachers and a photography teacher. The presenter asked these teachers specific questions that relate to being an educator, and how they got where they are today. Most questions related to their past, present, and future as an educator, and how their knowledge and wisdom of educating has broadened throughout their years of being a teacher. When presenting the project, the presenter will convey the educators' knowledge, and how all of their answers can relate to her life, and how they deepened her understanding of what it means to be an educator. The presenter will use this knowledge to help shape herself as an educator because all of them are very successful. The intended audience is for any one interested in broadening their knowledge of what it means to be an educator.

Presenter(s)-Major: **Douglas Nichols - Geology**  
Title: PROVENANCE AND AGE OF THE BROWNS PARK FORMATION AND BISHOP CONGLOMERATE BASED ON NEW DETRITAL ZIRCON STUDIES, NORTHWEST COLORADO  
Department: Physical and Environmental Sciences  
Sponsor: Andres Aslan

External Funding Source: National Science Foundation Grant EAR-1119635

Abstract: Age relationships between the Browns Park Formation and the Bishop Conglomerate are controversial. The Bishop Conglomerate is thought to be Oligocene in age and analyses of volcanic ashes produce age estimates of 30-34 Ma. In contrast, the oldest age date for the Miocene-Oligocene Browns Park Formation is 24.8 Ma. Six samples were collected from the Browns Park basal conglomerate in northwest Colorado and tested using the detrital zircon method. Detrital zircon grains were separated from sandstone samples and analyzed in the LaserChron lab at the University of Arizona. The U-Pb ages of these zircon grains were used to calculate their maximum depositional age. The Browns Park basal conglomerate at Yampa Valley is ~ 30 Ma, and ~28 Ma at Sand Wash. Northeasterly paleocurrent directions and the relatively old age for the Browns Park Formation at Sand Wash suggests that this locality should be mapped as Bishop Conglomerate instead of Browns Park. Using detrital zircon grains, the ages of the Bishop Conglomerate and Browns Park basal conglomerate are more similar than thought in the past.

Presenter(s)-Major: **Erin Nissen - Chemistry**  
Title: SYNTHESIS OF A SELECTIVELY IODINATED ISOQUINOLINE CARBOXYLIC ACID  
Department: Physical and Environmental Sciences  
Sponsor: Joe Richards

Abstract: GLP-1 is a naturally occurring polypeptide that binds with the glucagon-like-peptide-1 receptor (GLP-1R). In binding with the receptor a cascade of events triggers the release of insulin. GLP-1 was considered for diabetes treatment; however, it has an in vivo half-life of only two and a half minutes. T-0632 is an inverse agonist of GLP-1R which may bind to GLP-1R in a location proximate to the binding site of the natural ligand, GLP-1. Studying the binding sites of T-0632 with GLP-1R provides for future insight into drug design for diabetes treatments. A low yield procedure for the azidation of the isoquinoline moiety of the T-0632 analog was previously described. An alternate synthesis has been developed, focusing specifically on isoquinoline ring closure techniques. Details on the experimental procedure and comparison to previous methods will be discussed.

Presenter(s)-Major: **Erin Nissen - Chemistry**  
Title: SYNTHESIS OF BIS-IMIDAZOLYL COMPOUNDS: BUILDING BLOCKS FOR CORROLE ANALOGS  
Department: Physical and Environmental Sciences  
Sponsor: Joe Richards

Abstract: The isolation, characterization, preparation and use of porphyrins and porphyrin-like compounds have been studied for decades. Recently, there has been a great deal of interest in porphyrin-like macrocycles with isomeric, expanded, and contracted core structures. While corroles, a tetra-pyrrole example of the latter, have been known for some time, little work has been done to study the effects of core modification in this system. Toward this end, the synthesis of bis-imidazolyl compounds to be used as building blocks for a diaza-substituted corrole analog has been accomplished.

Presenter(s)-Major: **Denise O'Connor - English-Writing**  
Title: MEDUSA COMES OF AGE  
Department: Languages, Literature, and Mass Communication  
Sponsor: Jennifer Hancock

Abstract: Medusa Comes of Age is a poetry collection formulated as a dramatic monologue using the character and voice of a contemporary Medusa. M.H. Abrams defines the dramatic monologue in *A Glossary of Literary Terms* as a "type of lyric poem" separate from a "component in a play" that consists of three distinct features: (1) A single person who ... utters the entire poem in a specific situation at a critical moment...; (2) This person addresses and interacts with one or more other people; (3) The main principle is to reveal to the reader ... the speaker's temperament and character (48). In other words the dramatic monologue is a character driven piece that addresses the audience in his/her authentic voice while simultaneously exploring the poetry genre. In Medusa Comes of Age, Medusa is that character. She is more than myth; she is a human burdened by myth. She carries the weight of hideous looks and a crown of snakes on her head, but she still has to live in

this world. Each poem represents different snapshots into Medusa's psyche and offers the audience, both the reader and the implied audience she addresses, an opportunity to hear her unique voice as she reconciles struggle with success, and reality with fantasy.

Presenter(s)-Major: **Karen Olmedo - Pre-Business Administration, Eric Scholl - Computer Information Systems**  
Title: CAN WE ACCESS IT?  
Department: Business  
Sponsor: Gayla Slauson

Abstract: A database is being restructured by an applicant for Educational Access Services (EAS) on the Colorado Mesa University (CMU) campus. One of the responsibilities of the EAS office is to make audio books for students with disabilities. The Access database that EAS uses at the moment needs to be revamped to keep track of all of their available books on CD/DVD, and to track the students who use them. Restructuring the database will make it more efficient and effective for the office. The database design will be presented without showing confidential data, and the implemented changes will be discussed.

Presenter(s)-Major: **Rachel Orndorff - Nursing, AAS, Casey Peiffer - Nursing, AAS, Shenyce Plemel - Nursing, AAS**  
Title: MEDICATION ADMINISTRATION SAFETY  
Department: Health Sciences  
Sponsor: Genell Stites

Abstract: The question this project will answer is how to prevent medication errors. Strategies and tips to prevent medication errors, such as adding scanning and Electronic Medication Administration Records Software (EMARS), and increasing staffing to decrease medication errors and safeguard the patient will be presented. Nurses care about patients and about their outcomes. Medication errors are common and can be scary. The presenters want to see why they are happening, and what are the effects on both patients and nurses. The points that best summarize the research include why medication errors happen and ways to prevent medication errors. For example, burnout, lack of time, high patient to nurse ratio, paper Medication Administration Records (MARS), and not performing the necessary checks are a few reasons that errors may be made. Finally, the presenters will share tips on prevention of medication errors by having patients take charge of their health. The intended audience for this project is nurses, patient, employers, and family members.

Presenter(s)-Major: **Rafael Orozco - Spanish-Applied Professional**  
Title: COMMON FACTORS THAT AFFECT YOUTH AND THEIR EDUCATION  
Department: Languages, Literature, and Mass Communication  
Sponsor: Mayela Vallejos-Ramirez

Abstract: With an increasing gap in the economic equality in America, the working poor have faced a lot of problems in society. The great majority of the lower working class has been deprived from the opportunity of a fair education. It seems that investigation of this problem has affected people in the community of Grand Junction, encouraging opportunities to further understand the issue. In order to fulfill the FLAS 498 Spanish Practicum course, an investigation has been conducted on this topic plus an internship at the local non-profit organization, Riverside Educational Center. The results of both the literary research and working with low income students from the community will be presented as a final project.

Presenter(s)-Major: **Cassandra Park - Liberal Arts, Elem Teaching**  
Title: THROUGH THE EYES OF A TEACHER  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: This project aims to illuminate the world of education through exploring both the challenges as well as the rewards that come with a career in teaching. This project provides an honest look into being an educator through research, of which the views and opinions of several educators are a part. The field work was done by conducting interviews with educators from varied school levels and settings. The results were compiled in a way that allowed the presenter to compare and contrast them among each other, as well as to personal beliefs of teaching. Through the completion of this project, the presenter concludes that overall, teaching is a lot of work and not a lot of money to show for it. True, teachers do not teach for the money, but teach in order to be rejuvenated each day by the fresh young souls of their classrooms. They aim to make a positive difference in their students lives, instilling in them the potential to make the world a better place. In order for teachers to be effective, they must be driven by their passion and must be willing to teach from the heart each and every day. The intended audience for this project includes future educators as well as anyone else interested in the field of teaching.

Presenter(s)-Major: **Elizabeth Picazo - Spanish-Applied Professional**  
Title: TRANSLATION THEORY  
Department: Languages, Literature, and Mass Communication  
Sponsor: Mayela Vallejos-Ramirez

Abstract: Translation has to do with what is written and it shouldn't be confused with interpreting, which has to do with talking. Translation theory has a lot of information in it which is important and necessary for those who want to translate for a profession and make it a career. It is not an easy task to translate. This project will assess the origin of translation, the first school for translators; translation ethics; translation characteristics and elements; the three types of translation: intra-linguistic, interlinguistic, and inter-semiotic translation; the difference between freelance translation and agency translation; and the importance of culture in translation.

Presenter(s)-Major: **Alyssa Preston - Theatre Arts-Acting/Directing**  
Title: PRESENTATIONS FROM "GETTING OUT" AND "THE FOREIGNER"  
Department: Theatre  
Sponsor: Jeremy Franklin

Abstract: An effective audition monologue walks a tightrope between a simple formality and the sole reason you become employed. The presenter will perform a dramatic monologue from "Getting Out" by Marsha Norman and a comedic monologue from "The Foreigner" by Larry Shue. In auditions, casting directors look for elements such as stage presence, dramatic build, scenic beats, transition, and physical characterization. The presenter will showcase these elements with a resolution that leaves an audience wanting more. These monologues will also demonstrate how the actor's job of making choices brings a character to life.

Presenter(s)-Major: **Jessica Quackenbush - Kinesiology-Adapted PE**  
Title: SPORTS' INFLUENCE ON CHILDREN  
Department: Kinesiology  
Sponsor: Elizabeth Sharp

Abstract: The purpose of this study was to explore the influence of sports on children (under age 18) from the perception of both parents and players. This study was investigated due to a personal interest and to better understand the impact sports have on the development of children. Over 50 open-ended and Likert questions were distributed to parents and players involved in local sport programs. Field observations were also used to interpret the comments on the surveys. Likert survey questions were analyzed in Excel for averages. Open-ended questions were analyzed for patterns of responses. Conclusions from the data showed that most parents believed that participation in sports is healthy and beneficial to their child in multiple areas such as social development and scholastic achievement. Data collected from players revealed a relationship between the participation in sports and variables such as confidence levels, grades, and comfort in social settings. This study supports previous research that has shown sports positively influence players mentally, physically and socially.



Presenter(s)-Major: **Irene Queen - Environmental Science and Tech**  
Title: THE UPPER COLORADO RIVER BASIN GUIDE – AN ONLINE RESOURCE FOR WATER RESEARCHERS  
Department: Physical and Environmental Sciences  
Sponsor: Gigi Richard

Abstract: The Upper Colorado River Basin is a complex, highly managed water and environmental system. The goals of this project are to provide relevant and accessible information for water-related research and education for the area encompassing the drainage basin from headwaters of the Colorado River in Colorado and the Green River in Utah, south to Lees Ferry, Arizona. Ecosystem management along the Upper Colorado River Basin is complex, as is management of any ecosystem, and the Colorado River has added layers of management complexity. The Upper Colorado River Basin includes six major sub-basins – the Colorado Mainstem, the Gunnison, San Juan, Green, Yampa/White, and Dolores River basins, some of which span into multiple states. Within each basin are separate state management agencies. Within each state are regional management agencies. Within each sub-basin are citizen groups with regionally relevant issues. For each sub-basin, the Upper Colorado River Basin guide provides organized access to the various water-related state, regulatory management agencies, citizen groups, and relevant studies. The Upper Colorado River Basin Guide simplifies navigation and retrieval of data and information from these organizations.

Presenter(s)-Major: **Andrew Quesenberry - Computer Science, Abel Sanchez - Computer Science, Austin Stoner - Computer Science**  
Title: "INTERGALACTIC LOOBY" GAME PROJECT  
Department: Computer Science, Mathematics & Statistics  
Sponsor: Warren MacEvoy

Abstract: This is a demonstration of a small contract game for the iPad called "Intergalactic Looby". The presenters were in charge of designing and implementing various features for Synaptic Switch and their client. They used the Unity 3D Game Engine, and wrote all code in Csharp (C#). While the presenters did not work on the graphics, all transitions, animations, movement, sound and game logic was triggered in code. The game is based on Temple Run, which required the designers to analyze and reverse engineer several mechanics from that game, as well as implement several new mechanics from scratch.

Presenter(s)-Major: **Jean-Louise Reichman - Sociology**  
Title: GENDER NONCONFORMITY IN CHILDREN  
Department: Social and Behavioral Sciences  
Sponsor: Brenda Wilhelm

Abstract: Gender identity disorder (GID) is a disorder that causes children and adolescents to reject their assigned gender identity in favor of the opposite gender. However, according to the social constructionist perspective, gender is "humanly-made" and culturally defined. Therefore a disorder that contains gender as its main component can also be viewed as a social construction. In response to this proposal, survey research was conducted to examine the following hypothesis: there is a positive correlation between the belief that gender is socially constructed and the acceptance of gender nonconforming behaviors in children. The research also examines differences in views towards gender and gender nonconformity between sex, education level, political stance, race, and religion.

Presenter(s)-Major: **James Rice - Geology**  
Title: A GEOLOGICAL ANALYSIS OF FOOL'S HILL AND SMITH'S MOUNTAIN IN DELTA COUNTY, CO  
Department: Physical and Environmental Sciences  
Sponsor: Verner Johnson

Abstract: Two geologic areas, Fool's Hill and Smith's Mountain, lie along the Gunnison River in Delta County near the foot of Grand Mesa. Both areas exhibit characteristics that appear anomalous, or inconsistent, with surrounding geology. Fool's Hill is morphologically part of Grand Mesa, but may be structurally part of the Uncompahgre Uplift to the southwest. Stratigraphic exposure, made clearer by a series of Highway 50 road cuts, appears to dip eastward at the southern exposure, and northward at the westernmost exposure, and its connection to the Uncompahgre is not immediately clear. Smith's Mountain lies at the visible end of the Gunnison Uplift, and in fact occupies the mouth of the Gunnison Gorge, the end of the Black Canyon feature. It exhibits a dome-like shape, and the western edge is clearly a break or fault in the strata. The Ute Fault has been mapped within the canyon, but it is unclear if this western edge fault is part of the Ute Fault, or simply related and parallel. This study combines aerial image analysis, field research, and field-generated maps and cross sections, in an effort to clarify the two features' underlying structures, and associate them more definitively with their surrounding geological regimes.

Presenter(s)-Major: **Justin Robbins - Mechanical Engineering**  
Title: ALTERNATIVE ENERGY DESIGN GUIDELINES FOR CENTER PIVOT SPRINKLERS  
Department: Mechanical Engineering  
Sponsor: Timothy Brower

Abstract: The need for conservation of natural resources is growing as the means are being depleted. In some applications a hydro-power driven center pivot sprinkler is a responsible and an economical solution. In this presentation the benefits of hydro-power systems and a guide to designing them will be demonstrated. A final revision of the Alternative Energy Design Guidelines for Center Pivot Sprinklers will be used to assist current and future engineers working for Natural Resources Conservation Service.

Presenter(s)-Major: **Emily Roberts - Biological Sciences-Biology**  
Title: MITOCHONDRIAL FUNCTION IN AN INVASIVE IN VITRO MODEL OF BREAST CANCER  
Department: Biological Sciences  
Sponsor: Kelly Jean Craig

Abstract: Breast cancer is the second most common type of cancer, with approximately 250,000 new cases diagnosed in the United States annually and approximately 20% of these cases will be missed with current screening methods. With the development of molecular diagnostic testing, breast cancer could potentially be identified in earlier stages, followed more effectively through treatment, and possibly lower mortality rates. One of the most common characteristics of cancer cells is their ability to evade apoptosis, or programmed cell death, which is partially controlled by the mitochondria. Therefore, an ideal target for molecular diagnostics is the mitochondrion, which controls many signaling pathways for cellular survival, including apoptosis and bioenergetics. Apoptosis is influenced by mitochondrial dynamics, which change the shape (fragmented or elongated) and function (death or survival) of the mitochondrion. The protein, dynamin-related protein 1 (Drp1) promotes the fragmented shape of the mitochondrion, which is necessary step for apoptosis initiation. Using confocal microscopy, it was determined that an adenocarcinoma of the human breast (HTB-22) had a fragmented (fission) mitochondrial phenotype—even though the cells continued to be resistant to apoptosis. Upon examining other steps in the life cycle of the mitochondrion, including mitochondrial length, membrane potential, and reactive oxygen species production, it was determined that this in vitro model of breast cancer utilized an alternative pathway to promote turnover of dysfunctional mitochondria—mitophagy, or mitochondrial death dependent upon the lysosome. Mitochondrial fission and mitophagy work synergistically; dysfunctional mitochondria created by elevated reactive oxygen species production promote the fragmented mitochondrial shape, which signals their elimination via mitophagy. The HTB-22 breast cancer model displayed resistance to depolarization, increased reactive oxygen species production and enhanced mitophagy. These results indicate that the HTB-22 cells line have a pro-fission phenotype, which was not initially expected. Future directions of this project will examine the signaling pathways associated with Drp1 mitochondrial membrane binding to determine how these cells circumvent apoptosis despite apoptotic initiation by caused by Drp1-dependent fission. The downstream mediators of apoptotic signaling post-Drp1-dependent fission will be studied using various techniques, such as immunocytochemistry, confocal microscopy, and western blotting. Mitochondrial fusion will also be examined to determine if its up regulation promotes cell survival and growth in this breast cancer model.

Presenter(s)-Major: **Brandon Roland - Kinesiology-Teaching (K-12)**  
Title: TEACHING AS A PROFESSION  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: This project is aimed to inform and help up and coming education students to better understand the importance and actual position of a teacher. Through this project the presenter will show that teaching is much more than just standing in front of a class and teaching a curriculum. Three high school teachers were interviewed in an attempt to find out the true meaning of being a teacher. The presenter made an effort to find the true meaning of being a teacher by asking each educator a series of questions such as where they believe their teaching experience started, what motivates most teachers to continue teaching, and also what makes teachers leaders. Through these questions the presenter will shine light on the subject of what drives teachers to be these leaders of education for so many students.

Presenter(s)-Major: **Linsi Romano - Liberal Arts Pre-Elem Ed**  
Title: INSIDE THE LIFE OF A TEACHER  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: The goal for this project is to demonstrate the ideology behind teaching and why it is greatly important today. The presenter was motivated to work on this project to gain knowledge by interviewing experienced teachers. The audience for the project only needs to have passion for a particular subject in order to understand the presentation. This project presents discoveries from each interview, additional research, and personal experience. The conclusion is that there is a lot more to teaching than everyone sees. It is not an easy babysitting job, but a job that requires a great deal of responsibility for the young adults in a classroom and their futures. The larger significance of the project is the different views and opinions obtained throughout the interviews. This project is intended to help future teachers realize that teaching is not just a job — it is a passion.

Presenter(s)-Major: **Jordan Rothe - Bus Admin-Finance**  
Title: CONVENIENCE STORE DATABASE  
Department: Business  
Sponsor: Gayla Slauson

Abstract: This project involves designing a relational database for a new convenience store that physically sells items pre-ordered from the Internet. The presenter will demonstrate tables, forms, queries, and navigation tools.

Presenter(s)-Major: **Michael Rowe - Computer Information Systems**  
Title: THE FUTURE OF RFID TECHNOLOGY  
Department: Business  
Sponsor: Johnny Snyder

Abstract: The Information Technology (IT) field is buzzing about the latest form of communication involving high frequency radio waves. Radio Frequency Identification (RFID) is fast becoming the de facto standard for tracking and monitoring goods. More applications surface every day for Near Field Communication (NFC) and RFID technology could fundamentally change the amount of information being collected on products driving productivity and efficiency to a new level. The days of manually counting goods and scanning bars codes are numbered due to the ease of RFID technology. The Internet of Things (IoT) is growing as society enters the era of sensor technology. Wal-Mart currently has one of the largest RFID inventory systems in place and it continues to tag more products with the new technology. RFID is driving business value and innovation into a new paradigm. As more engineers find ways to implement this technology, daily life could shift from the way public transportation is managed to the contents of the refrigerator.

Presenter(s)-Major: **Orianna Rubin - Environmental Science and Tech**  
Title: MULTI-FOCUS MICROPHOTOGRAPHY OF DISTINCTIVE VEGETATIVE AND REPRODUCTIVE ASPECTS OF THE POACEAE PLANT FAMILY (GRASSES).  
Department: Biological Sciences  
Sponsor: Stephen Stern

Abstract: Dichotomous keys help users to delineate specific species by identifying characteristics based on morphology, behavior, and environment. Many keys are supplemented with anatomical drawings that provide a representation of the characteristics described. Within the plant kingdom, many morphological features can seem quite similar when described in text, which can result in confusion during the identification process. One of the most difficult plant families to identify to species is Poaceae- the Grass Family- due to the proliferation of reduced parts that results from small size and adaptation to wind pollination. This research utilizes a dissecting microscope, capable of taking detailed multi-focus images of very small objects, to create a scientific photographic reference to important identifying characteristics of grass species in Western Colorado. When used in conjunction with a dichotomous key, this reference will clarify the identification process as well as provide an educational tool to individuals familiarizing themselves with morphological plant features.

Presenter(s)-Major: **Kevin Saltou - Visual Communications, AAS**  
Title: REAL TIME MOVEMENT  
Department: Western Colorado Community College  
Sponsor: Daniele Balsamo

Abstract: The contents of this project show a female corrector in scrubs and demonstrates in real time movement of hair and clothes reacting to wind along with body movement. The software used is Autodesk 3ds Max 2014, Autodesk Mudbox 2014 and Marvelous Designer 3. Real-time computer graphics is the subfield of computer graphics focused on producing and analyzing images in real time. The term is most often used in reference to interactive 3D computer graphics, typically using a GPU, with video games the most noticeable users.

Presenter(s)-Major: **Tiffany Saunders - Nursing, AAS, Abby Schmeckpeper - Nursing, AAS, Maddison Steffen - Nursing, AAS, Matthew Veek - Nursing, AAS**  
Title: SAFETY IN RELATION TO IMAGING TESTS  
Department: Health Sciences  
Sponsor: Genell Stites

Abstract: Imaging tests such as Computer Aided Tomography, Magnetic Resonance Imaging and X-rays play a major role in assisting to diagnosis patients today. However, the exposure to radiation with imaging tests, plus the cost and additional processing time for results might be too much for some patients. Since the mid-1990s the number of imaging tests that are performed in the United States has tripled. This presentation will weigh the benefits of this type of service. The main goal of this presentation is for the patients to be educated on what considerations are involved with this type of testing.

Presenter(s)-Major: **Zack Schuler - Environmental Science and Tech**  
Title: THE EFFECTS OF CMU COMPOST ON PLANT GROWTH  
Department: Physical and Environmental Sciences  
Sponsor: Deborah Kennard

Abstract: By diverting food waste from the CMU dining hall and community college culinary program, student employees are able to create a nutrient rich soil amendment that can then be sold as a valuable product. Like all products, testing must be done to ensure quality and consistency. This experiment hoped to create a comparative baseline for future compost batches and determine quality compared to similar products such as Mesa Magic by analyzing the effects of compost on seed germination speed, total plant biomass and root length. Grow tests took place in the CMU automated greenhouse with two plant species: Early Scarlet Globe Radishes (*Raphanus sativus*) and Nasturtium, each with 7 replicates for each of the four treatments: a control Home Depot brand potting mix, a 50/50 Mesa Magic-control mix, a 50/50 CMU compost-control mix and a sorted CMU mix with a finer particle size. The experiment ran for approximately eight weeks. The composts are being analyzed in the CMU soils lab to determine pH, soil electroconductivity, bulk density, micronutrients and NPK. The results of this experiment will directly influence future composting practices at the facility and hopefully ensure a better overall product in the future for the facility and its customers.

Presenter(s)-Major: **Natalie Smith - Geology**  
Title: IS THERE A LINK BETWEEN THE RIO GRANDE RIFT AND THE YELLOWSTONE MANTLE PLUME? YAMPA VALLEY AS A POSSIBLE KEYSTONE OR CONNECTION.  
Department: Physical and Environmental Sciences  
Sponsor: Andres Aslan

Abstract: The Yampa Valley is located in northwest Colorado and contains dikes, diatremes, and basaltic flows of Miocene age. It has been proposed that the Yampa Valley is part of the northern continuation of the Rio Grande Rift, and that the volcanic activity in the Yampa Valley was fed by an extension of the Yellowstone Mantle Plume. The Leucite Hills are another set of volcanic flows, which are located in southern Wyoming. A path can be traced from the Rio Grande Rift up through Yampa Valley and Leucite Hills, terminating at Yellowstone. The continuation of this path to the south is the Rio Grande Rift. Is it possible that the Yellowstone Mantle Plume and the Rio Grande Rift are migrating towards each other? This study compares volcanic age data, chemical composition data, and magma origins from these three sites in order to explore the possible connection between Yellowstone and the Rio Grande Rift.

Presenter(s)-Major: **Hans Snell - Music-Education**  
Title: WHAT DOES IT TAKE TO BE A SUCCESSFUL TEACHER?  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: The goal for this project is to help future teachers have a better understanding of what it means to be a successful teacher. This goal will be achieved through careful discussion of teacher interviews and research. Because the presenter is studying to be a music teacher, music teachers were interviewed who had the most experience and passion for teaching in each grade level. The knowledge, excitement, and advice that these teachers provide about teaching is not only important for music teaching, but for teaching in general. The conclusion of this project will show that teachers need to constantly be striving for excellence. This will help teachers improve and help their students to have the best opportunities to learn.

Presenter(s)-Major: **Rikki Sours - Liberal Arts, Elem Teaching**  
Title: 1ST GRADE READING AND WRITING CASE STUDY  
Department: Teacher Education  
Sponsor: Cynthia Chovich

Abstract: A teacher candidate at Colorado Mesa University performed a case study, looking into the reading and writing skills of a 1st grade student. This literacy project, entitled Assessment Process and Analysis Learning Study (APALS), was designed to have up-and-coming teachers put theories to practice by conducting several assessments on one elementary student. This is an assignment that has pre-interns performing ongoing formative and summative assessments in order to familiarize them with the processes and techniques. The final part of the Assessment Process and Analysis Learning Study (APALS) project has the teacher candidate drawing conclusions regarding strategies, patterns, skills, and growth that they have observed, experienced, and assessed as they worked with the focal student. This is a project that allows for the candidate to share the information gathered with parents and colleagues. The intended audience of this project is fellow teachers and parents as well as future teacher candidates. It allows for the teacher candidate and audience to see the growth of the student over a period of time, as well as get an inside look at how children develop with regards to reading and writing. This project is significant because it investigates the role assessment has in identifying the developmental needs of a student, explaining how assessment drives instruction, and the importance of using valid and reliable measures to monitor student progress.

Presenter(s)-Major: **Amanda Stahlke - Biological Sciences-Biology**  
Title: MOLECULAR GENETIC STUDIES ON *CONIATUS* SPP., A NATURAL ENEMY OF *TAMARIX* SPP., RECENTLY FOUND IN COLORADO  
Department: Biological Sciences  
Sponsor: Zeynep Özsoy

Abstract: The tamarisk weevil, *Coniatus* spp., was first observed in western Colorado on the invasive shrub tamarisk (*Tamarix* sp.), during regular monitoring surveys performed by the Colorado Department of Agriculture, Palisade Insectary in 2011. The origin of the non-native *Coniatus* spp. remains unknown. The weevil has also been observed in California, Arizona, Nevada, New Mexico, Oklahoma, eastern Colorado, and Texas. Little is known about the weevil, including its predicted range, its effect on the tamarisk in conjunction with the biological control agent, the northern tamarisk leaf beetle (*Diorhabda carinulata*), and potential interactions with native ecosystems. *Coniatus* spp. individuals from several sites in North America with two distinctive pupal casings and various adult color morphologies were genetically compared to individuals from Italy, Kazakhstan, Uzbekistan, and Turkey. Molecular genetic analysis of a mitochondrial DNA region containing the Cytochrome Oxidase I gene was performed in an effort to identify genetic differences and construct a potential phylogenetic tree of *Coniatus* spp. Phylogenetic data may be further used to predict the range boundaries as *Coniatus* spp. populations grow in North America.

Presenter(s)-Major: **Jaimie Stephens - Physics**  
Title: CORRELATED QUANTUM STATES RESULT IN SUPERIOR ESTIMATION  
Department: Physical and Environmental Sciences  
Sponsor: David Collins

Abstract: The depolarizing channel, a type of evolution of a quantum system, causes a system with initial density operator  $\hat{\rho}_i$  to evolve to  $\hat{\rho} = \frac{1-\lambda}{2} \text{tr}(\hat{\rho}_i) \hat{I} + \lambda \hat{\rho}_i$ . Here  $\lambda$  is the probability that the state of the particle will stay the same. This parameter  $\lambda$  can be estimated from outcomes of measurements on the system after channel action. Any process of estimating  $\lambda$  will result in fluctuations that are quantified by an uncertainty. The goal of any estimation method is to minimize this uncertainty. The minimal uncertainty can be determined by using the Cramér-Rao bound and the quantum Fisher information (QFI), with minimal uncertainty occurring for the maximum QFI. The QFI depends on the initial state and the number of systems, and it is used as a measure of success of an estimation strategy. The researchers have explored various choices of initial states and shown that correlated states can yield better estimation strategies, then independent uses of the channel.

Presenter(s)-Major: **Torrey Steves - Spanish-Applied Professional**  
Title: THE LITERATURE OF "LO FANTASTICO" AND THE LITERARY TRANSLATION  
Department: Languages, Literature, and Mass Communication  
Sponsor: Mayela Vallejos-Ramirez

Abstract: Translation is becoming more and more important as the world becomes smaller. Globalization and the internet have facilitated the spread of literature around the world. In order to give people access to literature from all different cultures and languages; good translation is key. The translation of any piece of literature is a task which requires not only knowledge of the two languages in question, but also an understanding of the two cultures. Where a specialized translation requires the transfer of information from one language to the next, a translation of literature requires the transfer of a mood and feel as well. Applying the theory of literary translation and all it encompasses, part of this project will include a short story translated from Spanish to English. The other part of this project will be an introduction to "Lo Fantastico." The research into this genre has not only helped with the translation aspect, but also with the understanding of literature as a whole, no matter the language.

Presenter(s)-Major: **Hailie Taylor - Kinesiology-Teaching (K-12)**  
Title: SMALL TOWN U.S.A.  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: The focus of this project is on teaching children in small towns that don't benefit from the state as much as bigger cities. This presenter didn't consider teaching as a profession until coaching a 6th grade girl's basketball team, which provided the experience of changing lives for the positive, so she will also consider how coaching and teaching can tie together. It is a common mis-perception that teachers simply are babysitters drawn to the career for the holidays and summer vacations. Being a teacher goes much deeper than days off and easy hours -- it impacts the lives of children and helps them to grow. Interviewing several teachers provided the perspective that teaching is truly a big job and that teachers learn from their students. The intended audience is future teachers planning to work in rural communities.

Presenter(s)-Major: **Allison Theobald - Mathematics-Statistics**  
Title: THE UNKNOWN MATHEMATICS OF ECONOMICS  
Department: Computer Science, Mathematics & Statistics  
Sponsor: Phil Kavanagh

Abstract: Economics bases its subject matter on the social behavior of both individual agents and small players in decision making for the allocation of resources. The founding principle behind microeconomics is mathematics, ranging from multivariate calculus to analysis. However, some of the pinnacle mathematics theorems used in microeconomics are largely unknown to mathematicians. The presenter will examine some such theorems and address their applications in microeconomic theory.

Presenter(s)-Major: **Josh Thompson - Biological Sciences-Biology**  
Title: LIGAND DIRECTED FUNCTIONALIZATION OF STRONG, SP<sup>3</sup>-HYBRIDIZED C-H BONDS UTILIZING GOLD(III)  
Department: Physical and Environmental Sciences  
Sponsor: David Weinberg

Abstract: Methane is the primary component of natural gas, and an important feedstock for fuels and chemicals. However, methane gas has shown to be difficult to store and transport. Thus, direct, efficient conversion of methane into liquid chemicals would be useful. Unfortunately, selective functionalization of strong sp<sup>3</sup>-hybridized C-H bonds like those found in methane has proven to be difficult. The catalysts conventionally used in the conversion of methane are inefficient. Potential for the selective functionalization of strong C-H bonds has been exhibited by gold; however gold(III) has yet to definitively either activate or selectively functionalize strong sp<sup>3</sup>-hybridized C-H bonds in high yields. As such, chelating ligands have been synthesized to direct gold(III) toward strong, sp<sup>3</sup>-hybridized C-H bonds in order to facilitate these reactions. Gold(III) complexes containing this type of ligand have been synthesized, and preliminary C-H bond activation studies have begun.

Presenter(s)-Major: **Doran Tregarthen - Nursing, AAS, Tiffany Ware - Nursing, AAS, Teresa Ziegler - Nursing, AAS**  
Title: PALLIATIVE CARE  
Department: Health Sciences  
Sponsor: Genell Stites

Abstract: Palliative care is a new way of providing healthcare; it is person centered and takes into account the physical, psychosocial and spiritual care needs of patients. The presenters have very strong beliefs that best practice in nursing is to improve all aspects of health. This presentation provides research linking the use of palliative care improving quality of life and increased patient satisfaction. This project focuses on the research regarding this type of care and provides education about the benefits of this style of healthcare. Anyone who has a loved one in their life with the potential of a progressive disease/illness will benefit from the information presented.

Presenter(s)-Major: **Cesar Valenzuela - Exercise Science**  
Title: WHY I WOULD LIKE TO BE A TEACHER  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: The goal for this project is to give an outlook on why teachers strive to teach and remain passionate for teaching. This project has helped the presenter get in touch with the teaching life through interviews. This gave a rough idea of how the field is changing and how it is today. The information and knowledge gained will be shared through a poster format with the details learned through the interviews. The significance of this project will be that the audience will walk away with past and present knowledge of the field.

Presenter(s)-Major: **Trevor Van Tassel - History-Teaching (Secondary)**  
Title: TEACHING AS A PROFESSION  
Department: Teacher Education  
Sponsor: Jennifer Daniels

Abstract: When it comes to teaching as a profession there are many things to learn and some things are hard to get a handle on. Through interviewing teachers and asking them many questions the presenter became more informed of what it is to become a successful teacher. This project will explore the major points of becoming a teacher and describe why teaching is such an important profession. To completely understand this project the reader should know a little about teaching as a profession to understand the information that will be presented. From this project the presenter hopes to become a better teacher but also hopes to help future teachers understand what it means to become a better teacher.

Presenter(s)-Major: **Jessica Vandermeer - Theatre Arts-Dance**  
Title: EXPLORING THE MIND-BODY CONNECTION IN INJURED COLLEGIATE DANCERS  
Department: Theatre  
Sponsor: Melonie Buchanan Murray

Abstract: Studies show that up to 90% of collegiate dancers experience some type of injury during their university training. Dancers are prone to injury due to the amount of physical work and stress that the dancing human body endures. In addition, collegiate dancers are simultaneously coping with the daily stresses of college life such as homework, exams, dorm life, etc. The challenges of injuries are not just physical but also psychological. The mind-body connection is powerful, and the psychological implications can be detrimental to a dancer's development and career potential. By incorporating qualitative interview methods and observations, the researcher developed a dance movement performance that explores these psychological effects through choreography and the choreographic process. The culmination of this project is a mixed-media dance movement performance.

Presenter(s)-Major: **Chris Watry - Biological Sciences-Biology**  
Title: AN INVESTIGATION OF MOSS-DWELLING TARDIGRADE SPECIES COMPOSITION IN WESTERN COLORADO  
Department: Biological Sciences  
Sponsor: Aparna Palmer

External Funding Source: Desert Ecological Analysis and Restoration Grant

Abstract: The goal of this study was to collect information on the morphologies of moss dwelling tardigrades (water bears) found in the high-elevation desert habitats of Western Colorado. Water bears, which are aquatic animals, have an amazing ability to respond to harsh environmental conditions (such as desiccation) by entering a dormant state known as cryptobiosis. During cryptobiosis, little to no metabolism can be measured and these animals are thought to survive indefinitely while in this state. Mosses that contained tardigrades were collected from the surfaces of rocks and soil in pinyon-juniper habitats in Grand Junction CO. After extraction from the mosses, live and preserved specimens were examined using dissection, compound, and electron microscopy. The results show that two different tardigrade morphospecies exist locally. Morphospecies 1 (the White Crocodile) shows a clear or whitish coloration and morphospecies 2 (the Red Devil) shows a reddish coloration. Both species have been found together inhabiting the same moss as well as individually on separate mosses. This study is significant because it may allow for the description of new species as well as lead to a better understanding of the mechanisms by which tardigrades can survive in the high elevation desert despite being deprived of water.

Presenter(s)-Major: **Clayton Wein - Geology, Environmental**  
Title: SOCORRO MAGMA BODY: GEOPHYSICAL RESEARCH AND SIGNS OF ACTIVITY  
Department: Physical and Environmental Sciences  
Sponsor: Andres Aslan

Abstract: The Socorro Magma Body, located in central New Mexico, is currently showing signs of activity. The Socorro Magma Body is currently the largest magma body known to exist in the Earth's crust. The magma body is 50 to 70 kilometers in length and at a depth of 19 kilometers. Tectonism created the Rio Grande rift and Jemez Lineament in north and central New Mexico. The crustal thinning from these tectonic features weakened the crust and allowed abnormally hot mantle to rise into the crust. Rising mantle material from the Rio Grande Rift created some of the largest volcanic fields in North America, including eruptions that are among the largest over the entire history of earth. Because of the known volcanic history in New Mexico geophysical methods are being used to monitor and collect data on the Socorro Magma Body. Interferometric synthetic aperture radar, seismic surveys, and satellite radar are a few of the methods used to investigate magma bodies. To predict future activity of the Socorro Magma Body, these geophysical techniques are being applied. Maps have been created from the data to illustrate the activity of the Socorro Magma. Further geophysical analysis of the Socorro magma could prove useful in understanding more about the Rio Grande Rift and future volcanic activity in New Mexico.



Presenter(s)-Major: **Mariah Weinke - Biological Sciences-Biology**  
Title: ASSESSING EVOLUTIONARY RELATIONSHIPS AND IDENTIFYING SPECIES IN THE PLANT GENUS *SOLANUM* USING DNA SEQUENCE DATA.  
Department: Biological Sciences  
Sponsor: Stephen Stern

Abstract: The plant genus *Solanum* contains approximately 1400 species including well-known food crop species like potatoes (*Solanum tuberosum*), tomatoes (*Solanum lycopersicum*), and eggplants (*Solanum melongena*). One of the largest groups within the genus is the "spiny solanums", a group of approximately 350-450 species that all have sharp prickles. Species that have recurved prickles used for climbing other plants have long been thought to be part of a single evolutionary lineage but recent studies have shown that this is a convergent trait that has evolved many times. This research focused on understanding the evolutionary relationships of a newly described species of *Solanum* that has recurved prickles. DNA sequence data was obtained and used to assess evolutionary relationships and also aid in identifying plant specimens.

Presenter(s)-Major: **Danny Weller - Physics**  
Title: ELLIPTICAL-LIKE ORBITS ON A SPANDEX SURFACE  
Department: Physical and Environmental Sciences  
Sponsor: Chad Middleton

Abstract: Planets move in elliptical orbits with the Sun stationed at one of the ellipses' foci, as described by Kepler's 1st law. Recreating these elliptical orbits on a cylindrically symmetric surface in a uniform gravitational field has been shown to be impossible for the general case. The purpose of this project is to analyze elliptical-like orbits on a cylindrically symmetric spandex fabric. Securing a piece of spandex to a circular frame and placing a central mass on it, the fabric takes the shape of minimal energy, which can be understood by using the calculus of variations method. Using a small marble one can produce elliptical-like orbits around the central mass, when the right initial conditions are imposed. Lagrangian dynamics are used to theoretically describe the motion of a marble on the surface. For elliptical-like orbits with small eccentricities, the researchers arrive at approximate solutions that are found to precess over time.

Presenter(s)-Major: **Matthias Westenberger - Business Administration**  
Title: HIGH-FREQUENCY TRADING  
Department: Business  
Sponsor: Johnny Snyder

Abstract: High-Frequency Trading (HFT) is a controversial discussed topic in finance. Using high speed technology and fast processing algorithms, High-Frequency Traders are able to generate profits through executing immense amounts of orders and cancelations in the security markets within milliseconds. Many market observers see an improvement of the market quality connected with HFT, which shortens the short-term volatility. Other critics argue that this way of trading is incorporating too many risks, because humans cannot comprehend the countless actions of the algorithms. This presentation will address the HFT, the technology used and its impact on financial markets. The project will show the major change in financial markets due to HFT and which aspects investors have to consider in their future actions.

Presenter(s)-Major: **Samantha Wittig - Theatre Arts-Music Theatre**  
Title: INTO THE CLOSET: A SAMVENTURE  
Department: Theatre  
Sponsor: Jeremy Franklin

Abstract: Into the Closet: A Samventure is Samantha Wittig's cabaret exploring social media pressures and the sexual objectification of women. She will be using statistics, stories and songs as a lens to look at how media is adversely influencing today's culture. She uses her wardrobe as a platform of rebellion against the social norms that cast women as decorative or lesser. She will share her personal experiences of what has happened when she broke these norms. She will be singing "Glitter and Be Gay" from *Candide* and "You're Never Fully Dressed Without A Smile" from *Annie*. The songs she chose reflect some of the hurdles she has jumped on her way towards acceptance of her own artistic personality and style, unhampered by the constraints of fashion and media.

Presenter(s)-Major: **Anna Younger - English-Literature**  
Title: NEW WORLD TRUTH: A TRANSNATIONAL NARRATIVE  
Department: Languages, Literature, and Mass Communication  
Sponsor: Randy Phillis

Abstract: American Literature is a reflection of the world, from the eyes of the beholder to the reader beholden of a book. It illustrates contemporary moments that, in their purity, reveal truth normally overlooked, or hidden between the margins of everyday contemplation. It has been observed that an alternative ethnic narrative has particularly interested American writers and readers of literature. Contextually, it should come as no surprise, as America has had generations of immigration, and is currently affected by globalization. However, this interest of modern Americans has contributed to the composition of what some might generalize as, a newly formed "world" novel. That is, a narrative perspective that attributes a "world" critique, encompassing globalization and immigration. Research in the pre- and post-immigration status of, and culture among ethnically Dominican-Americans and American/Dominican political relations shows a correlation between a unique narrative and globalization. Junot Diaz's novel, *The Brief and Wondrous Life of Oscar Wao*, is a novel that is exemplary of this "world novel," illustrating a shift in American fiction from a uni-national narrative to a transnational narrative.

Presenter(s)-Major: **Alex Zemezouk - Mechanical Engineering Tech**  
Title: EFFECT OF A RANGE OF VARIABLE STIFFNESS FOOTWEAR DESIGNS ON EXTERNAL KNEE ADDUCTION MOMENT DURING WALKING  
Department: Mechanical Engineering  
Sponsor: Scott Bevill

Abstract: Osteoarthritis (OA) of the knee is more likely to affect an individual on the medial compared with lateral side. This is due to the greater mechanical loads acting through the medial compartment. OA has a direct correlation with the external knee adduction moment (EKAM) at the knee. By decreasing the EKAM with variable stiffness shoes the progression of OA can be slowed. Trials were run with five variable stiffness shoes and one control shoe with a 1:1 ratio. Other shoe ratios were 1:1.3, 1:1.6, 1:2, and 1:3.5 (with the lateral being the stiffer side). The fifth pair was constructed with a 1:1.3 with a tapered design. Fourteen healthy male subjects were asked to walk across force plates with all six pair of shoes. The five pair of variable stiffness shoes reduced the EKAM for subjects on average. The 1:3.5 shoe was most effective, on average, reducing the EKAM ( $-5.9 \pm 9.1\%$ ) relative to the control shoe. Although any individual shoe design reduced the EKAM for 64% of subjects at most, 93% of subjects had at least one variable stiffness shoe that decreased the EKAM. The results suggest that the optimal variable stiffness shoe design for an individual with knee OA is person-dependent.

Presenter(s)-Major: **Ryan Zentmeyer - Bus Admin-Finance**  
Title: ACCESS DATABASE DESIGN: INVENTORY SOLUTIONS  
Department: Business  
Sponsor: Gayla Slauson

Abstract: An Access database was developed for an inventory management system. The design is optimized for flexibility as future inventory items may require specific data unrelated to current inventory items. To provide an efficient and understandable user interface, VBA code was interlaced into the forms. Particular challenges were: addressing a multi-level, many-to-many relationship and the form structure involved, designing the database to support data that assists the user in data entry, and maintaining the integrity and agility of the database. Although the project is focused on a single application, the methods and structure of the database are not only universal, but also practical.



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