



First Annual Metro State
Undergraduate
Research
Conference

APRIL 20, 2012

PROGRAM & ABSTRACTS

Sponsored by

Metropolitan State College of Denver
Undergraduate Research Program

Pamela Ansburg, Ph.D. and Tom Davinory, Ph.D.
Faculty Associates for the Undergraduate Research Program

Members of the Undergraduate Research Program Advisory Council

Art Campa (Anthropology)	Rhonda Eaker (Applied Learning Center)
Janos Fustos (Computer Information Systems)	Adam Graves (Philosophy, on leave Spring 2012)
Chris Jennings (Technical Communications)	Daniel Krasner (Philosophy, replacement for Spring 2012)
Ford Lux (Biology)	Mark Potter (Center for Faculty Development)
Kamran Sahami (Physics)	Jacob Welch (Theater)

Mission

The Undergraduate Research Program promotes, supports, and celebrates faculty and student engagement in undergraduate research activities. These undergraduate research experiences enhance students' preparedness and competitiveness for future employment and the pursuit of advanced degrees.

TABLE of CONTENTS

Letters of Welcome..... 4

Acknowledgements..... 5

Program-at-a-Glance..... 6

Keynote Presentation..... 6a

Conference Map..... 6b

Program Schedule with Abstracts

 Oral Session I..... 7

 Poster Session I..... 21

 Oral Session II..... 34

 Poster Session II..... 48

 Oral Session III..... 62

 Poster Session III..... 71

 Oral Session IV..... 84

Index..... 89



LETTERS of WELCOME



Greetings!

*It is my honor to welcome you to the **1st Annual Metro State Undergraduate Research Conference**. The conference showcases some of the outstanding accomplishments of students here at the Metropolitan State College of Denver and the cutting-edge quality of the education they have received. It is an affirmation that the Metro State formula of hard work, excellent scholarship and personal guidance from our outstanding faculty can lead every student on the path to success.*

Metro State encourages and supports undergraduate research because it is known to be one of the most effective methods of teaching and learning. Students benefit through intellectual, practical, and professional development beyond the walls of their classrooms. Their work and accomplishments further reverberate across the whole campus community by enhancing classroom experiences, enlivening intellectual discussions, and enriching social interactions.

What you will encounter at this conference has numerous benefits, to not only Metro students but also to our neighbors in Denver, across Colorado, and around the entire global community. The scholarly contributions and creative work of our students are rooted in addressing the real and compelling issues that we all share. We know that the accomplishments of these students today will encourage tomorrow's students to seek further educational opportunities and challenge them to explore new realms of possibilities. Metro students will graduate with confidence and pride in their ability, be able to think critically, to work independently and to engage in their world.

Congratulations to all of the students displaying their work and to the faculty who have mentored them and everyone that has made this event possible – congratulations! Metro State is proud of you and encourages your future endeavors.

Stephen M. Jordan, Ph.D.
President

Dear Participants,

I am very excited to welcome you to the **1st Annual Metro State Undergraduate Research Conference**. During my first year here at Metro – 2009-2010 – I realized we had something very special going on here at this campus. I saw it in tenure and promotion documents and letters of recommendation for faculty to earn emeritus status; I read about it weekly in various news clips, @Metro, and The Metropolitan: Faculty across the entire College were engaged in research – serious, meaningful research – activities with their undergraduate students.



As I started to inquire about this wonderful phenomenon, I learned that Metro State was a member of the prestigious National Science Foundation Council on Undergraduate Research. Then I was invited to a variety of research showcases – Physics, Psychology, Biology and Chemistry, Aviation and Aerospace Science, and on and on the list goes. I knew we need to celebrate – to do more to recognize the faculty and the students engaged in these important projects.

Thanks to the leadership of AVP for Curriculum and Effectiveness, Dr. Sheila Thompson, and the Director of the Center for Applied Learning, Dr. Rhonda Eaker, we created two new positions using key faculty – Psychology Professor Pamela Ansborg and Earth and Atmospheric Sciences Professor Tom Davinroy – to coordinate and celebrate Metro State’s undergraduate research and creative activity successes.

Thanks to their creativity, hard work, and thoughtfulness we are now hosting our very own **1st Annual Metro State Undergraduate Research Conference**. The anticipation around this event has been breath taking: We had over 100 students pre-registered to participate in this event with nearly a week left to go for the due date. Now that’s impressive!

The work you will enjoy today generates so many mutual benefits it is amazing. The research literature about learning, retention, graduation, post-baccalaureate education and career pursuits all attribute significant student success to their engagement in undergraduate research. The research and creative activity generated from this work will contribute in meaningful ways to our community’s greater good by generating new knowledge, solving problems, seeking greater understanding, and artistically expressing a variety of emotions.

In the end, our students graduate with greater – and deserved – confidence in their ability to work independently, to think critically and creatively, and to engage meaningfully with the world around them. They leave this campus with pride in their talents and accomplishments. Metro State is enormously proud of them as well.

To everyone who has been part of this fabulous **first** for Metro State – Congratulations for jobs well done!

Vicki L. Golich, Ph.D.
Provost and Vice President for Academic and Student Affairs

ACKNOWLEDGEMENTS

We would like to extend our thanks and appreciation to the following offices and individuals for their contribution to the success of the conference.

All Moderators and Judges	Rachel Comfort	MSCD Student Activities
Amy Bechtum	McGraw Hill	MSCD Student Athletics
Bio-Rad	Scott Houck	MSCD Writing Center
Bio Tek Instruments, Inc.	MSCD Alumni Relations	Worth Publishers
Butterfly Pavilion	MSCD Honors Program	Shi-Kuei Wu and Ching Wu

And Metro State Applied Learning Center staff, with special thanks to Rhonda Eaker, Director; Frank Trujillo; and Louise Montoya.

Undergraduate Research Conference Taskforce

- Andrew Bonham (Chemistry)
- Bill Carnes (Management)
- Diane Davis (Math)
- Rachel Delaney (Art)
- Ramon Del Castillo (Chicana/o Studies)
- Amy Eckhert (Political Science)
- Scott Lubinski (Theatre)
- Bridget Murphy-Kelsey (Psychology)
- Jody Paul (Computer Sciences)
- Deanne Pytlinski (Art)
- Julie Reyes (Sociology)
- Maria Rey-López (Modern Languages)
- Kamran Sahami (Physics)
- Sheryl Zajdowicz (Biology)

The Chairs of each of the following sub-committees deserve special recognition for the many hours they generously spent working to create a successful conference for Metro State students.

Conference Promotion

- **Andrew Bonham (Chemistry), Chair**
- Alexis Karris, (Psychology)
- Linda Lockwood (Psychology)
- Ben Moritz (Honors Program)

Keynote Speaker

- Bethany Fleck (Psychology)
- Bridget Murphey-Kelsey (Psychology)
- Mark Mazurek (Biology)
- **Sheryl Zajdowicz (Biology), Chair**

Conference Awards

- **Scott Lubinski (Theater), Chair**
- Bill Henry (Psychology)
- Bridget Murphey-Kelsey (Psychology)
- María Rey-López (Modern Languages)
- Ben Moritz (Honors Program)
- Kamran Sahami (Physics)

Scheduling

- **Lesley Hathorn (Psychology), co-Chair**
- **Sheryl Zajdowicz (Biology), co-Chair**
- Lisa Badanes (Psychology)
- Bill Carnes (Management)
- Diane Davis (Mathematics)
- María Rey-López (Modern Languages)

Sponsors

- **Sheryl Zajdowicz (Biology), Chair**
- Hsiu-Ping Liu (Biology)
- Bissell Erin (Biology)
- Cynthia Church (Biology)
- Scott Lubinski (Theater)

PROGRAM - at - a - GLANCE

7:30 am - 2:00 pm	Conference Participant Check-in North Classroom (NC) Building - Atrium <i>Light Refreshments will be provided.</i>
8:45 am - 9:45 am	Conference Session I Poster Presentations - NC Building Atrium Oral Presentations - NC Building, Rooms: 1313, 1314, 1315, 1323, 1324, 1325, 1326
10:00 am - 11:00 am	Conference Session II Poster Presentations - NC Building Atrium Oral Presentations - NC Building, Rooms: 1313, 1314, 1315, 1323, 1324, 1325, 1326
11:15 am - 12:15 pm	Keynote Speaker: Dr. John Janovy, <i>Varner Professor Emeritus of Biological Sciences</i> <i>University of Nebraska-Lincoln</i> North Classroom Building, Room 1130
12:30 pm - 2:00 pm	Private Lunch for Presenters and Mentors Turnhalle, Tivoli Student Union
2:00 pm - 3:00 pm	Conference Session III Poster Presentations - NC Building Atrium Oral Presentations - NC Building, Rooms: 1314,1315, 1323, 1325, 1326
3:15 pm - 4:00 pm	Conference Session IV Oral Presentations (only) - NC Building, Rooms: 1315, 1325, 1326
4:00 pm - 4:30 pm	Social/Free Time while Judges Tally Scores <i>Participants are invited to gather in Turnhalle for light refreshments.</i>
4:30 pm - 5:00 pm	Awards Ceremony Turnhalle, Tivoli Student Union <i>Light refreshments will be provided.</i>

KEYNOTE PRESENTATION



Dr. John Janovy, Jr.

*Varner Professor Emeritus of Biological Sciences
University of Nebraska-Lincoln*

“I can do that!” – Reflections on the undergraduate research experience”

Dr. Janovy, Professor Emeritus in the School of Biological Sciences at the University of Nebraska-Lincoln, author of over 130 scientific journal articles and over a dozen books with titles that range from *On becoming a Biologist* to *The Ten Minute Ecologist* and *Foundations of Parasitology, 8th Edition*.

He is also the author of *Outwitting College Professors*, which is subtitled *A Practical Guide to Secrets of the System*. The book is intended to be somewhat subversive, but at the same time a true set of advice on how to maximize the value of your college education. "You're paying a bundle for that college experience, so you might as well get all, not just some, of the long term benefits".

Dr. Janovy writes: "Undergraduate students have worked in my lab, and with me in the field, since the summer of 1962. Often these young people were quite inexperienced, with no idea what they were really getting into with the decision to pursue a research project. But just as often, if not regularly, they quickly took possession of their projects while I stood back and watched, usually with total amazement, at the speed with which they became mature scientists, with transferable skills, and developed into leaders among their peers, actively seeking additional challenges. Few, if any, of their projects would have been considered “important” by the general public: no attempts to cure disease, solve global problems, or make money. Yet in the end, the very act of research, typically involving parasites, otherwise known as dumb, microscopic, and uncooperative animals, produced a transformation that could not have been accomplished by some prof lecturing from the front of a large auditorium. The main lessons that I’ve learned by watching these young people is that any university’s most valuable resources walk in the front doors by the thousands every year and the ultimate thrill of being an academic scholar is watching one of those thousands bring a project to closure. I’ll focus on a few of the more compelling stories, in the end commenting on what I have learned about my own business from being involved in undergraduate research”.

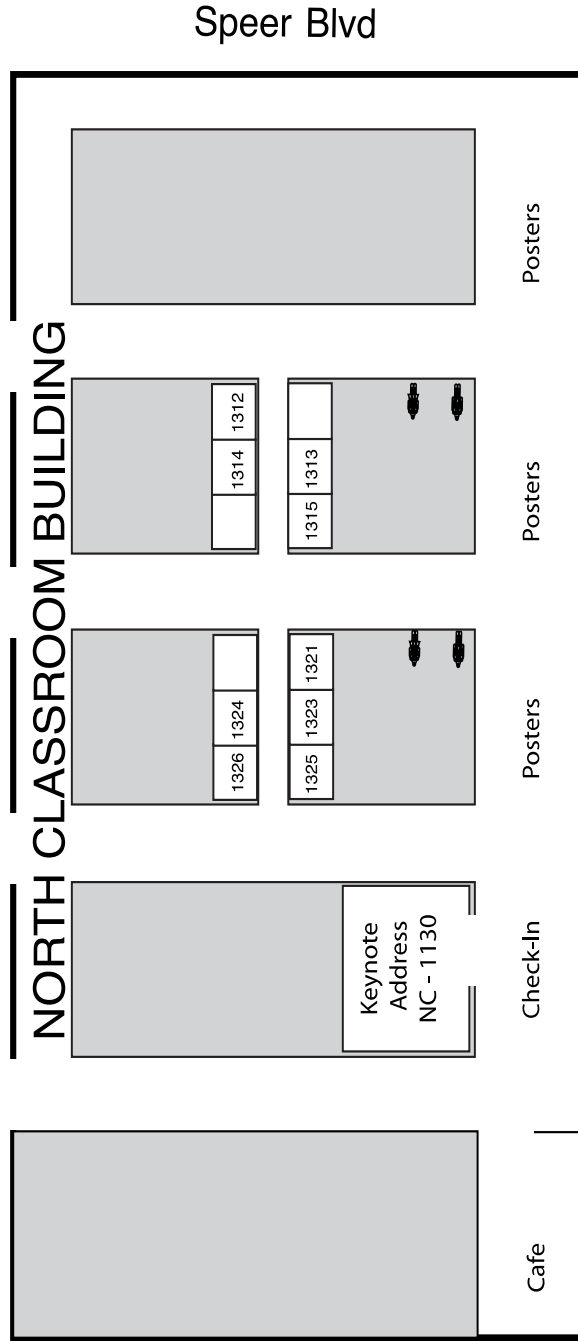
CONFERENCE MAP

METROPOLITAN STATE COLLEGE OF DENVER UNDERGRADUATE RESEARCH CONFERENCE APRIL 20, 2012



← To Tivoli Turnhalle

Larimer St.



Map of North Classroom Poster and Oral Presentation Locations

PROGRAM SCHEDULE

Oral Session I 8:45 am - 9:45 am

ROOM 1315
Social and Natural Sciences

8:45 - 9:00

Communication Relationships: Social Anxiety, Communication Channel Preference and Identification of Facial Expression

Christina E. Allard, *Psychology*

Faculty Mentor: Anne Weiher, *Psychology*

This study aims to investigate the relationships between social anxiety, communication medium preference and the ability to detect the emotion demonstrated by facial expressions. Individuals suffering from social anxiety show aversion to in-person communication, but anxiety and inhibition decrease when interaction is not face-to-face (Yen, J., et al, 2012). The ability to correctly assign an emotion to a facial expression also is hindered by social anxiety (Ball, T.M., et al, 2012). It was expected that a positive correlation would exist between social anxiety and preference for CMC (computer mediated communication), and negative correlation would exist between both social anxiety and preference for CMC with ability to detect facial expressions. Fourteen participants from MSCD responded to the Social Interaction Anxiety Scale, The Affect for Communication Channel Scale, and two differing facial expression tests. Using the Pearson correlation, the first hypothesis was supported: there is a strong relationship between social anxiety and the preference of CMC over in-person communication. The second hypothesis was not supported, and no evidence supported that ability to detect facial expressions is related to either social anxiety or communication medium preference.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:00 - 9:15

Macroscopic Heat-Alteration Attribute Analysis of Lithic Material and Interobserver Error

Jayson P. Gill, *Anthropology*

Faculty Mentor: Jon Kent, *Anthropology*

This paper tests the validity of macroscopic methods for determining heat-alteration in lithic materials. Experiments were designed and carried out in a manner that tested the multiple attributes that can be viewed macroscopically and to blind test the ability of researchers of different skill levels to make accurate determinations of heat-alteration. The question of which of the observed attributes are most successfully utilized in making correct observations is also addressed here. Macroscopic attribute changes have been found to be identifiable on three different material types used in this experiment and the ability of researchers to accurately make macroscopic determinations of heat alteration is shown here to be lacking. Amongst archaeologists there is currently a dependence on using macroscopic methods for determining heat-alteration in lithic assemblages. The 2010 research by Mourre et al is discussed here as an example of this and the problems that arise from this method. This paper is not meant to serve as an overarching model for the analysis of heat altered lithic material, or observer error rates, but rather to be used as a baseline for future testing and experimentation.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:15 - 9:30

Establishing a Difference: EEG Study of Multisensory Integration and Sensory Processing in Children

Alexander B. Howard, *Biology/Psychology*

Faculty Mentor: Randi Smith, *Psychology*

The ability to integrate multisensory information simultaneously is an important process for human behavior. Increasing numbers of children displaying sensory processing difficulties are seeking occupational therapy for problems with simple daily tasks such as getting dressed in the morning and following teacher instructions during school. Currently, limited research has been able to show a difference in neurological response to sensory stimuli between typically developing children and children with sensory processing disorder (SPD) in a lab setting. A sample of children seeking treatment was evaluated using a preliminary survey that excluded children with diagnoses ranging from ear infections to autism, children on medication that would interfere with stimulation reaction, and siblings of children with sensory processing disorder. Event-related potentials of sensory stimulation including auditory, somatosensory, tactile, visual, and an audiovisual combination paradigms are recorded using an EEG with 32 neural electrode sensors and 8 facial muscle electrodes. Results are currently pending but early lab data have been collected and analyzed from 2 typically developing children and 1 child with observed behavioral SPD symptoms. These results will be compared with previous findings of neural differences of the processing of sensory information in children. Research is being performed to demonstrate neural differences in children’s sensory-responsivity in an effort to increase the understanding of SPD.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:30 - 9:45

The Application of the Law of Armed Conflict to Cyberwar.

Ian T. Dehmel, *Political Science*

Faculty Mentor: Amy E. Eckert, *Political Science*

In recent years, the Internet has earned a reputation as a transformative technology, expanding the social arena and allowing speech to power from historically underrepresented parts of society. With the global expansion of a “wired” civil society advocating on a range of transnational issues, the legitimate political uses of the internet are fast becoming a source of heated debate. Scholarly discussion concerning the military and intelligence capabilities afforded, and vulnerabilities created by this evolving technology has been more circumspect. This paper examines instances of electronic attacks against state, military, and economic actors, and attempts to locate precedent for such modalities of conflict within existing international legal codes such as the United Nations Charter and customary international law. The paper then explores whether current international legal standards are adequate for addressing instances of cyber-attack. I conclude that the Law of Armed Conflict, as embodied in the U.N. Charter, lacks the necessary mechanisms to identify aggression in cyberspace, and thus could not offer useful guidance to policy-makers in the event of a disruptive cyber-attack.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session I 8:45 am - 9:45 am

ROOM 1323 *Social Sciences*

Oral Session I

8:45 - 9:00

Solar and Lunar Alignments at Chaco Canyon

Jeffrey A. Rattray, *Anthropology*

Faculty Mentor: David V. Hill, *Sociology, Anthropology, and Behavioral Sciences*

It has been proposed that many of the Great Houses in Chaco Canyon were intentionally constructed in such a way as to align with the rising, meridian and setting positions of the Sun or Moon at the extremes of their cycles. This project tests those claims by using satellite imagery to determine the azimuths of architectural features and compare them to the known azimuths of the rising and setting positions of the sun and moon on the horizon at the latitude of Chaco Canyon at these key times. The relationships between buildings aligned to the same solar/lunar event were then compared to see if a direct line between them reproduced the same azimuth. The hypothesized alignments were reproduced and verified to have a high degree of positional accuracy.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:00 - 9:15

How Finance and Institutions Globalize Economic Crises: the Thrift (S&L) Crisis and the Great Recession

Thomas A. P. Stephenson, *IDP - Political Science*

Faculty Mentor: Sheila Rucki, *Political Science*

The purpose of this paper is to explain why economic crises become global. This paper focuses on the role of institutions and financialization in global economic crisis. The idea for this paper comes from reading and observations about past economic crises. This paper compares and contrasts the Savings and Loan crisis and the "Great Recession" and explains why one goes global and the other does not. This phenomenon occurs due to two factors: financialization and policy failure. Financialization undermines policy through magnifying and spreading crises. The percentage of GDP that comes from Finance, Insurance, and Real Estate (FIRE) represents the extent to which an economy is "financialized". Using information from the OECD statistics site the paper found differences between the S&L Crisis and the Great Recession among the aspects of FIRE sector proportions and magnitudes of crisis. Using the percentage of GDP composed of the financial sector this paper has found several interesting things. The SNL crisis was not as severe, nor did it globalize like the Great Recession. The percentage of FIRE/GDP increased over time since the '80s. The financialized part of GDP corresponds with the direction of GDP growth. FIRE%GDP relates to GDP growth in lagging behind decreases and increases GDP responds to financialization before the FIRE sector decreases. The globalization and severity of economic crises depend upon the extent to which the world's major economies are financialized and the failure of institutional intervention. As financialization increases the scope and severity of economic crises will increase. With higher percentages of FIRE-to-GDP, institutions are less able to arrest crises. As our world more financialized more crises will occur and measures must be taken to prevent financial crises from occurring.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:15 - 9:30

LGB Stereotypes: Beliefs vs. Empirical Research

Jillian L. Sterns, *Psychology/Human Development*

Faculty Mentor: Anna Ropp, *Psychology*

This presentation explores a variety of stereotypes associated with LGB (lesbian, gay, and bisexual) individuals and their families. The specific stereotypes addressed in this presentation were collected from religious websites and a journal article by Lynn Wardle (2007) who argues against legalizing gay marriage. The central issues for discussion include 1) whether the LGB identity is a choice; 2) whether children with LGB parents are more likely to become gay; 3) whether those who identify as LGB are good parents; and 4) whether children of LGB individuals have more problems with social adjustment. Overall, based on a literature review, the information found on religious websites and Wardle (2007) was not supported by empirical data.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session I 8:45 am - 9:45 am

ROOM 1314
Social Sciences

8:45 - 9:00

Music With A Bad Rap: Lyrical Inspiration of Stereotype Activation in Children

Majken B. Berglund, *Psychology*

Faculty Mentor: Anna Ropp, *Psychology*

This presentation is a literature review that seeks to understand if automatic stereotype activation and application are created in children through exposure to negative stereotypes in Hip Hop and rap music. Research suggests that children, through social learning theory, model their behavior after peer examples and the media. Children form social categories to make sense of their world and form stereotypes automatically. When listening to music, children gauge emotional cues through the lyrics present in a song, and, in adolescence, music is used for identity formation and self-expression. Studies have shown that if adolescents are presented with Hip Hop imagery that includes negative stereotypes, they are likely to endorse those stereotypes themselves.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:00 - 9:15

Consent or Choice; Obstacles, Impossibilities and Alternatives to Shared Decision Making in Maternity Care

Carrie L. Hankins, *Women's Studies*

Faculty Mentor: Gerakina Arlene Sgoutas, *Women's Studies*

The goal of this project is to create an argument specifically for policymakers to show that while informed consent is the standard means of patient communication in maternity care, it is problematic if not impossible to truly implement in caring for women in the antepartum, intrapartum and postpartum periods. I will show how informed consent failure not only violates a woman's rights as a patient, but how it also increases poor outcomes and intervention. I will highlight the concept of informed choice as an alternative mode of communication between a woman and her caregiver; a concept that has long been implemented successfully in the Midwifery Model of Care proving better outcomes and satisfaction while lowering rates of unnecessary intervention and morbidity.

This project will first give background on informed consent as it came into being, how it is currently used in medicine and in the judicial system. It will then provide a critique on the current practice citing theoretical obstacles as well as poor outcomes resulting from it, specifically in regards to maternity care. This will be followed by an explanation of the alternative relational approach of informed choice and how it can overcome the problems faced by informed consent. Finally, a discussion of how the Midwifery Model of Care successfully implements this form of shared decision making. Examples of its successful use in various birth setting including new research into how direct entry out of hospital midwives create relationship and how this benefits the process of informed choice.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:15 - 9:30

Hollywood, the Lost Cause, and History

Patrick C. Gates, *History*

Faculty Mentor: Patricia Richard, *History*

Though the American Civil War itself ended in 1865, the conflict over how it should be remembered has continued until today, and movies have been one of the key weapons in this fight. Since the days of silent motion pictures, Hollywood has produced films that generally perpetuate one side of this debate: the side that advocates belief in the Myth of the Lost Cause. The Myth of the Lost Cause is a Pro-Southern view of the Civil War and Reconstruction that was conceived by Confederate sympathizers and veterans (such as E. A. Pollard and Jubal Early) just after the war ended. According to this ideology, the Civil War was unjustly waged by the Union, unfairly balanced in favor of the same, and caused by State's rights rather than fabricated racial issues. Examining the relationship between Hollywood and the Lost Cause has been done before, but only to a limited extent. This study goes to the length of examining a range of movies about the American Civil War and Reconstruction, noting that they often adopt the Lost Cause ideology, as well as display favoritism towards Confederates. At the same time, it evaluates the accuracy of several vital aspects of the Myth by comparing assertions of the Lost Cause ideology with historical records. The importance of doing this, is that it reveals whether bias has been displayed towards inaccurate views by Hollywood filmmakers. This study could easily be taken further, and expanded to discuss literature as well as film (and address additional, specific films). As it stands, however, its purpose is to evaluate the validity of key tenets of the Myth of the Lost Cause and to investigate whether Hollywood has a preference for its tenets.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:30 - 9:45

The Development of Prejudice in Children

Tandis Hashemi, *Psychology*

Faculty Mentor: Anna Ropp, *Psychology*

Where does prejudice come from and how does it develop in children? This presentation discusses the process of categorization and the development of prejudice in children and the different theories behind the topic. Prejudice develops in children at a very young age; some theories indicate that the development comes from social experience and others argue that it is an innate attitude. Amongst the many different theories behind the development of prejudice in children, this presentation will cover social learning theory and cognitive developmental theory. The social learning theory suggests that children develop prejudice from learning through the environment around them, and observing others. The cognitive developmental theory suggests that the development of prejudice is correlated to how children think of social groups and their limitations of cognitive abilities. The presentation will conclude by introducing a theory which explains prejudice development in children by incorporating the influence of the environment as well as the child's cognitive abilities.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session I 8:45 am - 9:45 am

ROOM 1326

Business, Education, and Humanities

8:45 - 9:00

Changes in Unintentional Sexual Harassment

Keith T. Crowe, *Business Management*

Faculty Mentor: Madison Holloway, *Business Management*

The social and legal aspects of the American culture are shifting. Technology is becoming more ever present in daily life, causing a mixing of work and personal lives on a scale never before seen. The outcomes of new social media and communication technologies have led to increases in productivity and decreased response times, but they come at a cost. Electronic social networking has helped to drive these changes and uses both home and work life to do so. However, activities which are legal and acceptable in the private domain are now crossing into the work place leading to actual and possible instances of sexual harassment.

Sexual harassment law is also changing, bringing broader interpretations of behaviors that contribute to a hostile work environment which warrant severe consequences. These changes are drifting into what is termed as unintentional sexual harassment. This paper explores these changes, proposes a definition of unintentional sexual harassment, examines generational norm changes and creates a set of guidelines to help prevent unintentional harassment incidents. The guideline changes are as follows:

1. Understand what unintentional sexual harassment is.
2. Be wary of mixing the use of electronic devices between work and home.
3. Before engaging in any potentially harassing activity, stop and think.
4. Remember that your digital footprint never goes away.
5. Realize the differences in acceptable behavior in different settings.

Continued on next page.

6. Be aware that many activities gaining acceptance can be harassing.
7. Understand that perceptions of behavior can vary from person to person.
8. Be sensitive to coworkers "hot buttons."
9. Remember that the consequences affect both individuals.
10. If you aren't sure if it could be unintentional sexual harassment, don't do it.

In an individual's private domain, there are many acceptable behaviors, hobbies, and practices. They are completely legal in the individual's private domain. The difficulty for the individual is to ensure that these activities do not exit the private domain. They feel that what they do in their own domain, on their own time, is their own business. This paper will delve into this attitude and the dangers it can present.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:00 - 9:15

ERP POST-IMPLEMENTATION TRAINING PROGRAM ASSESSMENT Identifying Key Factors that Improve Cognitive Outcomes

Jason Woodfork, *Business Management*

Faculty Mentor: Biswadip Ghosh, *CIS*

Enterprise Resource Planning (ERP) systems, such as SAP, feature a rich set of integrated business applications. To maximize the long term benefits from ERP implementations, organizations need to support end users with effective training during the post-implementation phase. Training programs that build the end-user's cognitive skills and business procedural knowledge are particularly important as it allows the users to understand the broader scope of the ERP system implementation and the strong integration of multiple business processes and functions. Given the high cost and variety of ERP training programs, there is a need to create validated models to assess content and benefits of such training programs. Using a field study of a collaborative, team-based training program with the ERPSim simulation tool, this paper develops and validates a fuzzy logic model to assess cognitive outcomes. The study finds that training team characteristics, particularly heterogeneity and cooperation, are most important in achieving higher levels of cognitive outcome. The results of the study imply that for ERP implementation success, the end-users must be given suitable training programs that allow them to share and integrate cross functional knowledge. Moreover, the success of such training programs needs to be periodically measured to assess cognitive outcomes.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:15 - 9:30

Undergraduate Teaching Assistant Interns in the First Year Writing Classroom: What Do the Students Think?

Heather L. Egeland, *English*

Faculty Mentor: Luis B. Rivas, *English*

This paper will address the benefits of including Teaching Assistant Interns in the First Year Writing (FYW) classroom. The purpose of employing Teaching Assistant Interns was to provide additional support for student understanding of composition theory in the FYW classroom. Anonymous student survey responses will be shared regarding the effectiveness of the Teaching Assistant Interns, as well as implications for success should the practice of including Undergraduate Teaching Assistant Interns continue.

Presentation Type: Other

Oral Session I 8:45 am - 9:45 am

ROOM 1313 *Education and Arts*

8:45 - 9:00

Testimonio of a Young Chicano

Vincent J. Lucero, *Chicano Studies w/ K-6 Elementary Licensure*

Faculty Mentor: Adrianna Nieto, *Chicano Studies*

English Only laws and bills have been an issue in Colorado's history since the Bilingual Education act passed in the United States public school system. With the influx of immigrants and those who were forced to assimilate with the American culture, the Chicano people have been the victim of losing part of their culture due to laws like English Only. As a young Chicano, I have been a victim of losing my language of my heritage because of racism and laws passed by the dominate culture. I see the use of English only to be a way to erradicate Bilingual Education and force the people again to assimilate with the American culture by not beign able to speak their native tounge. I am living proof of how the dominant culture has forced generation of my people to speak english and be weary of speaking the native language of the people who were here in Colorado before manifest destiny.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:00 - 9:15

The Struggle for Bilingual Education in Denver Public Schools

Amber A. Gonzalez, *History/Chicano Studies*

Faculty Mentor: Adriana Neito, *Chicano Studies*

Bilingual Education, a phrase many public educators will no longer use in their schools or classrooms for fear of being labeled anti-English. What led to this trend? Why did Denver Public Schools abandon Bilingual Education without fully implementing a true Two-Way Bilingual Model? Why are Spanish speaking students forced to abandon the mother tongue for monolingual English? Why did the media perpetuate misinformation regarding Bilingual Education? This paper hopes to answer those questions by looking at the formation of Bilingual Education in the United States and in the Denver Public Schools, the theories of second language acquisition, the backlash against Bilingual Education created by Amendment 31 in Colorado, and the deathblow led by No Child Left Behind to the Bilingual Education Act.

A court order by Federal Judge Matsch's began the Bilingual Education controversy of how to best educate English Language Learners (ELL) in Denver Public Schools. Yet, DPS never truly initiated a Two-Way Bilingual Education program. In the mid-1990s, the U.S. Department of Education and U.S. Department of Justice cited the district for not following Judge Matsch order from 1983. The School Board, in turn, pushed and pulled against the Federal Departments to create the English Language Acquisition Program where students would exit after only three years of mixed Spanish language and English language instruction into mainstream classrooms with English as a Second Language pullout for up to five years. Anti-Bilingual Education advocates purposefully created misinformation and used the media to perpetuate their anti-Bilingual messages through the 1990s into the 2000s, which led to the development and establishment of the Denver Public Schools' English Language Acquisition Program over a true Two-Way Bilingual Model. This paper will delve into the issues and promises of Bilingual Education in the Denver Public Schools to educate English Language Learners.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:15 - 9:30

Blind Spot: Advocate for Access

Jenny Goring, Christina Morales, Ryan Keeney, Devon McKenzie, Jamie Howe, Jessica Kanzenbach;
Art

Faculty Mentor: Lisa M. Abendroth, *Communication Design*

Blind Spot: Advocate for Access is a collaboration between Metropolitan State College of Denver Communication Design students and participants from Colorado Center for the Blind. We believe that accessibility for people who are blind is a human right. Blind Spot spreads accessibility awareness through a multi-modal visual and tactile campaign that promotes dialogue and discussion through design. Championed by people who are blind, graphics called "spots" direct attention to environmental, communication and technological obstacles that are not fully accessible and serve as a call to action to visit an integrated website—a source for education, advocacy and empowerment. Through our interaction with the students of the Colorado Center for the Blind, the issue of accessibility was a recurring theme. We chose to create an advocacy campaign for accessibility that became our central research focus—specifically accessibility in the urban environment. The goal of the Blind Spot campaign is to stimulate interaction between blind and sighted communities for the purpose of advocating equal access to communication and information within our mutual, shared and designed environments. The challenge includes educating a diverse group of constituents. The solution includes a yet-to-be-launched website (blindspotdenver.org) that documents accessibility and inaccessible features, serving to educate government officials, business owners and the public. The site is supported by a robust advocacy campaign that highlights awareness in the urban landscape and promotes dialogue.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:30 - 9:45

Becoming Citation Machines: How Writing Center Tutors Utilize Modeling to Help Students Avoid Plagiarism

Brittany Leddy, *English*

Faculty Mentor: Elizabeth Kleinfeld, *English*

This presentation will explore how tutors in the Metropolitan State College of Denver Writing Center utilize modeling, a step in a scaffolding based pedagogy, in order to provide examples of proper source citation to student tutees. Modeling is defined as “a form of demonstration followed by imitation,” while scaffolding is the “support of students so that they can cope with the task situation. The strategy also entails the gradual withdrawal of teacher from the process, when the students can manage on their own” (Dennen, 2007, p. 814- 816). Primary qualitative data was collected in the forms of tutoring session observations and participant research. In order to demonstrate proper citation, tutors modeled the use of a style guide or reference handbook in order to locate a graphic example of the citation format that the student could then use independently of tutoring. Through the use of this strategy, tutors created autonomous learners who could independently locate, and subsequently properly format, citations when they were needed in the student’s writing.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session I 8:45 am - 9:45 am

ROOM 1325 *Engineering & Technology*

8:45 - 9:00

STK Airspace Flight Simulation for Denver International Airport

Nick S. Schrand, Magens E. Orman, Chukwuemeka Akotaobi, Yee Tai; *Aviation Technology*

Faculty Mentor: Jose M. Lopez, *Aerospace*

The purpose of this study is to simulate all of the scheduled arrivals and departures at and around DIA over a 24 hour period for flow and efficiency analysis. In the future we hope to use this software to account for changing variables like runways, new aircraft, changing flight patterns and emergency procedures. This program, once developed could be used for future research and training in the airspace around DIA, along with the Denver-Metro Area. The finished program would integrate efficiency flow in the urban airspace while calculating changes in air traffic around DIA, which can again be caused by numerous factors. Currently we have a working simulation with hundreds of flights moving in and around simulated air space over DIA arriving and departing on accurate runways. These flights can later be altered to better suit the needs of someone using the program. Our focus now is basic flow patterns of air traffic in both volume and movements around the airport. This is crucial to the creation of an accurate flight simulator. We have accomplished this through the use of STK and Matlab.

Presentation Type: Other

9:00 - 9:15

Asteriod 2005 YU55

Yee K. Tai, *Aerospace Science*

Faculty Mentor: Jose M. Lopez, *Aerospace Science*

The study of my project is to track the Near Earth Asteroid 2005 YU55 with a satellite by using the software Astrogator in STK (Satellite Tool Kit). STK is physics-based computer software from AGI (Analytical Graphic Inc). Astrogator allows for mission planning and the analysis of orbits and spacecraft trajectory. Astrogator will help us simply the concept of astronavigation and calculation of forces between all the objects that are involves. For example, simple gravity, non-spherical gravity, third-body gravity, atmospheric drag, general relativity and others. By utilizing Astrogator, it will be possible to model a theoretical mission of creating a Flyby 2005 YU55 and using a satellite to follow the asteroid 2005 YU55. The Flyby mission will be a continuing project of fellow student, Alex McKenzie. The following mission will be simulated through STK with a launch, a couple of orbit determinations and to observe the asteroid. The goal of this project is to learn the concept of astronavigation, the orbit determination and integration into some other types of similar scenario. This scenario was able to show that the six orbital elements of the satellite and the asteroid.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:15 - 9:30

RD/D project for a local company

Brian Grant, Brett Hoag, Kham Xiong; *Mechanical Engineering Technology*

Faculty Mentor: Mingli He, *Engineering Technology*

Swisslog is a global supplier of integrated logistics solutions with a comprehensive portfolio of services. These services range from building complex warehouses and distribution centers to in-house logistics solutions for hospitals. Customers in more than 50 countries around the world rely on our decades of experience in planning and implementing integrated logistics solutions.

The company has been supporting Metro State Engineering Technology Department and Industrial Design Department for more than four years in providing RD&D projects for the junior and senior classes. Our student teams will perform proof of concept solutions to the selected project proposed by the company.

One of the 2011 – 2012 projects is Concept for High Capacity Station, which states: Swisslog's standard recessed station has a receive bin capacity of 3-4 carriers with an additional carrier causing overload sensor to set, depending on how carriers land and orient in the bin. Typical approach to increasing capacity is simply to provide a larger bin. This project would focus on ways of receiving carriers and organizing in the bin or receive area to better utilize the space and allow for ergonomic retrieval of carriers. The concepts should work within the existing station envelope, but rearranging of form and functional components is encouraged. Ideally the concepts would be passive, but this is not a requirement. Along with improved function, the look and feel of station should be redesigned to integrate the receive area concept and also to update what is now a form driven by traditional sheet metal processes. Shape development and materials exploration is encouraged. The company would not expect a proof of concept to include all of the above due to scope.

Deliverables could include:

- Fall Semester - Project proposal with project plan, budget and timeline. Also, demonstration of concept generation including sketches, renderings, CAD models and physical models as appropriate. This should be approached as is the team is selling their idea and proposal to prospective clients.
- Spring Semester – Presentation of physical proof of concept. This only needs to include the functional part of the station bin area. The aesthetic development and design can be presented with renderings, models etc.; any team is welcome to include that but not required as the ID students will be off the project for spring '11.

A team of mechanical engineering technology students was form undertake the task. In the fall of 2011, a proposal was submitted to the company with the intention to finish the proof of concept project by the end of spring 2012. This presentation will report the findings and current status of the current team.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:30 - 9:45

Design, Construction and Testing of Solar Furnace Design

Cary Caruthers, Mitchel Schroeder, Rebekah Gallegos, Megan Love; *Mechanical Engineering Technology*

Faculty Mentor: Aaron Brown, *Mechanical Engineering Technology*

The emerging field of alternative energy provides opportunities to develop new technologies to meet societal needs through a different paradigm. In this particular case motivation has been found to build a sustainable technology that alleviates energy burdens for marginalized communities who live in substandard housing in cold environments. In particular it was recognized that a large number of the Crow Reservation in Montana are currently burdened with energy bills to heat the government provided mobile homes not suitable for the harsh environment they are living in. This project aims to provide a technology that could potentially be used for people like this community to ease their situation through the implementation of an affordable and simple solar design aimed to convert UV radiation from the sun into heat that can be harnessed and applied directly to the living space of the fore mentioned mobile homes. The result to this challenge is a Solar Furnace design built from simple materials (i.e. recycled aluminum cans, lumbar and a clear polycarbonate screen) . The basic design incorporates an array of "solar tubes" which run from an inlet manifold to an outlet manifold and take advantage of the thermal material properties of aluminum and the greenhouse effect to warm air that passes through these tubes which will be fed into the living space through an outlet at the top mixing manifold. Measurements have shown an astounding temperature increase from the inlet to the outlet showing this simple technology to be very effective and a viable solution to the presented problem.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session I 8:45 am - 9:45 am

ROOM 1324

Natural Sciences and Mathematics

8:45 - 9:00

Desertification in the Denver Basin

Mary Katrina Andrus, *Environmental Science, Water Quality*

Faculty Mentor: Tom Davinroy, *Land Use*

The purpose of this study is to determine if the long-term drought being experienced in the Denver Basin is in fact a sign of possible climate change or desertification of the Denver area. This study uses data from approximately the past 100 years in the fields of precipitation, streamflow, temperature, snowpack, and population to observe possible trends indicating large-scale water loss. ArcGIS is also utilized to conduct a visual, side-by-side comparison of the change in water availability between the years of 1911 and 2011, taking careful consideration of the effect of population growth on demand and ground permeability. Preliminary analysis indicates that the Denver Basin is experiencing the effects of climate change on its water system, but has not entered the beginning stages of a true desertification.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:00 - 9:15

Investigating Neurogenesis with Biosensors Directed at Key Transcription Factors

Matthew R. Stoddard, *Biology*

Faculty Mentor: Andrew Bonham, *Chemistry*

Neurogenesis, the process by which neural stem and progenitor cells turn into functional neurons, is heavily regulated. Much of this regulation comes from the interplay of transcription factor proteins that direct the expression of key genes. Two of these transcription factors are the proteins Ascl1 and Lmo4 which regulate genes involved in neuronal commitment and the generation of autonomic neurons among other important genes in development of nervous cells. Ascl1 and Lmo4 mutants are known to be involved in human diseases including human neuroblastomas and small cell lung cancers. Deletion of either gene has resulted in death when tested in mouse models. Many details of the roles Ascl1 and Lmo4 play in neurogenesis, human disease, and how they interact with one another are not fully understood. To address these outstanding questions, we are generating sensitive, DNA-based biosensors for the quantitative detection of the DNA-binding activity of these significant proteins. These sensors will be used with recombinantly expressed and purified constructs of human Ascl1 and Lmo4, with the goal of determining the effect of protein-protein interaction on their regulatory activity.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:15 - 9:30

Life and Death in *Xenopus Laevis* Oocytes

Aviva A. Bulow, Trevor D. Hostetter; *Biology and Chemistry*

Faculty Mentor: Douglas W. Petcoff, *Biology*

Xenopus laevis oocytes, once matured, die apoptotically. While it is known that sphingolipids play a role in these processes, their role is not very well understood. Oocytes are generally matured by treating them with progesterone (PG), after which they quickly undergo apoptosis (within 24 hours). These effects appear to be mimicked by treatment with neutral sphingomyelinase (nSMase). We use morphological changes and western blotting to observe the effects of these two treatments on the oocytes. We note that both appear to act upstream of the kinase JNK. During maturation, JNK activates the pro-apoptotic Bad protein by phosphorylating it on its serine residue at position 128 on its amino acid chain (S128). We have confirmed that inactivation of JNK slows down phosphorylation of Bad at S128, which delays induction of apoptosis. We also note that both PG- and nSMase-stimulated cells do not appear to mature or die apoptotically in the presence of glutathione, indicating that these processes are oxidation dependent. We would like to investigate this further, and are hoping that our increased understanding of the maturation and death processes will help us develop an in vitro maturation/fertilization protocol for *X. laevis* oocytes. No reliable in vitro maturation/fertilization protocol exists, and establishing one would prove very useful to *Xenopus* researchers.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

9:30 - 9:45

Development of Algorithms for the Automated Generation of Sensitive Transcription Factor Bio-Sensors

Jody Stephens, *Mathematical Science*

Faculty Mentor: Andrew Bonham, *Chemistry*

Human transcription factors are proteins that play an important role in the regulation of both normal development and in many diseases. Recent advances in bio-sensors have led to a fluorescent bio-sensor design that uses short sequences of DNA as the sensing element. Ideally, these short sequences fold into two different shapes, with equal numbers of both in solution. These shapes are the same for each of the thousands of different transcription factors. However, the sequence of DNA that generates these shapes is different for each transcription factor. Determining these sequences by hand is unwieldy; therefore, to enable wider use of these bio-sensors an automated way of generating a sequence specific to a transcription factor is necessary. This algorithm needs to efficiently explore the entire search space for candidate solutions while minimizing false negatives and it needs to be able to determine which of these candidate solutions is best. Here, we will demonstrate a partial solution we have implemented using a backtracking tree traversal of the search space and discuss our efforts to refine the algorithm to work on larger sequences and to distinguish between the many candidates it finds. Ultimately, this computational tool will enable the rapid, efficient, and accurate design of bio-sensors that will aid in bio-medical diagnostics and research efforts.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Poster Session I 8:45 am - 9:45 am

NC BUILDING ATRIUM

#1

22 FEB 2012 Chinook Event at Boulder, CO

Jeff D. Auger, *Meteorology*

Faculty Mentor: Sam Ng, *Meteorology*

Along the front range of the Rocky Mountains, downslope wind storms have occurred frequently. There are two types of windstorms that can bring wind speed > 60 miles per hour (MPH). These infamous windstorms are known as Chinooks and Boras. Boras peak in occurrence during the spring and fall seasons, bringing cold air down the leeward side of the mountains. While Chinooks occur frequently during the cold months, bringing mild temperature conditions across the Front Range.

On February 22, 2012, a strong Chinook event took place over Boulder, CO. Storm reports cited damages ranging from air hanger roofs being blown off at the Broomfield airport to tipping large trucks and snapping trees along the foothill communities. This event brought temperatures in the high-50s around the midnight hours. The most damage occurred closest to the front range although gusty conditions and mild temperatures were observed as far east as the Denver International Airport.

Presentation Type: Poster Presentation

#2

Using SSR to Motivate Students to Become Lifelong Readers

Jennifer D. Barstow, *English/Secondary Education*

Faculty Mentor: Gloria Eastman, *English*

In this era of high stakes testing there is no doubt that teachers and parents alike want their students to become more motivated readers. Individuals who read are better rounded and have greater background knowledge to engage in everyday conversations. While the benefits of reading are apparent it is the difficulty that teachers and parents have motivating students to become avid readers outside the classroom that is the biggest concern.

Sustained silent reading or SSR is a nationwide practice that can be seen in classrooms throughout the country, however, many times SSR does not help motivate students to read leisurely. Students use SSR time to catch up on other homework or talk to their classmates about subjects unrelated to reading. Motivational strategies such as teacher role models, peer recommendations, and choice selection of genre specific books can help students become more enthusiastic about reading for pleasure.

This study will show, through in depth research, motivational approaches that can be used concurrently with SSR time in the classroom and will ultimately lead students to become leisure readers outside of school. By providing motivational strategies to classroom SSR time, students will ultimately be able to choose books that are enjoyable for them. When reading becomes enjoyable it leads to more reading which eventually will lead to better readers.

Presentation Type: Poster Presentation

#3

The Use of Game Systems to Positively Affect Student Motivation

Grant A. Bathe, *English*

Faculty Mentor: Gloria Eastman, *English*

Educators are always looking for new methodologies that will allow them to motivate and entice students into learning. Gamification, the application of video game based structures, rules, and reward systems into non-game contexts have become an area that several educational researchers have become increasingly interested in. With the hope that game-based structures will help to positively affect student motivation and authentically present the content educators hope to teach, different styles of applying games into the classroom have emerged. One such style seeks to center the classroom on a full video game, with lessons and skills embedded within the game itself. The other seeks to adapt the risk/reward structure present in most successful games in tandem with current educational delivery systems. The objective of this project was to gather the research done in these two areas with an eye toward practical application in the typical public high school setting. With this in mind, two studies serve as the exemplars of the two styles of gamification: one on the adaptation of a popular real-time strategy game into the American History curriculum, and the other discussing the benefits of using an experience point based grade system. In this endeavor, the data suggests that the adaptation of risk/reward structures strengthen our classrooms while the evidence for integrating video games into the classroom has proven, at best, inconclusive. Furthermore, while the adaptation of game systems into the live classroom has only been theoretically considered, this research shows that through a critical examination of video games that the cyclical nature of motivation, will, and action can be further understood and applied to the classroom environment.

Presentation Type: Poster Presentation

#4

Analyses and Determination of Caffeine and Caffeine Food Products using UV-Vis, FT-IR, GCMS, and HPLC

Peter T. Bucani, *Chemistry*

Faculty Mentor: Michael B. Jacobs, *Chemistry*

Caffeine is a common organic substance present in tea, coffee, and other caffeine containing food products. This analysis of caffeine involves the following instruments: ultraviolet-visible spectrophotometer (UV-Vis), infrared spectrometer (FT-IR), gas chromatography-mass spectrometer (GCMS), and high-performance liquid chromatography (HPLC). UV-Vis was used for the determination of caffeine in the sample of interest. FT-IR was used to identify the structure of caffeine. GCMS and HPLC were used to detect the presence of caffeine and quantify the amount of caffeine present in the samples. These instruments are common in most undergraduate laboratories. The results and information presented herein can be used as a paradigm for caffeine analysis in most undergraduate laboratories.

Presentation Type: Poster Presentation

#5

The Role of ENSO in Brazilian Droughts

Meredith Dahlstrom, *Meteorology*

Faculty Mentor: Richard Wagner, *EAS/Meteorology*

The South American country of Brazil is home to two of the largest rainforests on earth. The Amazon Rainforest and the lesser known Atlantic Rainforest make up 40% of the world's remaining rainforests. The Amazon Rainforest Basin is the largest rainforest on the earth, covering approximately 8.4 billion acres in Brazil alone. It has the most bio-diverse flora and fauna in the world, and is home to millions of species of insects and animals. One fifth of the world's fresh water is found in the Amazon Basin. The Brazilian Rainforests alone filter more than 20% of the carbon dioxide globally. Because of Brazil's heritage rainforests, the country should be considered a key player in the fight against global warming.

In recent years the Amazon Basin has experienced two major droughts. During drought years, the basin emits upward of five times the amount of carbon dioxide that it normally absorbs. Rivers dry up completely, trees die, and the forest has a very hard time recovering.

The purpose of this research is to explore the relationship between drought years and El Nino Southern Oscillation (ENSO). Additionally, current research shows that ENSO is sensitive to the Pacific Decadal Oscillation (PDO), which will also be examined for correlations. ENSO years are highly predictable (and to a lesser extent PDO years) and could be used as an indicator for the onset of drought. If droughts in the Amazon Basin could be predicted, there may be a chance of drought mitigation.

Presentation Type: Poster Presentation

#6

Synthesis of Three 3,6-dipyridalpyridazines Adapted for Undergraduate Organic Chemistry Laboratory

Nicole Dunki, Shanna Finch; *Biology*

Faculty Mentor: Susan Schelble, *Chemistry*

This experiment has previously been conducted on a micro scale; however, many undergraduate organic chemistry laboratories do not have the micro equipment available. Therefore, the synthesis of 3,6-di(2-pyridyl)pyridazine, 3,6-di(3-pyridyl)pyridazine, and 3,6-di(4-pyridyl)pyridazine has been adapted for instrumentation and glassware available in most undergraduate laboratories. Synthesis utilizing 2-, 3-, and 4-cyanopyridine with sulfur, ethanol, and heat was compared to synthesis without sulfur. The reaction with sulfur was significantly accelerated; however, it produces an undesirable sulfur-containing byproduct that is exceptionally difficult to separate from the compound of interest. The unusual in-sequence Diels-Alder and retro-Diels-Alder mechanism require addition of norbornadiene and produce cyclopentadiene as a byproduct. This experiment allows undergraduate students to perform a multi-step synthesis involving a unique reaction mechanism that is evidenced by interesting color changes.

Presentation Type: Poster Presentation

#7

Food preference in the Denver urban fox squirrel (*Sciurus niger*)

Clare Ennis, Cory Courtney; *Biology*

Faculty Mentor: Jennifer Gagliardi-Seeley, *Biology*

Choosing the correct food type can increase a mammal's fitness, especially going into the winter months. In fox squirrels (*Sciurus niger*), preferences of three nutritionally different foods were compared between two Denver urban park populations during October. Male and female squirrels of varying maturity showed preference for high fat content, nutrient-rich walnuts over high carbohydrate strawberries and nutritionally poor corn. There was no significant difference in food type preference between the two populations. Additionally, there was no significant difference in total walnut selection between males and females. Urban fox squirrels of both populations demonstrated the following three food-related behaviors: stay and eat; select and run; select and bury. Urban fox squirrel preference for walnuts in October may relate to its storability and high efficiency of metabolism.

Presentation Type: Poster Presentation

#8

Looking at the Effects of Max Protein and DNA-binding Using Sensitive DNA Biosensors

Amanda L. Faux, *Chemistry*

Faculty Mentor: Andrew Bonham, *Chemistry*

Interactions between proteins play key roles in cellular regulation and activity. This is primarily evident in the many protein-protein binding events that direct and control the process of transcription that regulates gene expression in the cell. To better understand the roles of these protein interactions on DNA-binding activity, we are developing sensitive, DNA-based bio-sensors for quantitative measurement of their effects on DNA-protein binding. Specifically, we will be using the a recombinantly expressed and purified form of the basic helix-loop-helix transcription factor Max, which has protein-protein interactions with a variety of protein partners, to investigate changes in DNA binding specificity and affinity.

Presentation Type: Poster Presentation

#9

Antibacterial Activities of Copper, Silver and Carbon Nanoparticles in Sock Fabric

Yantnew G. Gete, Richard H. Lohaus; *Biology and Chemistry*

Faculty Mentor: Rosemarie D. Walker, *Chemistry*

Advances in padding fabrics with nanoparticles to inhibit bacterial growth have led to recent development and marketing of copper, silver, and carbon antibacterial clothing for consumers. We examined the inhibitory effects of swatches of copper, silver and carbon impregnated socks on cultures of gram-negative *Escherichia coli* and gram-positive *Staphylococcus aureus* and *Staphylococcus epidermidis* in liquid broth and on agar plates. Previous experiments in this lab have shown that carbon swatches produced no inhibition, copper and silver swatches demonstrated marked inhibition, depending on fabric mass. *E. coli* exhibited more inhibition than *S. aureus* with silver and copper. Concentration of copper, silver and carbon ions resulting from aqueous interaction with nanoparticles was quantified using ICP-MS through repeated rinses using a shaker bath, and bacterial counts were assessed through plate-counting and spectrophotometry. Further investigations will explore anti fungicidal efficacy of both copper and silver nanoparticle impregnated fabric.

Presentation Type: Poster Presentation

#10

Investigation of SAK_0465, a Fur-homologue, in *Streptococcus agalactiae*Alyssa Guidry, *Biology***Faculty Mentor:** Sheryl Zajdowicz, *Biology*

Metals such as iron, zinc, and manganese are essential for bacterial survival. Despite the importance of these metals, they are toxic at high concentrations. As such, five primary families of metal-dependent transcriptional regulators, which include Fur, NikR, DtxR, ArsR, and MerR tightly control metal homeostasis in bacteria. While metal homeostasis has been extensively studied in a variety of bacterial pathogens, including numerous streptococcal species, there is limited information with respect to regulation of metal uptake in *Streptococcus agalactiae*, the leading cause of neonatal meningitis. In silico analysis of the genome of *S. agalactiae* identified a gene (SAK_0465) that has homology to fur. The ultimate goal of this project is to study the regulatory effect of SAK_0465 on the expression genes having products predicted to be involved in iron uptake or oxidative stress response. Toward this end, we are utilizing a reporter system in *E. coli*. We have PCR amplified SAK_0465, cloned it into the replicative vector pWSK29, and transformed it into *E. coli*, generating a SAK_0465+ strain. We will clone promoter regions for known iron uptake genes (*fhuD* & *fhuG*) upstream of a *lacZ* reporter gene in a pSPZ expression vector. These recombinant plasmids will be transformed into SAK_0465+ and SAK_0465- of *E. coli*. We will analyze these strains for expression of *lacZ* in cultures grown under high and low iron conditions. We predict that SAK_0465 will repress expression of *fhuD* and *fhuG* under high iron conditions.

Presentation Type: Poster Presentation

#11

Gender differences in eyewitness testimonyMi Huang, *Psychology***Faculty Mentor:** Chad Mortensen, *Psychology*

The purpose of this study is to examine gender differences in the accuracy of eyewitness testimony. Learning about gender differences can help improve our understanding of such testimony. This study examined gender differences for memory of context versus personal descriptions. It did so by comparing male and female recall of a video displaying a theft. It also examined gender differences in short-term and long-term memories by either having the participants to identify the suspects immediately after the watching the video or after a 5-minute delay.

This study found that although female eyewitnesses wrote marginally more details than male eyewitnesses in the short-term condition, male eyewitnesses exhibited a trend to have higher accuracy in identifying the suspect than female eyewitnesses. All male eyewitnesses correctly identified the suspect while only 40% of female eyewitnesses did. Female eyewitnesses also exhibited a trend to make more errors in describing the physical characteristics of the suspect. These patterns of results were not found in the long-term condition.

Presentation Type: Poster Presentation

#13

Is Male mate choice is equally important as female mate choice in the monogamous, biparental Convict Cichlid (*Amatitlania nigrofasciata*)?

Ashley N. Jostes, Jessica Quinn, Jennifer Pluta, Melissa Carlile, Melissa Kyer; *Biology*

Faculty Mentor: Jennifer Gagliardi-Seeley, *Biology*

In many species, choosing a high-quality mate or a high-quality breeding site can increase one's reproductive success. Previously, we set out to determine whether female mate choice in convict cichlids (*Amatitlania nigrofasciata*) was based on mate quality or breeding site quality. We created 3 compartments in a tank and placed a male in each outer compartment, leaving the center compartment as a neutral. Our experimental design isolated the males in their compartments with dividers that had holes large enough for the smaller female to swim to each compartment. In the experimental group, only the small male received a breeding site. In the controls, the males were of equal size and one male was randomly given a breeding site. We were unable to conclude anything from this experiment, because most of the females stayed in the neutral compartment; thus, no choice was made. This led us to investigate whether male choice is equally important as female choice. Since convict cichlids (*Amatitlania nigrofasciata*) are serially monogamous and biparental, it is quite possible that both male and female choice is important. We are repeating the above experiment with an addition of another female; thus, there will be two isolated males and two free-swimming females in each tank. We hypothesize that pair-bond formation will occur more often than the previous experiment since both males and females will be involved in the mate choice process.

Presentation Type: Poster Presentation

#14

Reading in the Classroom

Beth A. Juhnke, *English*

Faculty Mentor: Gloria Eastman, *English*

ABSTRACT NOT RECEIVED

15

The Impact of Emoticons and Text SpeakNatasha J. Malchow, *Psychology***Faculty Mentor:** Linda Lockwood, *Psychology*

Youth in the workforce today may not have the same attitudes about the appropriate formalities necessary in computer mediated communication (CMC) as older professionals (Rainee, 2006). Previous research has looked at CMC in emails from students to professors and found that emails overly casual in nature, such as containing emoticons or text speak, result in a lowered affect toward the student (Stephans & Cowan, 2009). However, little research has examined a student's position on the use of informalities such as emoticons and text speak in a professional environment. The goal of this study was to see if the use of emoticons and text speak in CMC, specifically an email, would influence a young adult to think the sender was less intelligent, less professional, or less mature. Participants were young adults between 18 and 30 years of age. The results of this study and future directions for research will be discussed.

Presentation Type: Poster Presentation

16

Reading Motivation: Do Choices and Book Talks Make a Difference?Shaun M. Martin, *English Education***Faculty Mentor:** Gloria Eastman, *English*

Motivating students to read is one of, if not the most, important and perplexing endeavors in which an English teacher must engage. How does a teacher, who loves to read, impart that love to a diverse student population in an increasingly paperless world? The answer is fourfold: passionate book talks, student choice, in-class independent reading time, and frequent progress checks. At Hinkley High School in Aurora, students encounter all of these and their reading prowess is growing more than grade level per year. Students in English 9 are given a wide array of choices regarding the books they read, they receive 30 minutes of independent reading time each class, their progress is checked on a weekly basis, but they do not receive long book talks as the verity of their choices is massive. MYP English students are given a choice between three books but they will be asked to read all three eventually, they receive 20 minutes of independent reading time each class, their progress is checked monthly, and they receive in-depth book talks on each of their books. Both classes are asked to keep a reading log, thereby they are engaging in a metacognitive reading process. I have collected reading logs from two English 9 classes and one MYP English class and I have used this data to judge the effectiveness of each strategy while cross-referencing the cultural background, initial reading ability, and sex of the students. I have also conducted a survey regarding reading habits and motivation. Given the success of the program, English teachers should employ these tactics not only to raise test scores, but also to build a love of reading in their students.

Presentation Type: Poster Presentation

17

Climate Factors During the Younger Dryas Event

John L. Melrose, *Environmental Science*

Faculty Mentor: Stella W. Todd, *Earth & Atmospheric Science*

The Younger Dryas event, known as the 'Big Freeze', is well documented in numerous data records. Core samples from rock, ice, and lake sediments all show abrupt changes from 11.5-12.9 thousand years before present. The Earth's climate began to shift from a cold glacial world to a warmer interglacial state. The transition was interrupted by sudden cooling in the Northern Hemisphere to near glacial conditions. The changes were not uniform throughout the globe. The data shows different changes in the Southern and Northern Hemisphere. A 'Bipolar see saw' is observed. In general, the Northern hemisphere cooled, and the southern continued to warm. Accumulation also varied greatly during this stadial. This poster display's some of those changes spatially. Proportional symbols of ice core sites show the differences in CO₂, temperature, and accumulation rates during this volatile time. The maximum and minimum data points were used to create the proportional symbols, highlight the areas of greatest change, and emphasizing the resiliency of the Southern Hemisphere. The accumulation rate map used interpolation techniques to better display these changes regionally. The outputs display the range of ice cores showed data points, and reinforce the world as a dynamic and complex climate system.

Presentation Type: Poster Presentation

18

Providing Supplemental Instruction about Chemical Concepts for General Biology Students

Michiko A. Nakajima, *Biology*

Faculty Mentor: Dr. Connie Gabel, *Chemistry*

Biology professors are tasked with ensuring that all students have a certain fundamental understanding of key chemistry concepts on which biological processes are based. Supplemental instruction to the professors' lectures provides an opportunity to reinforce essential chemical concepts. Focusing on conceptual learning in a group study environment has proved to be a successful approach in furthering students' depth of understanding. Specifically this occurs by continual reinforcement of vocabulary and chemical concepts primarily through visual group exercises that focus on larger biological concepts. Expecting students to grasp all the required chemical concepts after the lectures that open the course is a lofty goal that most students fall short of in some aspect. Continually revisiting the chemistry via supplemental instruction as it reappears in the course material has been well received by the students, who find the chemistry easier to grasp in the context of application in a biological system.

Presentation Type: Poster Presentation

19

Effect of Substituents on the Lipase-Catalyzed Synthesis of a Racemic Ester from Aromatic Chiral Ethanol

Nickolas B. Nelson, Mulualem Asmare; Max Minnig; *Biology/Chemistry*

Faculty Mentor: Susan Schelble, *Chemistry*

Chirality is inherent in most biological systems. Obtaining enantiomerically pure chiral compounds is essential for the development of many therapeutic drugs, fragrances, plant protecting agents, and other products. Examined here is the synthesis of a racemic ester and its kinetic resolution, catalyzed by an enzyme, as well as ability of the enzyme to kinetically resolve more demanding ortho and para substituted substrates. To provide a "standard" for comparison with ortho and para substituted compounds, 1-Phenylethanol was converted into racemic α -methylbenzyl acetate. The enzyme *Candida antarctica* lipase B (CAL-B) was utilized to catalyze the hydrolysis of the (R) enantiomer of the resulting α -methylbenzyl acetate while the (S) enantiomer remained almost unconverted. The products at the end of the reaction were two different compounds, the (R) enantiomer of 1-Phenylethanol (an alcohol) and (S) enantiomer of α -methylbenzyl acetate (an ester), which were easily separated. The ability of CAL-B to distinguish between the bulky phenyl, the small methyl, and ortho or para substituted compounds DL-2-Methoxy-Alpha-methylbenzyl alcohol (ortho) and 1-(p-Tolyl)ethanol (para) was examined, utilizing the same methodology applied to the standard, 1-Phenylethanol. The results of the catalysis of the ortho and para substituted compounds will be compared to the standard substrate to determine the effectiveness of lipase to effect their kinetic resolution. The examination and understanding of the effectiveness of enantioselective lipase catalysis is essential for the successful application of enzyme chemistry to industrial and pharmaceutical applications.

Presentation Type: Poster Presentation

20

The Great Flood of *Rhizophora mangle*

Corie A. Reeser, *Biology*

Faculty Mentor: Christy A. Carello, *Biology*

Red mangrove, *Rhizophora mangle* is one of the most important species in tidal zones because it provides nurseries for juvenile fish, habitat for coastal birds, coast line preservation and is an important source of organic material for the estuarine systems. Therefore it is important to study the impact of possible changes of the coastal habitats on this keystone species. Our study indirectly looked at the changes in sea level from global climate change and what possible effects it might have on mangroves. We designed an experiment that evaluated high water levels on growth parameters in mangroves by growing plants in low and high water conditions. Salinity, temperature and light cycles between treatments were kept constant in order to isolate the flooded variable. We took weekly measurements of the growth and productivity of the propagules (the fruiting body that red mangroves start out as) recording width, height and the number and quality of emerging leaves. After the term of growth we harvested each plant and recorded dry root mass and overall chlorophyll production. Much to our surprise the mangroves in the flooded bins showed greater growth and better resistance to desiccation. Further studies are needed to understand mangroves tolerance to the projected drop in salinity that would occur along with rising sea level.

Presentation Type: Poster Presentation

21

Relationship between the Service Industry and Coping with Stress

Laura Rivera, *Psychology*

Faculty Mentor: Linda Lockwood, *Psychology*

There has been a loss to the United States' economy associated with stress that has been as large as \$150 billion per year. Past research has not indicated what typical jobs seem to have more stress in the American population. It is predicted that people who work in the service industry cope with stress better than those who do not. Most studies have reported bivariate relationships of coping with stressors and demographic characteristics. Few studies have looked at job title and stress. Past research indicated that the United States has had a higher increase in the occupational stress in the hospitality industry in the last 15-20 years compared to other occupations. Almost half of workers reported one episode of psychological distress and many people suffer from burnout because they do not know how to cope with stress effectively. This study has measured college students from Metropolitan State College of Denver as well as friends, co-workers, and students in classes. This study adds the missing link that may lead to help with multiple health issues, it determines if an individual is more likely to report participating in positive coping mechanisms in response to stress events if they work in a service industry job. The relationship between the service industry and coping with stress was examined with a correlational study using a coping with stress questionnaire taking into account different scales that reflect different types of coping. The results of this study and future directions for research will be discussed.

Presentation Type: Poster Presentation

22

Anticipation, Empathy and the Spotlight Effect

Sarah Rowan, Sarah Lieberenz, Kelly Parker, Ashley Stamps, Lydia Tomlinson, Eric Klein, Alexander Porter, Alicia Burtard, Seneca Widvey, Anah E. Miller, James Jackson; *Psychology*

Faculty Mentor: Chad R. Mortensen, *Psychology*

The spotlight effect is when an individual has a tendency to overestimate how much others view their appearance and/or actions. The spotlight effect may interfere with the ability to empathize with others due to an individual's lack of perspective taking. If an individual is placed in the spotlight, does it change/affect their perspective of others in the spotlight? Does a spotlighted individual notice the mistakes of others more because they are more conscious of it or less because they are more focused on their selves? Participants were asked to either read out loud or to follow along with those asked to read. All the readers were asked to estimate how many mistakes they thought they would make prior to reading. All participants were then asked to rate the quality of each reader and count the number of mistakes when the readings were completed. A confederate was used as a reader that made purposeful mistakes. The results of this study did not find the traditional spotlight effect, however participants believed others would report more mistakes than they actually thought they made and this correctly predicted how many mistakes others actually reported. Additionally, individuals with a low Need for Cognition (NFC) noticed fewer mistakes than those with high NFC. The participants who read rated the confederate's performance highest of all groups, resulting from high empathy, and participants who did not read rated the confederate's performance lowest of all groups, resulting from low empathy. The participants who read remembered less about the confederate than participants who did not read resulting from the readers being more focused on being in the spotlight.

Presentation Type: Poster Presentation

23

The Effect of Sexuality Education on College Students' Attitudes Toward Individuals with Physical Disabilities

Mary K. Sharpe, *Psychology*

Faculty Mentor: Mary Ann Watson, *Psychology*

The objective of this study was to determine if learning more about the sexuality of those with disabilities would affect the attitudes college students hold toward the sexual activities of individuals with disabilities. The general purpose of my research is to study the attitudes students hold toward the sexuality of those with disabilities, and if sexuality education has any effect upon these attitudes, specifically if learning more about the sexuality of those with disabilities is related to able-bodied students' holding more accepting attitudes toward their peers with physical disabilities. The hypothesis of this study is that students will demonstrate more accepting attitudes toward the sexuality of individuals with disabilities after receiving the relevant sexuality education. Students in two sections of Psychology of Sexuality at Metropolitan State College of Denver formed the experimental group. These students were surveyed before and after the relevant information was presented. The relevant information included two films, workbook activities, and classroom discussions. Students were asked to complete the Disability Social Relations Generalized (DSRGD) Scale, developed by Hergenrath & Rhodes, which was created to determine the influence of social context on attitudes held toward persons with disabilities. This survey instrument also includes seven demographic questions, covering race, age, gender, and college major. Data analysis is ongoing at this point. The implications of the results for future research and insight into the role of education about the sexuality of those with disabilities will also be discussed after results are obtained.

Presentation Type: Poster Presentation

24

Facilitating Literature Circles

Kyle A. Stovall, *English*

Faculty Mentor: Gloria Eastman, *English*

Literature circles or book clubs have proven to be an effective way to enhance student interest, comprehension, and accountability in novels assigned for classroom purposes. However, while the positive implications are widely known, deciding how and where to integrate the concept of literature circles into the classroom can at times be hazy. Deciding how to teach students to participate in literature circles as well as when they should be implemented in the classroom is the key to understanding literature circles. The purpose of this research ties directly into the central research question: how should literature circles be taught for student autonomy? The majority of answers were found through student interaction and observations during literature circles in a 9th grade classroom. Here, it was ascertained that there are specific ways in which literature circles should be taught in addition to how the literature circles are regulated after being established. To support classroom observations various education philosophers such as Vygotsky were examined. In the English classroom, the literature circle is a common practice or at the least commonly known, the purpose of this work is to shed light on how literature circles are to first be implemented and taught for maximum effectiveness. While most research shows the effectiveness of literature circles after they are done or have already been set up; this research is directed at what needs to be done in order to set literature circles up. In base, research through observations has found that literature circle jobs must be taught individually and in depth before even starting, and the groups must be self-regulated with the teacher acting as a facilitator.

Presentation Type: Poster Presentation

25

Cell Phones: A Distraction or Useful Tool?

Tarayn M. Svalberg, *English*

Faculty Mentor: Gloria S. Eastman, *English*

With the increasing accessibility of cell phones, almost all students have one. Often they are regarded as a menace to the classroom. My project poses the question: Cell Phones- A Distraction or a useful tool. Various research shows the importance of the integration of these miniature "powerful, inexpensive computer" as not just a possible integration to the classroom, but a positive one. The use of cell phones can add excitement and accessibility to any classroom lesson.

Presentation Type: Poster Presentation

26

Reading and Memory

Sara E. Torrez, Andrew DeLao, Shericka Edwards, Ryan Hoffman, LaShon Young, Sharon Wharton, Arijana Jaksic, Aleah DeGeneres, Jessica Persing; *Psychology*

Faculty Mentor: Lesley Hathorn, *Psychology*

Meta-comprehension refers to the knowledge of strategies utilized by a reader to understand a text while reading that text. The memory of a text is dependent on the goal of the reader and the type of text that is read. It is believed that meta-comprehension will be most effective when more difficult texts. The purpose of this study was to assess reading comprehension and memory for a text under a variety of text conditions. Participants read texts from several topics so that comprehension and memory for difficult and easy texts, spatial texts, and organization of information could be evaluated. The study is ongoing. Should the results confirm the premise of this study, it would indicate that while reading challenging texts, meta-comprehension will be paramount however; this supposition also relies on the goals of the reader and the text itself.

Presentation Type: Poster Presentation

27

Positive Affect Outcomes when Gratitude is Expressed Through Art versus Writing

Mary Wade, *Psychology*

Faculty Mentor: Lesley Hathorn, *Psychology*

In an attempt to improve upon a commonly used gratitude exercise, the current study sought to determine if the incorporation of art can increase positive affect and decrease negative affect to a greater extent than a traditional version of this technique. In this traditional version individuals are asked to write down the five things for which they are most grateful for, producing, among other benefits, improvements in affect. Other research has shown that drawing may be a superior mode of communicating compared to writing as a means of improving affect. In the present study one group of participants engaged in the traditional exercise, while another group drew depictions of the five things that they are most grateful for. After the participants took five minutes to complete their respective exercises, an assessment of affect was taken.

Presentation Type: Poster Presentation

28

Quantitative Analysis of RNA Polymerase II Binding to Transcript Abundance in Lytically Infected VZV Tissue Culture CellsAnesha E. Williams, Stephanie Gipson; *Biology***Faculty Mentor:** Sheryl Zajdowicz, *Biology*

Open reading frame (ORF) 9 of Varicella Zoster virus (VZV) exhibits a relatively high abundance of transcripts in lytically infected tissue culture cells when compared to ORFs 8 and 10. We hypothesize that the high abundance of ORF 9 transcripts is associated with a complex between RNA polymerase II and mediator. To test this hypothesis we performed chromatin immunoprecipitation assay (ChIP) on sonicated VZV-infected HFL cell DNA with mouse antibody to RNA polymerase II. Quantitative PCR (qPCR) of antibody-treated and control samples with ORF 9 primers indicated a greater pull-down of antibody-specific DNA. qPCR of cDNA, tested with the same ORF 9 primers, confirmed the high abundance of ORF 9 transcripts. Construction of cDNA and RNA polymerase II maps, both normalized to input samples, suggests an inverse relationship, with a high level of transcripts within the ORF 8 and 9 regions, but a low level of RNA polymerase II. This analysis serves as preliminary data and the basis for testing mediator association.

Presentation Type: Poster Presentation

29

Purinergic signaling as a potential mechanism by which varicella zoster virus induces cerebrovascular remodeling and stroke.Ann M. Wyborny, *Biology***Faculty Mentor:** Mark Mazurek, *Biology*

Varicella zoster virus (VZV) is an exclusively human alpha-herpes virus that causes chicken pox on primary infection, with more than 95% of the world population infected. After primary infection, VZV establishes latency in ganglionic neurons. With a decline in VZV-specific cell mediated immunity, such as in elderly or immune-compromised individuals (AIDS, cancer and transplant patients), VZV reactivates and typically causes shingles. However, VZV has also been shown to cause stroke by infection of the cerebral arteries and this has shown to be more common than previously believed. In fact, patients with zoster have a 30% increased risk of stroke. Previous studies in our lab reveal that VZV infection of cerebral arteries causes the innermost layer of the artery to thicken which can potentially block blood flow thus leading to stroke. Additional studies have suggested that the cells in this thickened intima actually originate from other cells in the artery wall that have been induced to proliferate and migrate inward by multiple factors, one such factor being extracellular ATP release. Studies in hypoxia-induced pulmonary vascular remodeling suggests that extracellular ATP is released in response to low oxygen, it then binds to specific purinergic receptors and stimulates proliferation.

Thus, we hypothesize that VZV infection of arterial cells causes extracellular ATP release and induces cell proliferation. To test this hypothesis, we examined VZV-infected cells for extracellular ATP release and examined the effect of ATP on cell proliferation. Our preliminary results indicate that VZV infection of vascular cells causes extracellular ATP release; and in a separate experiment, extracellular ATP induces cell proliferation as seen by immune-staining with Ki-67, a proliferation marker. These results points to a possible mechanism by which VZV induces cerebrovascular remodeling, along with stroke, and suggest that purinergic signaling pathways may serve as potential therapeutic targets.

Presentation Type: Poster Presentation

Oral Session II 10:00 am - 11:00 am

ROOM 1315

Health Services and Social Sciences

10:00 - 10:15

Childhood Obesity Prevention in the Child Care Setting

Erin M. Lustig, *Nutrition*

Faculty Mentor: Cynthia Dormer, *Health Professions*

The obesity epidemic is a major issue facing the U.S. and Colorado. While Colorado is one of the leanest states in the nation, the rates of obesity amongst our population are rising quickly, at a rate that exceeds the national average. According to the Colorado Department of Public Health and Environment, over one quarter of children aged 2-14 were overweight or obese in 2008. Child care providers have the unique opportunity to effect positive change in the futures of children due to the nature of their work, they are professionals in the field, and spend a significant amount of time that with children. Our research aims to assess whether providing low-cost continuing health education and follow-up policy development support leads to voluntary adoption of obesity prevention practices by care givers. Our method for researching the potential of this approach is a two part process. The first component of the project was to hold a continuing education event for 300 child care providers where there were classes on many health related topics. At the end of this event the attendees were surveyed regarding their current workplace practices as well as policies that are feasible in their workplace. They were then offered follow-up support to adopt new health related policies. This on-site policy adoption assistance will be the second portion of the project. Approximately 10% of the attendees indicated that they are interested in follow up, on-site support. Overwhelmingly, the survey indicates that overall the child care providers see the adoption of nutrition, physical activity and health promotion policies as feasible in their work places.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:15 - 10:30

Improving the Odds (ITO): Pathways to Responsible Living

Thai Intarakamhang, Katherine M. Miller; *Psychology*

Faculty Mentor: Travis M. Heath, *Psychology*

Improving the Odds (ITO): Pathways to Responsible Living is an evidenced-based, 7-session, manual-guided treatment program for adults, ages 18 or older, with a history of high-risk gambling and gambling addiction. The program seeks to treat problematic gambling behavior through the use of Cognitive-Behavioral techniques as well as relational techniques that teach clients how to deal with uncomfortable feelings, urges and cravings, and satisfy other important psychological needs. The treatment curriculum for ITO is comprised of three treatment modules that are structured around three phases of treatment. These treatment phases are premised on the conceptual framework of the Challenge to Change, or the reflective-contemplative phase, the Commitment to Change or determination and action stage, and the Ownership of Change or the stabilization of change. The rationale and purpose of each phase are outlined. Each module provides an overall statement of purpose, contextual explanation and is subdivided into a series of discrete sessions (lesson plans) with specific learning objectives and strategies to achieve those objectives. Each module with its discrete session plan is taught in a logical sequence with basic topics covered first, serving as the foundation for more difficult concepts covered later. ITO is behavioral oriented, skill based and multimodal. ITO attends to both extrapersonal circumstances (events that lead to gambling) and intrapersonal processes (thoughts, emotions, beliefs, attitudes) that lead to gambling. Building on the findings of evidenced-based substance abuse and rehabilitation models and programs, the treatment curriculum is built around key topics or themes for self-improvement and change. These themes are not necessarily presented in sequence, but are imbued in the treatment curriculum content and process

Presentation Type: Other

10:30 - 10:45

650 Miles to Mars: The Impact of Poverty on Adolescents in Rural America

Lauren J. Melone, *Speech, Language, and Hearing Sciences*

Faculty Mentor: Steven W. Reiquam, *Speech Communication*

Poverty has a tremendous impact on the lives of adolescents growing up in rural America. In this narrative autoethnography, the author describes her own experiences as a teenage runaway who left Fort Collins, Colorado to live in Cushing, Oklahoma. She examines how these experiences helped her grow as she learned to embrace the cultural differences between the two communities. She reflects on her ignorance regarding the reality of poverty and how her transition from wealth into poverty gave her a new perspective. The questions of the study were: How did the author's cultural competence evolve during her time in Cushing and how did poverty and hardship help to shape the culture she experienced? This work provides anecdotes that describe challenges faced by the author and her peers while simultaneously celebrating the creativity and resilience of the young people that she encountered. She analyzes how living below the poverty line influenced the education, social environment, and home life of several of the families that she lived with. Ultimately, writing the autoethnography empowers her to use her unique perspective to educate others about issues surrounding child poverty in America. Implications for today's educators and policy-makers are discussed including ideas for minimizing obstacles and enhancing the strengths of adolescents to help them work toward a more prosperous future.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session II 10:00 am - 11:00 am

ROOM 1323 *Social Sciences*

10:00 - 10:15

Treatment for Interpersonal Violence Offenders: Theories and Efficacy

Tandis Hashemi, Jonathan Lussier, Jacki Fiegl, Vanessa Farrera; *Psychology*

Faculty Mentor: Travis Heath, *Psychology*

Regardless of religion, ethnicity, race, sexual orientation, or socioeconomic status interpersonal violence (IPV) is a life issue that occurs between couples. On the topic of IPV between couples the majority of therapeutic approaches and research focuses to a greater extent on the victim rather than the perpetrator. One of the two purposes of this presentation is to discuss therapeutic approaches that centered on the treatment of the perpetrators of IPV.

Of the modes of therapy that are used to treat IPV between couples, cognitive behavioral therapy (CBT) has developed to become the one most commonly used to work with such cases. The second purpose of this presentation is to further discuss alternative approaches to CBT that focus on the treatment of perpetrators of IPV. Among the approaches that were investigated for this presentation was the transtheoretical model of change, motivational interviewing, feminist therapy, narrative therapy, couples therapy, and solution-focused treatment. Each of these approaches were investigated for their claims of efficacy as well as the methods they utilize to treat clients.

Following the review of literature of these alternate approaches it's quite evident that they can be just as if not more effective than CBT. For approaches whose evidence tends to be more qualitative in nature it is suggested that future research strive to attain results that are quantitative. These alternative approaches to therapy, as with any other, are at their most effective when contextual situations favor their strengths. Considering the variance that is present within any population and the responsibilities of therapists to carefully determine what approach is best suited for their client and will yield the highest probabilities of success; it is recommended that future research on the treatment of perpetrators of IPV incorporate alternative approaches and not focus so heavily on CBT.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:15 - 10:30

Working with MAXQDA: International Marriage in Okinawa

Tracy Ingram, *Anthropology*

Faculty Mentor: Rebecca Forgash, *Sociology, Anthropology, and Behavioral Sciences*

International marriage or kokusai-kekkon as it is called in Japan, is an increasing occurrence, and one that has caused controversy especially in Okinawa. Other kinds of "marrying out" include marrying a person from mainland Japan, another island in Okinawa, and especially U.S. military servicemen whose presence in Okinawa has been another controversy. Using transcribed interviews conducted by Dr. Forgash, I am applying qualitative data analysis software called MaxQDA to code for these various types of "marrying out." This has been an ongoing project; the current phase involves coding for changing perspectives of "marrying out" in Okinawa and Japan, as well as the changing definition of Okinawan and Japanese identity and the impact of the U.S. military in Okinawa.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:30 - 10:45

An exploration of folklore and superstition within modern China as seen during a two week tour

Diana Drake, *IDP - Chinese Lore and Culture*

Faculty Mentor: Ting Jiang, *Social Sciences*

This presentation will show examples of current folklore and active superstitions that we observed during a two week tour in northern China as well as explain some of the history and rationale behind these practices. It will include aspects of folk art from traditional dancing to modern martial and meditative practices. It also includes incorporation of superstitions into modern dress and actions. Mention will be made of artistic practices that show the blending of modernization with superstitions as well. This is not a comprehensive overview but a brief exploration of modern Chinese folk expression as seen within daily life.

This presentation will help show the other face of the Chinese people as many still hold to the view that the Chinese do little outside of work and school. Through personal observation these examples were recorded. Many scholarly works have been used as resources to assist in helping analyze the behaviors seen as well as personal interviews with some cultural experts. Through this and many other presentations I hope to be able to share the wonders and depth of Chinese culture, helping to tear down dangerous stereotypes and help foster understanding between Chinese and American people.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session II 10:00 am - 11:00 am

ROOM 1314 *Social Sciences*

10:00 - 10:15

Why Lecture? What Factors Influence the Teaching Methods College Professors Choose to Use?

Nicki Cupit, Kristin Broussard, Alek Hess; *Human Development*

Faculty Mentor: Lisa Hagan, *Psychology*

Professors are asked to balance their time between research, service, advising, and teaching. Massey and Zemsky (1994) state that time spent doing research is time taken away from improving teaching skills. These two roles of research and teaching conflict because of the different demands and responsibilities attached to each (Fox, 1992). In 1996, Braxton recommended that research examine how institutional research expectations influence teaching quality, however, to date there has been little research in this area. The present study examines if type of institution and research expectations has an impact on teaching type and quality. Surveys regarding teaching method and teaching development were given to 275 psychology professors from across the country. Results indicated that there was a significant difference between the teaching methods used at research intensive versus teaching based universities. Specifically, teachers who came from research I institutions engaged in less development opportunities to improve their teaching and had a more teacher-directed teaching style than professors from research II or teacher focused universities.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:15 - 10:30

Recognizing Childhood Obesity

Stephanie Schleicher, *Psychology*

Faculty Mentor: Lesley Hathorn, *Psychology*

The purpose of this study was to help in the fight against childhood obesity by bringing attention to one of the main contributing factors of the disorder, recognition. Previous studies have shown that often times the most at-risk groups for childhood obesity are those that cannot recognize the problem or do not see it as a problem. This study tested people's ability to recognize childhood obesity by viewing photographs of children at varying weights and sorting the photographs into one of five categories. The expected results were that the general public would be unable to discern normal weight from overweight. Hopefully bringing attention to this issue, and the difficulty that some individuals have recognizing it, will foster further research to help people view childhood obesity as a problem that cannot be overlooked.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:30 - 10:45

The Effect of Demand Characteristics on the Perception of Tattooed Persons

Trelawney E. M. Copley-Smith, *Psychology*

Faculty Mentor: Lesley Hathorn, *Psychology*

Individuals with tattoos are typically perceived as socially deviant and have been consistently rated more negatively than non-tattooed individuals on personality and credibility scales. The purpose of this study was to determine whether demand characteristics effect perceptions towards tattoos. Participants were randomly assigned into either the “exposed tattoo” or “hidden tattoo” group in which my tattoos were hidden or exposed, respectively. They were asked to rate two images (one tattooed male and one tattooed female) using a Personality Scale and a Credibility Scale. Scores of the two groups were compared to determine whether participant bias was elicited in the presence of demand characteristics and if the image of the tattooed woman was rated differently than the image of the tattooed man.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:45 - 11:00

The Third Wheel: A Third Effect of Viewing Non Goal-Based Reality Television

Sara E. Torrez, *Psychology*

Faculty Mentor: Lesley Hathorn, *Psychology*

Reality television shows are everywhere nowadays, whether it is a competing for a goal or a prize at the end of the show (goal-based) or watching the rich and famous live their lives on television for the whole world to see (non goal-based). The purpose of this study was to measure how non goal-based reality television programs influence behaviors of viewers, and to include a behavior measure to the initial study that analyzed perceived realism and self-monitoring perception. The participants viewed a small video segment of a goal-based or non goal-based reality television show just as in the initial study; however a collaborative project (The Gilligan’s Island Collaborative Project) replaced the self-monitoring questionnaire in order to measure cooperation amongst participants. This study is ongoing. It is expected that participants in the non goal-based group will be less cooperative than those participants in the goal-based group and would implicate that non goal-based reality television not only effects perceived realism and self-monitoring, but that it also affects cooperative behavior towards others.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session II 10:00 am - 11:00 am

ROOM 1326 *Social Sciences*

10:00 - 10:15

Analysis and Comparison of Creativity Tests for Use in Business Education

Kristine Lankovska, *Marketing*

Faculty Mentor: Angelica Bahl, *Marketing*

The purpose of analyzing and comparing different creativity tests for use in business education is to set forth goals on improving the teaching of the creative process in the business classroom. The central research question addressed is the analysis of available creativity tests and evaluating which tests are better suited for business education. Various creativity tests were gathered according to academic, or secondary, research sources available on the subject of testing creative thinking and the formulation of solutions. After selecting creativity tests that applied specifically to college students, many of the tests were sampled and further assessed by using primary research data. The findings of this research show that there are a variety of tests currently available for use in business education. There are a number of creativity tests that measure various aspects of a student's ability to think and approach problems and devise creative solutions. However, not all available tests are suitable for a specific focus on business education. The main implications of this research are that many of the creativity tests currently available for educators do not provide solid and trustworthy results, especially when used in business classroom. Many tests are overly subjective in that the assessment of responses is dependent on the experience and personal bias of the person evaluating the test results. According to this research, the most valuable and highest scoring creativity test proves to be the Torrance Test of Creative Thinking. It has the least amount of evaluation errors recorded to date. Furthermore, it offers comprehensive guidelines for response assessment.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:15 - 10:30

Membership Paradigm Shift Understanding the New Model of Professional Organization Membership for the Meetings and Events Industry

Anna-Belle Merrill Burton, Camille Armas, *HTE*

Faculty Mentor: Dr. Cynthia Vannucci, *HTE*

1. Motivation/ Problem statement

The motivation behind our membership paradigm shift study is to understand the new model of professional organization membership for the meetings and event industry by answering the age old question "how do we retain members and keep them engaged and involved in our organization"?

2. Methods/Procedures/ Approach

- Qualitative data collection: Focus groups were conducted across the Rocky Mountain region where we collected qualitative data by observation, interviews, and focus group feedback. The highlighted Rocky Mountain region cities who participated in our focus group were Cheyenne Wyoming, Salt Lake City Utah, Albuquerque / Santa Fe New Mexico, and Denver Colorado. Each focus group was comprised of 6-8 individuals both members and non-members of professional organizations,

Continued on next page.

and elaborated on the following open ended questions:

1. What benefits do you seek from a professional association membership?
2. What impacts your decision to attend a long distance meeting or event?
3. What are your thoughts and involvement with web based meetings and events?
4. What are relevant and beneficial industry topics that interest you?

- Quantitative data collection: A comprehensive web based survey comprised of 15 question will be sent out via email to a data base of 200 people both professional association members and non-members to collect quantitative data and demographics to support the qualitative focus group findings.

- Triangulation: A combination of both our qualitative and quantitative data will be used in conjunction with our literature review findings to develop a professional research opinion on our research.

3. Results /Findings: As a result of completing the above research procedures we were able to answer the problem of the membership paradigm shift quantitatively, provided insight to create strategies to correct the problem, provided awareness about membership, direct recruiting efforts, and further strengthen and provided direction for the goals of the RMPCMA Rocky Mountain Chapter association.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:30 - 10:45

Safety and Security in the Colorado Hotel and Lodging Industry.

Cory A. Morrison, *IDP - Hospitality Safety Management*

Faculty Mentor: Dr. Cynthia Vannucci, *Hospitality Tourism & Events*

The general purpose of my work was to investigate the safety and security of the Colorado Hotel and Lodging Industry, establish a relevant safety and security index for the compilation and evaluation of the findings, determine if the empirical data establishes a correlation between the property location, price segment, size and age of the establishment and the overall safety and security index.

The central research questions addressed through my work is: "Are Colorado Hotel and Lodging Establishments safe and secure?" and "Does property location, price segment, size and age have an impact on the safety and security index of the establishment?"

Surveys were distributed to hotels, motels, bed & breakfasts, resorts and other lodging establishments within the State of Colorado. The surveys classified establishments into different categories including location, price segment, and number of rooms and age of property. Based upon a security index out of a possible 100 and a safety index out of a possible 100 if the property had the surveyed item they received a "1" and if they didn't they received a "0". The resulting score was multiplied by the safety and security index to establish the average rating for that class of establishment.

The findings and implications of my research will be presented at the conference with a ten minute oral presentation, a three minute question and answer period and a hard copy of the report being provided to attendees. The findings and implications will also be published and distributed by the Colorado Hotel & Lodging Association.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:45 - 11:00

Making the Invisible Knapsack Visible: Deconstructing Pedagogical Approaches to Race in Women's Studies Classrooms.

Josie L. Shapiro, *Women's Studies*

Faculty Mentor: Adriana Nieto, *Chicana/o Studies*

This paper examines how Women's Studies programs often reproduce and reenforce white supremacy within the feminist academy. In the spirit of decolonizing knowledge within academia it seems more than appropriate to investigate a deconstruction of feminism's own participation in the reproduction and reenforcement of white supremacy. My research draws on current scholarship from Women's Studies, Critical Race Theory, and Whiteness Studies in addition to a foundational base in critiques from feminists of color of dominant feminist discourses over the last thirty years. By specifically analyzing the discourse of white privilege versus white supremacy in Women's Studies classrooms I aim to highlight the need for a change in pedagogical approach to the subject of race and its intersections with gender, class, and sexuality. We cannot envision a transformative future in academia without looking to the ways in which we are teaching a new generation in regards to race and actively striving to do better. It is the goal of my research and work within Women's Studies to do exactly this, to challenge the pedagogy of our discipline and how we address race. My paper aims to highlight the successes of racial analysis within Women's Studies programs and use them as examples of anti-racist praxis that we all might strive towards.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session II 10:00 am - 11:00 am

ROOM 1313

Arts and Humanities

10:00 - 10:15

Language and Identity in Mountain States Male Speakers of English

Colin Pitet, *Computer Information Systems*

Faculty Mentor: Marina Gorlach, *Linguistics*

I propose to study the way gender identity is created, negotiated, and performed in everyday speech and conversational interaction. Currently I am interested in the performance of masculine identity and plan to analyze the casual conversation of male gendered native speakers of American English in and around Denver, Colorado for phonological features and discourse strategies. Specifically, I am interested in both the phonological phenomenon of g-dropping and the creation of "safe place" through discourse. Using as a starting point the framework of queer linguistics and the research of sociocultural linguists, I hope to describe some of the social mechanisms by which cultural participants portray themselves and create relationships with others through language. In addition, I hope to add to the ongoing research analyzing men's lives, attitudes, and language use with the goal of increasing awareness of the intragroup variation within males in American culture.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:15 - 10:30

Not Just An Event

Maureen K. Owen, *Music/HTE*

Faculty Mentor: Joice W. Gibson, *Music*

The Choral Celebration at Metro State is a music event focused on educating and motivating high school choral ensembles to increase their musical growth. This event is one of the most anticipated music events in CO and has managed to affect the lives of over 20,000 people including students, directors, professors and community members since it was founded. As with any event however, it is difficult to quantify or even identify its full impact. This study takes that challenge in offering an in depth examination of the full impact the Choral Celebration event has had through an analysis of its effect on Metropolitan State College of Denver, the Colorado community, and choral music as a whole. This study illuminates the true scope that even one event can unknowingly have and hopes in the future to bring a higher degree of awareness to the currently under-appreciated potential of events.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:30 - 10:45

Status and Gender: Self-portraiture and the Status of the Early Modern Artist

Bitel A. Beyette, *Art History*

Faculty Mentor: Carmen Ripolles, *Art History*

Since the Renaissance when the idea of self-fashioning was born, artists have often used self-portraiture to create a specific identity for themselves. However, what happens when the constructed identity does not align with the social norms that are in place? My goal has been to explore how Baroque period self-portraits that pushed the strict gender boundaries society held in place may have affected the artists' self-fashioning. I have chosen to examine two self-portraits: "La Turbantina" by the male artist Guido Reni, which appears in the larger painting "St. Benedict Presented With Gifts by Farmers," and "Self-Portrait as the Allegory of Painting" by the female artist Artemisia Gentileschi. Through a comparison of the paintings and research regarding societal norms, I have concluded that self-portraits can display various levels of self-fashioning depending on the type of portrait created, as well as the gender of the artist.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:45 - 11:00

Compositional Alternatives to the Oral Transmission Theory of Homeric Epic Poetry

Rodrick S. Schubert, *IDP - Classical Roots of Western Intellectual Thought*

Faculty Mentor: Bruce Degi, *English*

Since Milman Parry's thorough analysis of Homer's Iliad and Odyssey, completed during the first part of the twentieth century, many classical scholars have found themselves agreeing, disseminating, and adding research to his primary thesis. Parry contends that the Homeric compositional technique demonstrated through the written documents that were available to him could only have been created through the process of oral story-telling. This compositional technique was most aptly demonstrated by the repetitive use of metaphorical epithets to support the narrative structure and provided mnemonic

Continued on next page.

devices that the story teller used to create the specific performance's piece. Each teller of tales delivered a performance that was both anchored in that which was recognizable by the receiving audience of listeners and that which would delight this same audience with the storyteller's ability to create a fresh tapestry of lyric verse during each specific epic performance.

My contention is that while storytelling and improvisational performance techniques were, and are, available for each narrative performer of verse, this was not what the author, or authors, composed in Homer's Iliad and Odyssey. These extant texts are more likely the product of a scribal school tradition that developed the ability to create the epic verse structures like Iliad and Odyssey. These schools provided for the complete education of each student from the school's region, but they were also transnational in pedagogical outlook and scope. The demarcation limits of this paper are a text from a "New Kingdom" school demonstrating the benefits of becoming a scribe and the aesthetic concerns expressed by both Plato and Aristotle in the Republic and Poetics. This paper concludes with a nod toward the emic/etic distinction as it relates to early literary document analysis.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session II 10:00 am - 11:00 am

ROOM 1325
Engineering & Technology

10:00 - 10:15

The Possibility of Commercial Space Flight to the Moon

Brandon J. Hackney, *Aerospace Systems Engineering Technology*

Faculty Mentor: Jeffrey C. Price, *Aviation & Aerospace Science*

John F Kennedy stated that within a decade man would have successfully landed on the moon and safely returned home. When President Kennedy's vision came true within the decade and the United States won the 'Space Race' over Russia; Apollo missions began to lose significance and support. With the last of the Apollo missions being canceled (Apollo 18-20), much of the momentum carrying national pride, technology, and infrastructure was lost with it. After achieving such a lofty goal and having already proven ourselves as a technologically advanced society, it did not make economic sense to continue to visit the moon just because it is there. Recently many commercial space companies have sprung up from the downsizing of NASA, including notable companies such as Virgin Galactic, SpaceX, and XCOR. These companies are not sustained by government money but require private investment, budgeted resources, and foreseeable future profits. These practices benefit the space industry, requiring engineers to not only be innovative and think outside the box but to budget resources, strive for efficient and cost effective solutions, and search for new profitable technologies. This paper will discuss the future economic plausibility's of commercial moon colonization focusing on lunar resources utilization using emerging technologies of today. The plausibility of future technologies for moon colonization will be determined using a decision matrix approach with an array of quantitative and qualitative properties. Ultimately, the technologies which prove to be the most economically profitable for society will win out, a monetary standard can be set, and the foundation for moon colonization can be laid. As exact numbers and figures may be difficult if not impossible to come by; educated estimates extracted from academic or educational literature may be used.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:15 - 10:30

Design, Construction and Testing of a Jominey End-Quench Machine

Dan Strawn, James Anderson, Mitchel Schroeder, Cary Caruthers; *Mechanical Engineering Technology*

Faculty Mentor: Aaron Brown, *Mechanical Engineering Technology*

A Jominey End-Quench machine would be a valuable tool to use in the engineering labs. This machine would give the engineering students the ability to test and understand hardenability of steel. A Jominey End-Quench machine works by using water to cool one end of a sample of steel at a faster rate than the rest of the sample. The cooling differential leads to different material properties along the sample. This will be a valuable tool, allowing the engineering students real world experience versus learning about material properties out of a book.

The cost of buying this machine far exceeds the cost of building one. So it is proposed that a group of students build a Jominey End-Quench machine. This project then aims to design, build and test (for verification) a Jominey End Quench Machine. This will be done for undergraduate research, and presented at the research symposium later this year. After the symposium the students will use the machine to demonstrate the use of heat treatment in material science.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:30 - 10:45

Coronal cavities and their relation to coronal mass ejections.

Blake Forland, *Physics*

Faculty Mentor: Jim Dove, *Physics*

The solar corona is very dynamic, involving solar flares and corona mass ejections (CMEs). The nature of these eruptions, and what triggers them, is poorly understood, but magnetic activity is thought to be the main culprit. CMEs often occur in coronal cavities (regions of less dense material strongly influenced by magnetic fields), thus the study of cavities can provide clues as to what triggers CMEs. I am investigating whether a correlation exists between cavity morphology and CME occurrences. Two years of data from the Atmospheric Imaging Assembly (AIA) instrument aboard the Solar Dynamics Observatory (SDO) satellite is being examined and all observed cavities are analyzed for characteristics such as shape, height, size and relation to CMEs. The analysis will determine statistical correlations between cavities and CMEs and what characteristics of coronal cavities are indicative of CMEs events.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:45 - 11:00

Design and Build a Three Piston Radial Solar Stirling Generator

Greg Stevens, *Mechanical Engineering Technology*

Faculty Mentor: Mingli He, *Engineering Technology*

The purpose of this project is to design, build and analyze a three piston radial solar Stirling generator that will power a DC generator with no external energy source but the sun. The radial solar Stirling engine shall be built with the knowledge gained in multiple facets of mechanical engineering: mechanics, statics, programming, machine design, material sciences, electronics and thermodynamics. The Stirling cycle engine converts a very simple thermodynamic process into mechanical energy; this mechanical energy shall generate electricity with a DC motor. Solar energy will be focused on the Stirling engine with the use of three Fresnel lens; the Stirling engine will use this solar energy in the thermodynamic process that shall power the engine and generator. The entire solar Stirling generator shall track the sun's celestial motion throughout the day with a photo-voltaic solar tracker.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session II 10:00 am - 11:00 am

ROOM 1324 *Natural Sciences*

10:00 - 10:15

Survey of larval black fly (Diptera: Simuliidae) in selected Colorado Rocky Mountain streams

Layla T. Al-Shaer, Dave S. Larson; *Biology*

Faculty Mentor: Robert G. Hancock, *Biology*

In July of 2011 black fly larvae were randomly collected from multiple sites within selected drainages in the Colorado Rocky Mountains. In this multifaceted study, one of our principal objectives was to discern how many species could be found in a thorough altitudinal-based sampling scheme of selected drainages from headwaters and first-order streams through third order streams, as well as to gain further insight as to the behavioral ecology factors that may affect location preference. As sessile filter feeders, larvae are ecologically important in limnetic food chains and, because of their sensitivity to pollutants, as an indicator species. While black flies are not vectors for human diseases within the U.S., they carry various nematodes and protozoa that can impact the agricultural communities of Colorado, including the affliction of livestock and poultry with ailments such as encephalitis, epizootic vesicular stomatitis and leucocytozoonosis. Furthermore, many species are mammalophilic and, depending on the season, can become quite pestiferous. A wide range of species diversity was found across three genera: Heledon, Prosimulium and Simulium, by means of microscopy and physical characteristic anatomy of the larva.

Larvae in certain mountain-dwelling species of the black fly genus Prosimulium have been shown to exhibit facultative predation on other Dipteran larvae. We report here a first-hand account of predation by Prosimulium frohnei on chironomid larvae in a high-alpine first order stream of the Four-mile creek drainage of the Mosquito Range in the Colorado Rocky Mountains. Gut content analysis revealed both insect cuticle and head capsules as well as microalgae, which confirms the facultative predation of P. frohnei. This opportunistic manner of feeding could be explained by the high elevations at which this species of larva is found.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:15 - 10:30

Evidence for Ammonia Oxidizing Archaea in a Constructed Sewage Treatment Wetland

Autumn Remmert, *Biology*

Faculty Mentor: Rebecca Ferrell, *Biology*

Nitrogen containing compounds such as ammonia, nitrite and nitrate from sewage pose considerable danger to the environment. Coral reef systems are especially susceptible to the effects of these environmental pollutants. Constructed Sewage Treatment Wetlands (CSTW) have shown to be efficacious at removal of nitrogen compounds from sewage, and effectual at prevention of further environmental damage. The current project is a long term enrichment culture microcosm project

Continued on next page.

investigating the identification of ammonia oxidizing microorganisms from a CSTW in Akumal, Mexico. The discovery of Archaea capable of ammonia oxidation has generated considerable interest and investigation in microbial ecology and there is a growing body of literature dealing with it. Previous work on this project has shown the presence of Archaea in our enrichment cultures by 16S rRNA sequencing that showed homology with halophilic marine Crenarcheota. The current focus is on nitrifying genes, specifically ammonia mono-oxygenase gene (*amo*) subunit A, in Ammonia Oxidizing Archaea. Primers specific to AOA *amoA* have been used to detect the presence of AOA in our enrichment cultures by both qualitative and quantitative PCR. Amplicons have been cloned and sequence data from them is currently being analyzed.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:30 - 10:45

Addressing weaknesses in math skills with supplemental instruction in general chemistry

Ryan T. Fitt, Michael D. Radulovich, Ralph McBride; *Chemistry*

Faculty Mentor: Connie Gabel, *Chemistry*

General Chemistry is, for many students, their first exposure to a math-intensive science class. In the first semester of a Supplemental Instruction (SI) program at the Community College of Denver, SI peer leaders observed that a lack of prior knowledge in math skills was inhibiting the ability of students to learn concepts in general chemistry. Consequently, a set of pre-tests were prepared and administered at the beginning of the second semester of the SI program for General Chemistry I and General Chemistry II, for the purpose of evaluating prior knowledge. Results of the pre-tests indicated that students generally struggled in two areas: 1) applying basic algebra skills to chemistry, and 2) proper use of a calculator in operations requiring multiple steps. In SI sessions throughout the semester, peer leaders focused on addressing these weaknesses by working with the students on problems that involved the application of basic algebra skills, and by stressing robust calculator techniques. Results of a post-test given at the end of the semester, as well as STEM retention data, suggest that the SI program's emphasis on improving applicable math skills in chemistry improved student success in these areas.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

10:45 - 11:00

Extra Baggage: Larval Water Mites and Orchid Pollinia on Biting *Aedes hexodontus*

Michelle L. Wiegert, Scott Hill; *Biology*

Faculty Mentor: Robert G. Hancock, *Biology*

In late July following a winter of record snowfall, biting catches of *Aedes hexodontus* mosquitoes were made in subalpine meadows at different elevations in an east facing mountain drainage in north central Colorado. Captured females were frequently found with large stalked pollinia from bog orchids in the genus *Habenaria* attached to their eyes and/or bright red larval mites attached to their thoracies. Collections were made at four elevations at sites ranging from 2940m-3530m. At each higher site, the distance to and relative amount of boggy terrain decreased with increasing elevation. Both pollinia and mites occurred at abundances approaching 2% but showed no apparent relationship with elevation

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

NC BUILDING ATRIUM

1

Prevalence of Addictive Cigarette Smoking Behavior Based on Taste Ability

Linda A. Atty, *Psychology*

Faculty Mentor: Dr. Linda Lockwood, *Psychology*

Cigarette smoking is a primary source of unnecessary death. According to the American Lung Association smoking cigarettes causes over 393,000 deaths a year (2012). It is important to understand potential risk factors that can predispose someone to become addicted to nicotine, so that effective preventative measures can be used. Past research has established a link between Phenylthiocarbamide (PTC) tasting and alcoholism, showing that people who have the ability to taste PTC are less likely to be dependent on alcohol (Schoenborn, & Benson, 1988). PTC tasting is genetically determined and is assumed to reflect a person who is very sensitive to bitter tastes. It is believed that this sensitivity might lead to an aversion to certain tastes like alcohol. However, few studies have been conducted that examine PTC tasting and nicotine addiction. This study used the Fagerström Test for Nicotine Dependence to determine if there was a connection between PTC tasting and nicotine dependence (FTND). It was hypothesized that students who tested dominant for the PTC gene would score lower on the FTND, thus showing a resiliency against nicotine addiction. A t-test was used to compare the mean scores on the FTND. Smokers, who tested positive for the PTC gene, were compared with smokers who tested negative for the PTC gene. The results of this study and potential future studies to further this area of research will be discussed.

Presentation Type: Poster Presentation

2

Grip Glove

Chris Carpenter, *Industrial Design*

Faculty Mentor: Ted Shin, *Industrial Design*

The purpose of the Grip Glove is to aid individuals who suffer from arthritis and/or other similar disabilities in the hand. It was made to assist individuals with daily tasks that cause people pain such as lifting a frying pan, opening a door or opening a jar. There are many products that aid people with one task, but nothing that is universal to an individual's life and needs.

The Grip Glove uses an Electromyography Sensor to read myoelectric signals sent from the brain to the hand. This information is used to control a small motor that operates a Boa system. Cables run along the finger and are pulled by the motor. This allows the user to grab any object, however the Boa system and cables are taking the load off of the joints and muscles in the hand. This reduces inflammation and stress that causes pain. In the event of an emergency, a clutch bypasses the assembly allowing the glove to open and release.

Because the grip glove works with the hand it is not limited to picking up a frying pan or opening a door. The grip glove allows the user to perform a variety of tasks that would otherwise be difficult and cause pain.

Presentation Type: Poster Presentation

3

Grammarians Project

Irene D. Chavez, Jessica Schiewe; *Modern Languages*

Faculty Mentor: Maria Akrabova, *Modern Languages*

Research the psychological and/or sociological impact of language using published sources of English and Spanish language grammatical errors. A compilation of thirty samples (20 Spanish/10 English) were used to analyze the impact of language in various classifications such as punctuation and orthography. The samples were obtained from various media including the internet, newspapers and periodicals.

Presentation Type: Poster Presentation

4

A Brief History of Eugenics in the United States of America

Trelawney E. M. Copley-Smith, *Psychology*

Faculty Mentor: Lesley Hathorn, *Psychology*

The history of the eugenics movement in the United States was brief, lasting approximately twenty years. The notion was conceptualized by Francis Galton in England in the late 1860's and was widely popular across Europe and the US. Eugenic sentiments, however, had long existed in America, so the idea and subsequent eugenic programs caught on quickly. While this was typically a matter of social class in Europe, American eugenics took a racial and ethnic turn and was decidedly prejudicial against many minority groups including immigrants and the mentally retarded. Hitler's implementation of a similar, but far more extreme, eugenics programs in Nazi Germany, however, created an anti-eugenic reaction and the term became less frequently used. In modern American society, there are still many programs and procedures based in this eugenic mindset (selective abortion, genetic testing, etc.), they merely lack the stigmatized name.

Presentation Type: Poster Presentation

5

Personality Factors and Delay Discounting

Andrew M. DeLao, Sara Torrez, LaShon Young, Ryan Hoffman, Sharon Wharton, Shericka Edwards, Arijana Jaksic, Aleah DeGeneres, Jessica Persing; *Psychology*

Faculty Mentor: Lesley Hathorn, *Psychology*

The ability to plan for the future involves attitude, cognition and the individual's ability to delay gratification. When provided a choice between a smaller immediate reward or larger but delayed reward, most individuals consistently opt for the immediate reward, showing a weaker orientation to the future. The value at which an individual views the immediate and delayed rewards to be equal is indifference point. The present study examined personality traits for each participant, and looked for links between those traits and the individual's ability to delay gratification. A delay discounting task was used to measure individuals' orientation to the future, in which participants were instructed to choose between receiving an immediate reward of a lesser value or a delayed reward of a greater value. Participants were required to make this decision at six different time periods: one day, one week, one month, three months, six months, and one year. Starting values of \$200, \$400, \$600, or \$800 were randomly assigned to participants. For the purposes of this study, the greater value of the delayed reward was set at \$1000. Of the five personality factors including openness, conscientiousness, agreeableness, extroversion and neuroticism, only neuroticism was significantly correlated with future orientation. No significant differences were found between the dollar amounts accepted within each time period and the starting amounts, indicating the absence of an anchoring effect. Thus, individuals who score above average in neuroticism may have weaker orientation to the future.

6

Learning from the Past to Protect the Future: Preventing Habitat Loss for the North American Beaver

Holly D'Oench, *Biology*

Faculty Mentor: Christy Carello, *Biology*

The North American beaver (*Castor canadensis*) is a valuable member of wetland habitats because it creates standing water habitat for plants and other animals. Extra management practices when a population or habitat is in jeopardy are critical for overall ecosystem health. Beavers have significantly declined in a biologically valuable wetland that is located in the Cucumber Gulch Wildlife Preserve, Breckenridge, Colorado. It is paramount to identify the cause of the decline and implement methods for recovery.

To accomplish this goal, we will be employing tactics to help relieve the impact of the external stressors that are affecting beavers. This includes the addition of aspen branches and logs to provide higher quality food as well as material for stronger dams. We will also conduct intensive population surveys to have a more precise understanding of the total number of beavers and total number of beaver family groups.

We predict that improvement of the wetland habitat will cause the beaver population in Cucumber Gulch to recover and rise. With a suitable habitat and a large amount of desirable food, the offspring of the current beavers will stay in the area and in turn, have kits of their own leading to a steady increase in numbers. Establishing a protocol for habitat improvement that encourages beavers to inhabit an area will provide land managers with a tool they can use when faced with a similar problem.

Presentation Type: Poster Presentation

7

The effect of immediate and uninterrupted skin-to-skin contact on breastfeeding duration.

Zahra Farazandeh, Jennifer Kane, Kaitlin Hornbostel; *Human Nutrition and Dietetics*

Faculty Mentor: Jennifer Weddig, *Health Professions*

Human milk is recognized as the ideal food for infants. The American Academy of Pediatrics recommends exclusive breastfeeding for the first 6 months of life and continued breastfeeding with complementary foods to one year and beyond. Breastfeeding provides many health benefits for mother and child including prevention of chronic disease and obesity later in life. Healthy People 2020 set goals for 82% of women to initiate breastfeeding, 46% to breastfeed exclusively at 3 months and 26% to exclusively breastfeed through 6 months. According to the CDC, in 2011 national breastfeeding rates were 74.6%, 35.0% and 14.8% respectively.

Uninterrupted skin-to-skin contact (SSC) between mother and baby immediately after birth improves breastfeeding initiation and rates at hospital discharge. The area not widely investigated is the effect that immediate and uninterrupted SSC and SSC during the first 72 hours has on breastfeeding exclusivity and duration up to one year of life.

This research investigates the impact immediate and uninterrupted SSC until first feeding and continued SSC during the first 72 hours of life has on the exclusivity and duration of breastfeeding at 2 days, 2 and 6 weeks, 3 and 6 months and duration at 9 and 12 months. Data is being collected from patient charts at a birth center in Colorado as well as a control birthing center and a survey is in development. Student researchers are collecting data on total SSC from birth to discharge and time from birth to first breastfeeding.

If this research demonstrates that SSC improves breastfeeding exclusivity and duration, the evidence may assist hospitals and care providers in amending their postpartum practices to include greater SSC for mothers and babies as well as education for parents about the benefits of SSC.

Presentation Type: Poster Presentation

8

Los Niños de La Calle

Amber M. Feese, *Photojournalism/Spanish*

Faculty Mentor: María Rey-López, *Modern Languages*

As a result of poverty, natural disasters and immigration, 40 million children are currently living in the streets of Latin America. They are forced into a life of crime and destitution, and often do not even make it into adulthood. This project is an informational, research-based analysis that investigates the reasons for and realities of this devastating phenomenon. Other aspects that are analyzed are the public opinion of these children in their own countries, the varying levels of different countries' involvement in this issue, and the existence and development of organizations that aid in this cause. The question left after it all is this: Is the current level of aid really enough? Through literary research, this question is addressed and suggestions are given to better the lives of the growing number of Latin American street children.

Presentation Type: Poster Presentation

9

Suspected Kimberlite in Northern Colorado

Stephanie M. Gallegos, *Environmental Geology*

Faculty Mentor: Uwe R. Kackstaetter, *Earth and Atmospheric Science*

Kimberlite pipes are small in diameter, carrot shaped, geologically elusive, ultra mafic igneous structures which are penetrating the crust all the way from the mantle. They often occur in swarms, such as in the Colorado – Wyoming district, are primary source rocks for diamonds, and are very difficult to detect. A small Kimberlite is believed to exist in a road cut on County Road 45E and Highway 287, just North of Virginia Dale, Colorado, in a minor fault line. While first surveys confirm the presence of chlorite, a common decompositional mineral of ultra-mafic lithologies, samples are currently being investigated through thin sections, XRD, chemical analysis, and heavy mineral identification to verify a suspected Kimberlite in this particular area.

Presentation Type: Poster Presentation

10

Generation of Unknown Physical Values from Existing Eco-regions Geo-Spatial Data Using GIS Softwares:Case Study Colorado Eco-regions

Amanuel T. Gebru, *Earth & Atmospheric Science and GIS*

Faculty Mentor: Stella W. Todd, *GIS*

The purpose of this research is to eloquently investigate and examine the existing Eco-regions & Eco-division physical data of nationwide ecosystem. Likewise, to generate and derive the physical elements such as elevation, actual temperature average, average precipitation, etc. And finally to come up with excellent new generated values of eco-regions of Colorado. These general purpose regions are critical for structuring and implementing ecosystem management strategies across federal agencies, state agencies, and nongovernment organizations that are responsible for different types of resources within the same geographical areas.

The approach will be applied in this research is entirely basis on the geo-informatics technologies in order to generate different new ecological values such as generating new elevation , new average rainfall values , new average temperature monthly values etc.

The source of the ecological geospatial values may be from different sources but most probably will be the U.S. Environmental Protection Agency and Western Ecology Division.

By thoroughly Characterization of different ecological values as well as generating new values from already compiled ecological inputs. The final expected result will come up in different output format i.e. Map of Ecoregions of Colorado and its statistical representations.

Presentation Type: Poster Presentation

11

Characterizing the Apobec3/Rfv3 Dependent Neutralizing Antibody ResponseKarl Heilman, *Biology***Faculty Mentor:** Mario Santiago, *CU Denver School of Medicine Division of Infectious Diseases*

The development of a vaccine that combats HIV-1 is a global health priority. It is commonly thought that an HIV-1 vaccine should stimulate protective antibodies, but the nature of a protective antibody response against HIV-1 remains elusive. In contrast, mice infected with Friend retrovirus (FV) develop a potent neutralizing antibody (NAb) response due to the action of a classical gene known as Recovery from Friend virus 3 (Rfv3). Rfv3 was later found to be encoded by Apobec3, an innate factor which inhibits retroviruses in vitro. We therefore set out to determine the composition of Apobec3/Rfv3 dependent NAb response, focusing on the two parts of the antibody molecule: (1) the antigen binding site; and (2) the Fc component that mediates cellular effector functions. Enzyme linked immunosorbent assays (ELISAs) were conducted to quantify the endpoint titers of IgM, IgG and its corresponding subclasses (IgG1, IgG2 and IgG3) from plasma of Apobec3 wild-type (WT) and knockout (KO) F1 mice harvested at 28 days post infection (dpi). Antibody responses were evaluated between native and detergent lysed virions. No difference in virus-specific IgM responses was observed between WT and KO F1 mice. Virus specific IgG titers against native virions were significantly higher in WT versus KO F1 mice, but this was not observed against detergent-lysed virions. IgG2 titers against native virions correlated with Apobec3-dependent neutralization, however, this was not observed for IgG1 and IgG3. These findings reveal that the Apobec3-dependent neutralizing antibody response correlates with IgG binding to intact virions and the IgG2 subclass. These findings suggest that a protective IgG response against FV is characterized by recognition of the native viral proteins and an unknown cellular effector component.

Presentation Type: Poster Presentation

12

Self-Monitoring and HappinessSamantha L. Iwerks, *Psychology***Faculty Mentor:** Alexis Karris, *Psychology*

Happiness and self-monitoring are both topics of interests for psychologists. Happiness has taken the stage more recently as psychologists have taken more of an interest in what is right with people, as opposed to the traditional interest of what is wrong with people. Some predictors of happiness have been shown to be younger age, satisfaction with income, employment, "high community trust," and religiosity (Doherty & Kelly, 2010). In addition, it has also been found that happiness is good for one's health (Veenhoven, 2008). Findings such as this continue to spur on the popularity of studying happiness. Self-monitoring, while not as recent a topic of interest as happiness continues to compel psychologists to research it further. It has been suggested through multiple studies that high self-monitors are more likely to emerge as leaders (Eby, et al, 2003), and that different aspects of high self-monitors are correlated with different eating pathologies (Bachner-Melman, et al, 2009). While both topics, happiness and self-monitoring, are of value, little is known about happiness in relation to self-monitoring. What is known is that high self-monitors are better than low self-monitors at concealing their happiness when it is proper to do so (Friedman & Miller-Herringer, 1991). The current study aims to determine whether or not there is a direct relationship between self-monitoring and individual happiness. It is hypothesized that individuals who are high self-monitors will negatively correlate with individual happiness levels and that individuals who are low self-monitors will positively correlate with individual happiness levels. The outcome of the hypotheses will be determined by having participants complete four different surveys: the Self-Monitoring Scale, the Subjective Happiness Scale, the Satisfaction with Life Scale, and the PANAS (Current). The data will be analyzed using a Pearson Correlation. The results of this study and future directions for research will be discussed.

Presentation Type: Poster Presentation

13

Modified Grading Scale for Cloze Assessments in General Chemistry

Keith Lambert, *Aviation Technology*

Faculty Mentor: Eric Ball, *Chemistry*

Cloze assessments have been demonstrated to be an average predictor of student success in general chemistry. Cloze assessments are fill in the blank tests that evaluate a student's innate understanding of a text book passage. The passages are taken from general chemistry text books and are about vapor pressure. These passages were subjected to every 7th word deletions and then modified to have the same number of parts of speech deleted. General chemistry students take the test at the beginning of a semester by going online and filling in the blanks with the words that they believe the author used. Their answers are scored and their scores are compared to their ACS exam scores and their final grades. A new grading scale has been created so that semantically and syntactically correct words are given partial credit, instead of an all or nothing grading system that is currently in use. This new grading scale was devised using the most common wrong answers from previous student's assessments and from answers that were determined to fit the blank. The new grading scale is hypothesized to predict student performance better than the current grading system that is used. Ideally, these cloze tests could be used to identify students who need extra help to pass general chemistry before they realize they need help. They could also be used to identify the most student friendly general chemistry text book.

Presentation Type: Poster Presentation

14

Insertion of Simian immunodeficiency virus-gag Sequence into Simian Varicella Virus Genome

Martin J. Lapel, *Biology*

Faculty Mentor: Andrew Bonham, *Chemistry*

Varicella zoster virus (VZV) causes chicken pox, becomes latent in ganglia and reactivates decades later to produce zoster in humans. Simian varicella virus (SVV) infection of primates causes similar disease and therefore serves as an adequate animal model to study VZV. SVV and VZV open reading frames (ORFs) share 25-75% homology. VZV ORF 66, a gene not required for replication, is homologous to SVV ORF 66 and has been shown to inhibit the production of class I major histocompatibility complex (MHC) of infected cells in culture. En passant mutagenesis was used to construct two SVV mutants using a recombinant bacterial artificial chromosome (BAC) containing the complete SVV genome and green fluorescent protein (GFP). In the first mutant (SIV gag WT), Simian immunodeficiency virus-gag (SIV gag) driven by the EF-1A promoter was inserted at the 3'-end of wild type SVV ORF 14. In the second mutant (SIV gag Δ 66), in addition to the insertion of SIV gag, stop codons were introduced into SVV ORF 66. The mutant BACs were transfected into Vero (monkey kidney) cells to produce a cytopathic effect (CPE) that was GFP-positive. The SIV gag Δ 66 virus will be used to determine if ORF 66 expression is essential for immune evasion of SVV by blocking SIV gag-specific T-cells. An understanding of the function of varicella ORF 66 may help in the development of novel vaccines in the future.

Presentation Type: Poster Presentation

15

Lesson's learned: the maturing of the outsourcing industry.David Lauten, *CIS***Faculty Mentor:** Biswadip Ghosh, *CIS*

The late 1990's was a rush to strategic outsourcing. There was a causation of reasons for this, including Y2K, dramatically increasing information technology costs, and companies wanting to focus on their core competencies, or not having the right information technology competencies, to name a few. Multi-billion dollar and multi-year outsourcing contracts were awarded. We will focus on the aerospace industry, and the automotive industry. Our focus will use Requests for Proposal, as well as Proposals, to examine what was limited to ensure vendor profit as well as reduce costs to the outsourced companies. Through these early outsourcing engagements, both vendors and client companies have matured and evolved their outsourcing portfolios. Many client companies have moved to multisourcing, and successful vendors have evolved their offerings to concentrate on services. In the current global environment, both vendors and clients have many more choices.

Presentation Type: Poster Presentation

16

Memory for identifiable visual scenes and objects is better than memory for nonsense scenes and objects.Soloman Madron, *Exercise Science & Psychology***Faculty Mentor:** Cynthia Erickson, *Psychology*

The purpose of this research project was to better understand the relationship for memory of visual scenes. Visual memory is unique because memory for images is virtually unlimited, yet most of what we know about memory comes from testing memory for words or numbers. Memory for information we understand is better than memory for information we have only processed superficially. Memory for information we understand is better than memory for information we have only processed superficially. We have found that prior knowledge influences our memory for visual scenes. For the experiment we showed participants a variety of know images, such as a flower or a person riding a bike, as well as a variety of "nonsense" images, such as fractal patterns. During our research we found that: 1) Memory for images is very good, participants were able to remember 60 novel images with near perfect accuracy when asked later if they had seen them before, 2) Memory for images depicting something recognizable was remembered better than "non-sense" images, such as the fractal patterns. These results indicate that college students may develop better techniques to remember large quantities of material if they can semantically encode a visual image for the material.

Presentation Type: Poster Presentation

17

Quantitative Bio-sensors for the Rapid Detection of Human Transcription Factors Involved in Early Cancer Detection

Morgan A. Miller, *Biology*

Faculty Mentor: Andrew J. Bonham, *Chemistry*

Early cancer detection is reliant on sensitive tools to monitor for the presence of abnormal changes in cells. Perhaps one of the most striking features of cancer is the aberrant regulation of transcription factors, proteins that control and direct gene expression. The development of novel tools to assess and understand this transcription factor dysfunction is a significant challenge. Here, we present a sensitive, DNA-based bio-sensor that is capable of quantitatively detecting transcription factors involved in cancer onset and progression. These sensors will be used to monitor the DNA-binding activities of the recombinantly expressed and purified proteins Myc, a proto-oncogene up-regulated in many cancers, and Sp1, an enhancer of gene transcription, with the goal of identifying combinatorial effects from the proteins in complex.

Presentation Type: Poster Presentation

18

NEST-SITE SELECTION OF CLIFF SWALLOWS (PETROCHELIDON PYRRHONATA) IN A METROPOLITAN ENVIRONMENT

Keely Nolan, Wanda Sowa; *Math*

Faculty Mentor: Christy Carello, *Biology*; Nels Grevstad, *Mathematical and Computer Science*

Cliff Swallows frequently nest under bridges that span rivers and creeks in the Denver metropolitan area. Our objective in doing this study was to find which aspects of a bridge and its surrounding habitat are significant to nesting Cliff Swallows. We counted intact swallow nests and nest remnants on the undersides of 80 bridges. These counts were done along two rivers and their tributaries in both urban and suburban settings. We evaluated bridge construction material and categorized the adjacent vegetation buffer as either wild-type or maintained. We found a positive correlation between a wild-type buffer and a larger number of nests. Additionally, a larger buffer size had more nests. Concrete bridges were preferred over wooden ones. An urban setting was also positively correlated to a larger number of nests than a suburban one. In order to provide adequate habitat for nesting Cliff Swallows and allow them to expand their realized niche, we recommend that new bridges built in urban settings have a large, heterogeneous, wild-type buffer, and have a mainly concrete composition on its underside. We hope that this study provides significant and useful information regarding Cliff Swallow nest-site selection; much of which is still unknown.

Presentation Type: Poster Presentation

19

Delineating Putative Amnicola Species Using Cytochrome C Oxidase Subunit I DataDarcy O'Donnell, *Biology***Faculty Mentor:** Hsiu-Ping Liu, *Biology*

The purpose of this research project is to use mitochondrial gene data in order to determine the taxonomy of mud amnicola samples. Because the universal COI primers did not successfully amplify the COI gene of the collected mud amnicola samples, I will design, test, and optimize mtCOI primers for mud amnicola. I will use these primers in order to generate sequence data for the putative mud amnicola specimens.

Presentation Type: Poster Presentation

20

Investigating the Effects of Spatial References in the Timing of the Flash-lag IllusionJacob D. Paschall, *Biology/Music Composition***Faculty Mentor:** Mark Mazurek, *Biology*

The purpose of our research is to investigate the effects of spatial references in the timing of the flash-lag illusion. The flash-lag illusion is a visual illusion that has been studied widely with a variety of different parameter manipulations. The basic illusion is as follows: a flashed stimulus, which is flashed at the moment a moving stimulus is aligned with it, will not be perceived as aligned with the moving stimulus. In fact, the flashed stimulus will be perceived as lagging behind the moving stimulus, i.e. the flashed stimulus will appear to flash after the moving stimulus has already passed the flashed stimulus' location. The question of how our brains create this illusion is hotly debated, with deep implications for our understanding of conscious awareness. To investigate this question we perform perceptual experiments with volunteer human subjects. We use the scientific computing software MATLAB® to display the flash-lag paradigm as well as for the statistical analysis of data. In our investigations we study the effects of a visually presented spatial reference on the degree of lag in the flash-lag illusion. Subjects adjust the position of a moving bar until it perceptually aligns with a flashed bar. We predict that visually presented spatial references will decrease the flash-lag effect when presented near the moving bar. If this prediction is confirmed, this will suggest that the flash-lag illusion is likely the result of higher order cognitive circuitry in the brain (e.g. circuits in the parietal or temporal lobes) rather than lower order pre-cognitive circuitry (e.g. adjacent retinal cell interactions).

Presentation Type: Poster Presentation

21

Preparation of N-Amino Acid Thiophosphoramidates from Ester Protected Amino Acid Salts

Mason R. Preusser, Troy Kahle, Christen Hardtke; *Chemistry*

Faculty Mentor: Susan Schelbe, *Chemistry*

Several novel N-Amino Acid Thiophosphoramidates were prepared from ester protected amino acid salts and either dimethyl thiophosphoryl chloride or 5,5-dimethyl-2-thio-1,3,2-dioxachlorophosphorinane. Triethylamine is used to deprotonate amino acid salts and dimethyl thiophosphoryl chloride or 5,5-dimethyl-2-thio-1,3,2-dioxachlorophosphorinane is used to derivatize the final Thiophosphoramidate. Proton NMR is used to positively determine the Identity of the products.

Presentation Type: Poster Presentation

22

Modifications to the Chelex DNA extraction method to reduce cost and extraction time

Michael D. Radulovich, William Barela; *Chemistry*

Faculty Mentor: Kelly M. Elkins, *Chemistry*

The DNA extraction methods used in crime laboratories including Chelex-100, Phenol-Chloroform-Isoamyl Alcohol, dialysis, and commercial kits (e.g. Promega's DNA IQ™ and Qiagen's QIAamp) vary widely in terms of cost and extraction time. The 5% Chelex method is the cheapest but is time-consuming due to a recommended 6-8 hour, 56 °C incubation step. In this study, we evaluated the Chelex method for DNA recovery and amplifiability using reduced incubation times (thirty to ninety minutes) and overnight without Proteinase K. The results showed that any incubation time over sixty minutes and the procedure from which Proteinase K was omitted produced results similar to those produced using the standard method. The modifications to the procedure make the Chelex method easier to implement in forensic DNA biology or molecular biology classes in a typical 3-hour lab period. Further testing is being done on reducing the concentration of Chelex and using alternative chelating agents.

Presentation Type: Poster Presentation

23

The Effects Of Microbes On The Growth Of *Solenostemon scutellarioides*Ean T. Tafoya, *Political Science***Faculty Mentor:** Christopher Meloche, *Biology*

Solenostemon scutellarioides, commonly known as Coleus, is a widely planted ornamental that is easily propagated vegetatively. As a result, Coleus has become a profitable plant that is mass produced in greenhouses. Previous studies correlate increased growth for members of the Lamiaceae family in soils where they form symbiotic relationships with mycorrhizal fungi and rhizobacteria (Morone-Fortunato & Avato 2008) (Gopal 2010). Additionally, a fertilization treatment was used to mimic greenhouse-growing conditions. The purpose of this experiment is to determine if soil inoculated with four species of the genera *Glomus*, three species of the genera *Bacillus*, and *Pisolithus tructorius* have an affect of root growth, shoot growth, and total fresh weight of *Solenostemon scutellarioides*. The experimental design consisted of 100 individual vegetative cuttings placed in four treatments groups and was conducted for six weeks. The treatments were: no fertilization/soilless potting mix, fertilization/soilless potting mix, no fertilization/ potting mix inoculated with the aforementioned microbes, fertilization/ inoculated potting mix inoculated with the aforementioned microbes. The fertilizer was a standard 300ppm liquid Nitrogen fertilizer and it was administered on a bi-weekly pulse basis. The experimental design was originally designed to apply a one-way analysis of variance to the metrics, but the study yielded an interesting finding. Those individuals subjected to the fertilized treatments suffered substantial mortality. As a result, a comparison of means and a Student's t-test will be used to determine if there is a statistically significant affect of inoculated potting mix on the growth of *Solenostemon scutellarioides*. If the treatment has a positive effect on the growth of *Solenostemon scutellarioides* then the increased yields can result in greater profits for retail greenhouses or more fit plants for recreational horticulturalists.

Presentation Type: Poster Presentation

24

Spatial Assessment of Possible Waterborne Transport Pathways for Radiological Contamination from the Schwartzwalder Uranium Mine.Wesley F. Underwood, *Land Use***Faculty Mentor:** Stella Todd, *Earth and Atmospheric Science*

The Schwartzwalder Uranium mine is an idle underground mine located in the Ralston Creek watershed of Jefferson County, approximately eight miles northwest of Golden, Colorado. The mine was in operation from 1953 through 2000, during which an estimated 789,000 cubic yards of material was removed. The mine workings consist of 19 levels of underground tunnels to a depth of over 2,200 feet below the surface. When dewatering activities at the mine ceased, water began filling the underground voids of the mine. The exposed uranium ore oxidizes and becomes water soluble, contaminating the mine pool. The water level is currently being monitored to assess possible release of contaminated mine pool water into the surface flow of Ralston Creek. Dissolved uranium in the mine pool has been measured in excess of 1,000 times the accepted drinking water standards. Water analysis of Ralston Creek and its drainage exhibit elevated levels of uranium as well as other dissolved metals.

This study was confined to the area encompassing Gilpin County, Jefferson County, Adams County and Denver County. A spatial analysis was performed to identify possible routes of waterborne contamination from the mine site.

Continued on next page.

The natural surface flow pathway from the mine site includes Ralston Creek, Ralston Reservoir, Clear Creek and the South Platte River. Many metropolitan city boundaries are either crossed by this path, or are adjacent to this possible transport route. Many artificial pathways connect, cross over or are adjacent to the Ralston Creek surface flow path, allowing transport into adjacent aquifers and municipal water supplies during normal conditions or flood events. Alluvial transportation pathways exist from the Ralston Creek watershed and water wells within this basin, and adjacent to the surface flow pathway. The Denver basin aquifers lie directly underneath or are adjacent to the Ralston Creek watershed and/or surface flow pathway.

Presentation Type: Poster Presentation

25

Delineate Species in Springsnails

Jessica L. Walsh, Corbin J. Bradford; *Biology*

Faculty Mentor: Hsiu-Ping Liu, *Biology*

The primary objectives of this study are to use mitochondrial DNA (mtDNA) markers, cytochrome c oxidase I (COI) and NADH dehydrogenase subunit I (NDI), to study the taxonomic status of *Pyrgulopsis micrococcus* populations from the American Southwest. DNA is extracted, amplified and sequenced from four populations of *P. micrococcus*. DNA sequence data is edited and analyzed. Results from this study will be used to delineate the taxonomy of *P. micrococcus*. We foresee delineation of new species as a result of sequencing the two genes.

Presentation Type: Poster Presentation

26

Designing ND4 and ND4L PCR Primers for Mitochondrial DNA in Pebblesnail

Erin J. White, *Biology*

Faculty Mentor: Hsiu-Ping Liu, *Biology*

The genus *Fluminicola*, commonly known as pebblesnails, is a diverse group of snail found in fresh waters of the northwestern United States (1). Unpublished reports suggest that the genus *Fluminicola* is made up of many still undescribed species (2). The aim of this study is the design of primers for mitochondrially encoded NADH dehydrogenase 4 (ND4) and mitochondrially encoded NADH dehydrogenase 4L (ND4L) genes (3,4). These primers will allow for more accurate species identification in the pebblesnails helping to better direct conservation and management efforts in the Klamath River, Deschutes River and southern Oregon coastal drainages (2). Within the mitochondrial ND4 and ND4L gene, conserved regions will be identified in related gastropods and primers will be designed accordingly. These new primers will be tested using polymerase chain reaction (PCR) and the resulting PCR product will be prepared and sequenced. Confirmation of the effectiveness of the primer will be done using BLAST analysis. Effective primers will be ideally used to help researchers identify approximately 40 putative pebblesnail species. It will also be possible to identify the mitochondrial gene order and location of the ND4 and ND4L using the newly designed primers.

27

The History and Influence of InfinitySeneca Widvey, *Psychology***Faculty Mentor:** Mona Mocanasu, *Math*

This project examines the history infinity and the various rules and people who have influenced this concept. Infinity goes as far back as the ancient Greeks. For the Greeks there was a dichotomy when considering the infinite. Their view broke it down into potential infinities and actual infinity. In mathematics infinity represents a series of numbers without limit. The symbol for infinity the lemniscates, ∞ , was first introduced by the mathematician John Wallis in 1655. In calculus we see as the Limit of x approaches a $f(x) = \text{infinity}$. What this is saying is, there are infinite series of numbers x can be as it approaches a . As the value of $f(x)$ can be made arbitrarily large by taking x close but not equal to a . L'Hospital understood this and in 1696 evaluated limits involving indeterminate form such as $0/0$ and ∞/∞ . L'Hopital's rule helped connect the ideas of infinity and calculus, by using derivatives to understand function behaviors as inputs of x gets larger. Cantor (1870) helped elaborate infinity with the realization that real numbers are more numerous than natural numbers. We can see this through Aleph Numbers, \aleph Aleph numbers were introduced by Cantor in Set Theory, and the Continuum Hypothesis. The Continuum Hypothesis simply states: There is no set whose cardinality is strictly between that of the integers and that of the real numbers. Kurt Gödel, 1940, and Paul Cohen, 1963, showed the Continuum hypothesis can neither be proven or disproven. Since the Greeks infinity has intrigued philosophers and mathematicians alike. John Wallis helped bring infinity into mathematics, and L'Hospital showed how to deal with indeterminate values. Cantor's incite helped refine our view of infinity, keeping infinity as an instrumental part of philosophy and mathematics.

Presentation Type: Poster Presentation

28

Tools of the Metro Ethnography LabSavannah J. Yapuncich, Vanessa Burrows, Tracy Ingram, Parker McLaggan; *Anthropology***Faculty Mentor:** Rebecca Forgash, *Anthropology*

The Metro Ethnography Lab aids students and faculty alike in their research endeavours. The Ethnography Lab is a research and training facility dedicated to the documentation and analysis of human culture. As a professional data-gathering method, ethnography involves cultural and linguistic immersion in the community under study and the collection of qualitative data through participant-observation, interviewing, recording of naturally-occurring social interaction, and other techniques. Analysis centers on the patterns and substance of human beliefs and practices as they relate to a diverse set of real world communities and issues. To aid in these objectives, the Lab offers a range of equipment. Housed within the Department of Sociology, Anthropology, and Behavioral Science, the Metro State Ethnography Lab facilitates access to state-of-the-art field equipment and technologies used by professional ethnographers, including high-quality digital audio recording equipment, microphones, and headsets. Laboratory work stations (PCs) are outfitted with software for transcribing, analyzing, and archiving digital audio, visual, and textual data. The facility also houses a small library. This presentation will expand on the uses of ethnography and the lab's equipment, and will detail the policies and procedures that the work study students have helped to develop for the lab.

Presentation Type: Other

Oral Session III 2:00 pm - 3:00 pm

ROOM 1315
Social Sciences

2:00 - 2:15

Humor and Empathy Styles

Bronwyn V. Brewer, *Psychology*

Faculty Mentor: Lesley Hathorn, *Psychology*

So often, people do not seem to take a sense of humor seriously, yet there are serious implications to ignoring humor in life. In several studies, humor has been shown to reduce stress and improve quality of life. Humor is used not only to improve one's own life, but the lives of those involved with people who have positive humor styles. It is the correlation between positive humor styles and empathy styles high in interpersonal qualities which is likely responsible for this life benefit. In this study we look at correlations of positive and negative humor styles with the different types of empathy styles. The ideas discussed are that (a) people who prefer a positive humor style would also have a higher level of empathic concern and (b) also show higher levels of other interpersonal empathy styles. People who show a higher interest in negative humor styles, such as self-defeating or aggressive humor, would show lower levels of interpersonal empathy styles, but higher levels of fantasy style empathy. The results of the initial findings of the study are also discussed.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

2:15 - 2:30

Global and Local Precedence: Do you see the big picture?

Jennifer L. Becker, *Psychology*

Faculty Mentor: Lesley Hathorn, *Psychology*

Past research has shown that there is an overwhelmingly global precedent response while viewing stimuli with global and local aspects. Global precedence is the tendency to view the image as a whole whereas local precedence is the tendency to notice the details first. Studies have shown that culture does have an effect on precedence. People in remote countries tend to demonstrate local precedence while people in western cultures tend to show a global precedence. In this study, art was incorporated in the different types of stimuli viewed by participants. All participants viewed three different types of stimuli: global and local images, comparative images and pieces of art. One group viewed the images in 5-second intervals while the control group viewed the images in 15-second intervals. They were asked to explain what they saw first in detail along with any other information they wanted to disclose. This allowed me to determine whether they were viewing the stimuli in a global or local manner. My purpose in running this study was to not only determine whether there was a global or local precedence when different images were viewed as well as, to conclude whether art was viewed in a global or local manner.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

2:30 - 2:45

Personality Traits and Bullying

Crystal M. Collins, *Psychology*

Faculty Mentor: Lesley Hathorn, *Psychology*

Bullying is a pervasive and worldwide problem found in nearly every aspect of society including children in school, young adults in college and even adults in the workplace. The primary goal of the present study is to determine if a relationship exists between the personality traits of extroversion and introversion and the tendency of a person to be a bully or be a victim of bullying. Previous research on the topic suggests a relationship between personality traits and reported bullying events. The present study asked participants to complete 2 surveys, one on bullying and one on personality traits. Results indicate that the personality trait of extraversion and the tendency of an individual to be a bully are not statistically significant, however the likelihood of an extravert to be a victim of bullying is tending toward statistically significant, which is in opposition to the original hypothesis. Upon further analysis, it was discovered that a statistically significant relationship existed between individuals who scored low in agreeableness and the likelihood of being a victim of bullying. People who score low in agreeableness may be seen by others as non-conforming and uncooperative, thereby not fitting in with the popular crowd and leaving them open to being the target of a bully.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

2:45 - 3:00

The relationship between procrastination and personality traits, and multitasking and cognitive failures

Danielle E. Hustead, *Psychology*

Faculty Mentor: Robert Schatz, *Psychology*

Research on procrastination and the five factor personality traits have shown a relationship between individuals who have a tendency to self-report high procrastination behaviors, conscientiousness, and neuroticism (McCown, Petzel & Rupert, 1987; Johnson & Bloom, 1995; Lay & Brokenshire, 1997). Research on multitasking and cognitive failures has shown that college students who have a tendency to score higher in their preference to multitask also have a tendency to score higher on the number of cognitive failures. Participants consisted of 43 undergraduate college students between the ages of 18 and 30 years. In order to determine the students tendency for procrastination behavior's, personality traits, preference for multitasking behaviors, and frequency of cognitive failures, the Procrastination Scale for Student populations (PASS), developed by Lay (1986); the 44-item Big-Five Inventory, developed by John, Donahue, and Kentle (1991); the Multitasking Preference Inventory, developed by Conte and Jacobs (2003); and the Cognitive Failures Questionnaire, developed by Broadbent, Cooper, FitzGerald, and Parkes (1982) were used. In light of previous research, it is expected that there will be a relationship between procrastination and the big five factor model, and between multitasking and cognitive failures. The data collected in the present research will be tested using the Pearson correlation model and multiple regressions.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session III 2:00 pm - 3:00 pm

ROOM 1323 *Social Sciences*

2:00 - 2:15

What Influences College Drinking?

Kristin A. Broussard, Sharon Wharton, Jacqueline LaBarbera; *Human Development*

Faculty Mentor: Lisa K. Hagan, *Psychology*

Excessive drinking among college students has many negative effects including health problems, injury, increased instances of sexual assault, property damage, and death. Understanding why college students drink can help to prevent excessive drinking and the negative effects. The purpose of this study was to examine the correlations between contingent self-worth, motives for drinking and gender differences in college drinking behaviors. One hundred and twenty-nine college students were given surveys that measured their alcohol consumption, contingencies of self-worth, and motivations for drinking. Results indicated that the best predictors of alcohol consumption were intrinsic contingencies of self-worth, and enhancement and conformity motives for drinking. These results indicate that most college students have higher alcohol consumption when they feel pressure to drink to fit in with a peer group, or to enhance the social situation they are drinking in, and that college students drink very little or not at all when they have a strong values or morals that oppose drinking.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

2:15 - 2:30

Creativity in Groups and Individuals

Maggy M. Stacy, *Psychology*

Faculty Mentor: Robert Schatz, *Psychology*

Creativity contributes to our lives in a myriad of ways. People use creative problem-solving to manage the demands of family, social engagements, work and academic endeavors. Previous research has found higher levels of creativity in group work. This study sought to measure the differences in creativity levels in group work compared to individual work. The study also focused on participants' self-perception of creativity levels before and after engaging in creativity tests. Two tests were used: the Remote Associates Test and a test including twenty-four sets of Rebus puzzles. In each session of participants, each participant did one of the tests individually and the other test in a group of three or four. In each session, the tests were given in a randomized order. In addition, sessions alternated the order of group work and individual work. The participants began their session by filling out a scale from 1 to 7, indicating how creative they felt at that moment. After the first test, they filled out this scale again. After the second test, they completed the scale for the third time. The purpose of this study was to measure both creativity differences between groups and individuals, as well as to measure differences in creativity self-assessments before and after each test. Results found that creativity scores in group work were significantly higher than creativity scores in individual work.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

2:30 - 2:45

Biomolecular Analysis of Organic Residues Extracted from Early Plains Indian Pottery

Denise Regan, *Anthropology*

Faculty Mentor: Jon Kent, *Anthropology*; David V. Hill, *Anthropology*; April A. Hill, *Chemistry*

The Welcome Home rock shelter located in Elbert County, Colorado is currently under investigation by archaeology professors and students of the Sociology, Anthropology and Behavioral Science Department at Metropolitan State College. The ceramic pottery excavated from this rock shelter is the focus of this research. The estimated dating of the ceramic artifacts is 1100 – 1300 CE. The samples being tested are retrieved from varying depth levels in the ground. Analysis of the ceramics is being done to determine what food items might have been cooked in the pottery. The methodology requires the use of a gas chromatography–mass spectrometer. Such analytical studies using the recovery of organic molecules from prehistoric pottery are a new technique that has only in recent years been applied to archaeological pottery in Colorado. The analysis focuses on the organic molecules that are extracted from the pottery sherds. Although this research is in its early stages, willow bark has already been identified in one of the samples. The organic chemical found in willow bark is salicylic acid, and chemically similar to aspirin. Willow bark of varying stages of growth was used by Plains Indians as food, or to brew a beverage and for medicinal purposes. The find, this early in the research stage, is encouraging. More substances are expected to be detected, expanding the knowledge of the cuisine of the rock shelter inhabitants.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session III 2:00 pm - 3:00 pm

ROOM 1314
Social Sciences

2:00 - 2:15

Mitigating the Backfire Effect with Self-Affirmation

Sarah B. Rowan, *Psychology*;

Faculty Mentor: Chad R. Mortensen, *Psychology*

People have a tendency to engage in motivated reasoning when considering new information that might modify their existing beliefs and perceptions about the world (Taber, Cann & Kucsova, 2009). Within politics, this drives the tendency for citizens' existing attitudes to bias their evaluation of political arguments. Nyhan and Reifler (2010) found that after reading a news article containing an ideologically relevant misperception and a correction to it, political conservatives were more likely to agree with a statement supporting the misperception. They labeled this increase in support for misperceptions the backfire effect. The present research seeks to replicate the backfire effect using a similar news article format. Additionally, self-affirmation will be used in attempt to mitigate the effect. Affirmation techniques begin with the assumption that people's beliefs are a significant part of their

Continued on next page.

identity (Cohen, Aronson & Steele, 2000). As such, providing information to people that challenges their pre-existing beliefs may threaten their identity, forcing them to cling to the pre-existing beliefs more strongly, which may help to explain why backfire effects occur. Self-affirmation techniques first bolster an individual's identity, allowing subsequent challenging information to have less of a negative impact (Cohen, et al., 2000). Four mock news articles were constructed from fact checking articles at PolitiFact.com. Eighty-three participants were assigned to three conditions. In the control condition participants read the mock articles without corrections. In the backfire condition participants read the same articles but with corrections to the misinformation added. In the affirmation condition participants first completed a self-affirmation exercise, then read the mock articles with corrections. We predict that corrections will fail to reduce misperceptions overall, and will increase misperceptions in some, causing a backfire effect. The self-affirmation treatment will reduce misperceptions and prevent the backfire effect, even among the most ideological. Data analyses are still in progress.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

2:15 - 2:30

Wuppy Wellness: A Case for the Animal-Assisted Therapy Approach

Sarah M. Deering, *Sociology*

Faculty Mentor: Alexis Karris, *Psychology*

The purposes of this review are twofold. First, it will establish the effectiveness of animal-assisted therapy techniques through an analysis of existing research. Second, these tactics will be applied to provide support for the concept of Wuppy Wellness—an inpatient rehabilitation facility that incorporates animal-assisted therapy -- designed for patients with mental disorders and/or substance dependence issues. Although only a brief snapshot of a working idea, this illustration will provide support for a new revolution in substance treatment.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

2:30 - 2:45

Is Maternal Reminiscing Style Effected by the Presentence of Documentation? A Preliminary Analysis

Kendra R. Dobie, Ashlie E. Reither, Jordace Sanderson, Dara L. Tabugadir, Sara Yacovetta;
Psychology

Faculty Mentor: Bethany K. B. Fleck, *Psychology*

This study examined the effects of documentation on maternal reminiscing style with preschool aged children. Mother-child conversations about learning events were recorded both in the presence of documentation and not. Results indicated greater maternal high elaborative speech in the presence of documentation.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session III 2:00 pm - 3:00 pm

ROOM 1326
Humanities

2:00 - 2:15

El reflejo de Calderón de la Barca en La vida es sueño.

Elizabeth M. Oquendo, *Spanish K-12*

Faculty Mentor: María Rey-López, *Modern Languages*

Muchos han escuchado el decir de “la vida es sueño, y los sueños, sueños son,” pero sin saber que tan famoso dicho proviene de la famosa obra de Calderón de la Barca, y mucho menos sin pensar que este autor haya usado esta obra en base a diferentes acontecimientos familiares que pasaron en su vida. Todos los conflictos por los cuales tuvo que pasar el autor, fueron expresados y reflejados de diferentes maneras, ya que psicológicamente estaba bastante afectado, aunque prefirió no hablar, pero sí crear. En este ensayo se explorará más allá de lo que fue la vida de Calderón, ya que los personajes usados en la obra *La vida es sueño* son similares a los de su vida familiar, especialmente el de su padre, y en el fondo manifiestan la influencia que el espíritu del Barroco dejó en sus obras.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

2:15 - 2:30

Deus Ex Machinae en el Siglo de Oro

Alejandro J. Pitillas Estévez, *Modern Languages*

Faculty Mentor: María Rey-López, *Modern Languages*

My paper explores how conflicts are resolved in Golden Century Spanish theater. The plays studied are: *La vida es sueño*, *El burlador de Sevilla*, *El caballero de Olmedo*, *El lindo don Diego*, *Las paredes oyen*, and two "entremeses". It focuses both on the idea of "honor" and the plot device known as "deus ex machina".

Mi trabajo explora cómo se resuelven los conflictos en el teatro del Siglo de Oro español. Las obras estudiadas son: *La vida es sueño*, *El burlador de Sevilla*, *El caballero de Olmedo*, *El lindo don Diego*, *Las paredes oyen*, y dos "entremeses". Se centra tanto en la idea del "honor" como en el uso del elemento llamado "deus ex machina".

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

2:30 - 2:45

"LA VIDA ES SUEÑO" ("Life is a Dream") by Pedro Calderon de la Barca.

Rocio Madera, *Spanish*

Faculty Mentor: Maria Rey-López, *Modern Languages*

"La vida es sueño" is one of the most important pieces of literature from the barroco. I will be talking about the main topics such as, family, women, men in power and the mystery of life being a dream. The central argument is the conflict between free will and fate, which I will be covering as well. "La vida es sueño" is a play by Pedro Calderon de la Barca one of Spain's greatest dramatists, and was first published in 1635. Calderon belongs to the Spanish Golden Age. In "La vida es sueño" ("Life is a Dream") the author plays with the problem of distinguishing between illusion and reality.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session III 2:00 pm - 3:00 pm

ROOM 1325

Engineering & Technology, and Mathematics

2:00 - 2:15

Proof of concept research for a local company

James Swanson, Dustin Linquist, Julia Markina, Terian Turner; *Mechanical Engineering Technology*

Faculty Mentor: Mingli He, *Engineering Technology*

Swisslog is a global supplier of integrated logistics solutions with a comprehensive portfolio of services. These services range from building complex warehouses and distribution centers to in-house logistics solutions for hospitals. Customers in more than 50 countries around the world rely on our decades of experience in planning and implementing integrated logistics solutions.

The company has been supporting Metro State Engineering Technology Department and Industrial Design Department for more than four years in providing RD&D projects for the junior and senior classes. Our student teams will perform proof of concept solutions to the selected project proposed by the company.

One of the 2011 – 2012 projects is Concept for Dispatch Cueing, which states: Swisslog's standard station only has ability to load a single carrier at a time for pending dispatch. Similar to the project above, this project would focus on addressing needs of customers with high capacity and throughput requirements for workflow at a given station. Please explore a concept or approach that could cue multiple carriers for dispatch. Ideally, this would be some kind of passive system but not required. These concepts do not need to stay within the station envelope but will need to work with existing station mechanism (motorplate). As above, the look and feel of station should be redesigned to integrate the cueing concept and also to update from. Shape development and materials exploration is encouraged. The company would not expect a proof of concept to include all of the above due to scope.

Continued on next page.

Deliverables could include:

- Fall Semester - Project proposal with project plan, budget and timeline. Also, demonstration of concept generation including sketches, renderings, CAD models and physical models as appropriate. This should be approached as if the team is selling their idea and proposal to prospective clients.
- Spring Semester – Presentation of physical proof of concept. This only needs to include the functional part of the station bin area. The aesthetic development and design can be presented with renderings, models etc.; any team is welcome to include that but not required as the ID students will be off the project for spring '11.

An interdisciplinary team was form in the fall of 2011, with 3 MET students and 5 IND students, while the MET students will finish the proof of concept project by the end of spring 2012. This presentation will report the finding and current status of the current team.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

2:15 - 2:30

The Bionic Agricultural Worker

Miguel Angel Hernandez, *Civil Engineering*

Faculty Mentor: George Donovan, *Mathematics*

To provide assistance to farm-workers, the elderly, and individuals with back injuries the following quasi-exoskeleton design can reduce repetitive movement injuries from bending down. As research and development of exoskeletons continue we have found that the majority of applications have been geared towards use by the Armed Forces. Unfortunately, individuals seeking to benefit from the use of an exoskeleton are faced with a high purchase price and lack of availability. However, within the specialty world of exoskeletons we can explore the idea of creating a quasi-exoskeleton that can meet the needs of average individuals seeking a cost effective design.

We will present a design that has real world applications while attempting to make it affordable, durable and not reliant on electrical power. To make the quasi-exoskeleton affordable we will design it from existing components already in production. Existing components will be comprised of items such as snowboard strap in bindings, ball joints, wind-up springs, adjustable poles, and boot spurs. The mechanics of our design allow the knee joint to move along with the individual during activities. The ball joint will move along with the individual's hip allowing for freedom of movement. The energy of motion from bending down will be stored in an adjustable wind up spring creating resistance throughout the entire movement. An ergonomic bar will both carry and apply resistance to the individuals mid section. The adjustable poles allow the individual to adjust the knee joint, ball joint and ergonomic bar to a desired height. Unlike specialty exoskeletons that are sensitive to repairs our design's materials will be easy to replace.

Designs of this type are very challenging. Its success is a step forward for individuals who suffer from physical injuries as a result of repetitive bending from farm work, age or injury.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

2:30 - 2:45

Sudoku Hypercubes: Construction and Bounds

Emily Hill, *Theoretical Mathematics*

Faculty Mentor: John Ethier, *Mathematical and Computer Sciences*

Much is known about Latin squares and sets of mutually orthogonal Latin squares. Sudoku squares are a specialized, more restrictive type of Latin square. In this talk, we will provide a definition of Sudoku cubes, and a method for constructing them. Additionally, we will prove that the maximum number of Sudoku cubes of order n^3 that can be constructed by this method is given by $(n^3-n)(n^3-n^2)$, a novel result. Finally, we will generalize our results to higher dimensions.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

2:45 - 3:00

The Linear Keyed Extended Range C-Soprano Saxophone

Daniel Ausmus, *Mechanical Engineering Technology*

Faculty Mentor: Mingli He, *Engineering Technology*

The fundamental design of the saxophone has been unchanged for over one hundred and fifty years. Modern players of the instrument have found the limitations of the design, exceeding the speed of its function. I have created a new design of saxophone that uses the traditional finger patterns for notes, but functions in a different way. The design will reduce clutter on the body, eliminate traditional repair problems and tasks, create a more durable padless design that is low maintenance, function faster than any saxophone currently, and to have a true tapered bore without losses of sound quality due to tone hole chimneys. The design features coiled springs, push rod key work that has never been attempted, linear key work never before attempted, tapered key cups that seal down into a true tapered conical bore, and an extended range to low G. This radical new take on the saxophone draws inspiration from automotive engines that were invented after the saxophone. A prototype is being produced currently.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Poster Session III 2:00 pm - 3:00 pm

NC BUILDING ATRIUM

1

Review of Male Bonding over 30 year

Yesenia Acevedo, Seneca Widvey, Andrew DeLao, Sara Torrez; *Psychology*

Faculty Mentor: Lesley Hathorn, *Psychology*

The purpose of this review was to determine how the literature has cited and referenced male friendships over the past 30 years. Using "Publish or Perish" the target article by Caldwell and Pepau (1982), Sex Differences in Same-Sex Friendship, was the most referenced a paper with 360 other authors referencing their work. Some characteristics identified by Caldwell and Pepau (1982) were: women placed an importance in talking and men in activities; how much time they spent with their friends, and many more. The characteristics from the original article were recorded and compared to the cited article. Articles were also coded into accurate and inaccurate interpretations of the characteristics found in the target article. Some of the key results for the characteristics were: women disclose emotional sharing more with same sex friends: 90(55.56%), Men prefer activities with same sex friends: 62 (36.27%), Women express more feelings than men: 55 (33.95%), Inaccurate citations made up 50% (81) of the articles citing the target paper (74 cited the target article inaccurately and seven cited the target article in the reference section but not in the body of the paper). Characteristics identified in their article such as, women disclose emotional sharing more with same sex friends than men do" and "men prefer activities with same sex friends more than women do" have been supported by many articles in subsequent research. What is concerning, however, is the numerous inaccuracies in citing the target article that were made. Future research should look into the accuracy of full journal publications, and compare each article's quality of citation. A comparison of publications could also be completed. This research should also be done across various fields of psychology as well as science to see if this issue happens in other fields and subgroups.

Presentation Type: Poster Presentation

2

Metagenomic Analysis of Seasonal Bacterial Communities in Alpine Soil of Rocky Mountain National Park

Tessa Arends, Margaret Balas; Biology

Faculty Mentor: Joanne Odden, *Biology*

Alpine tundra forest soils are exposed to increased nitrogen deposition and seasonal climatic changes that could affect the growth of existing and new plant life. Therefore, it is important to assess potential impacts of changing climate on these ecosystems in regards to species diversity and abundance. We have taken a metagenomic approach to identify bacterial DNA present in soil samples collected at Rocky Mountain National Park. From this, we should be able to assess both phylogenetic and metabolic diversity from these microbial communities.

We identified bacteria in alpine soil samples by building bacterial 16S rDNA libraries. Soil was collected at three sites: two alpine tundra sites (one containing organic soil and one containing mineral soil) and one site located in an Engelmann spruce forest. Soil was collected from each site on three dates in June, July, and August 2011. We performed DNA extractions on all soil samples and PCR amplified DNA using universal bacterial 16S rDNA primers. We have built clone libraries from the amplified PCR products using the TOPO TA cloning kit (Invitrogen) and have randomly selected clones to screen for inserts. We use basic alignment search tool (BLAST) searches to determine phylogeny of our cloned bacterial DNA. We have combined sequence identification with published cultivation studies to assemble an understanding of bacteria present. The bacteria identified in this study have important roles in nutrient cycling, plant symbiosis, nitrogen and carbon fixation, and possible methane degradation. These studies are critical in identifying the community members and ultimately understanding the roles and functions of soil microbes during seasonal climatic changes.

Presentation Type: Poster Presentation

3

Critical Temperature of the 1D Antiferromagnetic Ising Model on a Maximally Even Lattice

Simon Bondch, *Physics*

Faculty Mentor: Richard Krantz, *Physics*

A long-ranged antiferromagnetic Ising model on a two-sublattice Maximally Even lattice has been developed in the Mean Field Approximation. In the limit of zero applied magnetic field we determine the critical temperature, the temperature at which spontaneous magnetization on each sublattice - the so called staggered magnetization, occurs. The critical temperature depends on: 1) the structure of the lattice, 2) the number of neighbor interactions accounted for, and 3) the strength of the interaction between neighboring spins. This work is an extension of the work of Douthett and Krantz (1996), and Krantz, Douthett, Doty, (1998). This work provides a framework for understanding phase transitions in the context of lattice models which are important in fields like solid-state chemistry and superconductivity.

Presentation Type: Poster Presentation

28

Design and Build a Torsion Testing Machine

Jeramie Chlumsky, Jasmine Bott, Cody Overcash, Matthew Fauth; *Mechanical Engineering Technology*

Faculty Mentor: Mingli He, *Engineering Technology*

Torsion testing of material samples helps further student knowledge regarding the properties of those materials and enhances the foundational concepts of combined stresses and strain. The ability to witness and record these effects provides a physical example of the calculations learned in Strength of Materials type classes. The engineering department at Metro has been without one of these testing machines for several years. In light of this our aim is to design and construct a torsion testing machine capable of delivering high accuracy and reliable performance to the civil and mechanical engineering lab, at low cost. We achieved this aim by first identifying the principle requirements of designing a torsion testing machine through the use of AISI standards, and best industry practices. We then researched currently produced torsion testing machines, and finally generated a design which would conform to our cost model, and technical requirements set forth in the standards. Our design is based on novel application of currently existing technology, and relies heavily on readily available materials and parts, which simplifies construction and maintenance. The few custom built assemblies were selected to control costs, with great effect. The machine will be constructed under our budget of \$2000.00, have a life of greater than ten years, and be entirely computer controlled to eliminate safety and experimental error concerns. The torsion testing machine will be nearly world class on a shoestring budget, and will be fully realized in the 2012 spring semester.

Presentation Type: Poster Presentation

5

Labeling of Genetically Modified & Engineered Packaged Food & Produce

Meghan M. Dever, Brianna R. Crout, Kyung Lee; *Communication Design*

Faculty Mentor: Kelly Monico, *Communication Design*

Through basic research, observations, and interviews, myself as well as two other design students have found that there is a problem concerning the labeling of GMO and GE packaged foods and produce. The problem that our group is concerned about is the lack of information that household shoppers and the general public have about Genetically engineered foods.

The labeling problem we are concerned with is the lack of clarity not only in the general nutrition labels, but also in the misleading words & phrases placed on food that is labeled as natural, but is not necessary organic. The first step in our research problem is gaining information through surveys and interviews about the knowledge of the general public and household shoppers about genetically engineered foods. Through a campaign to educate the public about the harm and general knowledge about GMOs and GE food, we seek to influence a push in the labeling of Genetically modified packaged goods and produce.

Presentation Type: Poster Presentation

6

Recognizing Object Location with Pictures

Shericka D. Edwards, *Psychology*

Faculty Mentor: Lesley Hathorn, *Psychology*

Following previous research, this study was conducted on the basis of recognizing object location with pictures. People tend to think they are better than they actually are at object location memory. Many individuals are not able to notice when their surroundings have been changed in ordinary life situations. The current study tested the individual's ability to recognize when an object has been changed. The participants were tested by watching pictures on a slide show. The slide show consisted of twenty pictures in total of different household items. The participants viewed a slide and then in the next slide some items were moved around, taken out, or added.

Presentation Type: Poster Presentation

7

Oxidative Sensitivity and Anaerobic Stabilization of Colloidal Nano-Copper

Jason M. Eubank, *Chemistry*

Faculty Mentor: Michael Jacobs, *Chemistry*

Metallic nanoparticles are an area of both ancient, and ever growing interest. Applications range from as mundane as decorative glazes, to the exotic realms of quantum mechanical research and self assembling nanostructures. While much work has been done with gold and silver nanoparticles, interest in copper nanoparticles has only recently begun to receive a comparable measure of attention. One possible reason for this is the fact that copper nanocolloids are generally short lived under ambient conditions. This begged the question whether this delicate system could be modified to a more stable, and therefore more usable, form. Dilute aqueous solutions of copper (II) were reduced by sodium borohydride and aged to create copper colloids with particle size in the 10-20 nm region. These colloids proved to be very sensitive to oxidation by ambient atmospheric conditions and demonstrated a lifetime of less than 48 hours. By purging the colloids with inert gas and storing under anaerobic conditions it was possible to extend the life of the colloids indefinitely. Furthermore, upon exposing aged anaerobic colloids to ambient air, oxidation was essentially instantaneous. While further investigation into potential applications of anaerobic copper colloids is warranted, this system displays intriguing sensitivity to a variety of conditions. Additionally, the ease with which these normally short lived particles may be stabilized could prove valuable by making them available in ways that have heretofore remained unexplored.

Presentation Type: Poster Presentation

8

Synthesis of Coumarin Laser Dye Analogs using Knoevenagel and Pechmann Condensation

Alicia N. Gamble, Eric Berg, Rachel Marini; *Chemistry*

Faculty Mentor: Ethan Tsai, *Chemistry*

Derivatives of coumarin have been widely used in the field of science, from blood-thinners to laser dyes. Coumarin laser dye analogs have strong fluorescent properties and are efficient at emitting wavelengths in the blue-green spectrum. Synthesizing coumarin laser dye analogs and analyzing their fluorescent properties would give undergraduate students more experience with fluorescent organic compounds and the unique syntheses that are used to prepare them. In our research, four different coumarin derivatives were synthesized (3-acetyl-7-(diethylamino)-2H-1-benzopyran-2-one, 4-methylumbelliferone, 5,7-dihydroxy-4-methylcoumarin, and 5-hydroxy-4,7-dimethylcoumarin) using the Pechmann and Knoevenagel condensation, and each product was analyzed for absorbance and emission. The analyses of the products were compared to ¹H-NMR, IR, melting point, absorbance, and emission standards, all of which were comparable. For future research, quantum yield of each product is to be calculated.

Presentation Type: Poster Presentation

9

Comparison of Two Prion Protein Mutants and Their Impact on Stability in Several Mammalian Species

Emily R. Hager, *Chemistry*

Faculty Mentor: Kelly Elkins, *Chemistry*

Prion diseases are caused by the misfolding and aggregation of the prion protein in the nervous system. There is considerable homology among mammalian prion proteins however the diseases rarely cross the species barrier. Several mutations associated with salt bridges within the protein are associated with prion diseases in humans and were probed with molecular mechanics computations. These mutations were also investigated by molecular dynamic studies. The R208H mutation does decrease the stability of each of the four mammalian prions studied, but interestingly the D178R mutant increases stability for each of them. Although important for overall stability of the prion protein, the salt bridges seem to be less significant in the changing of the prion protein from its native form to the disease associated misfolded form.

Presentation Type: Poster Presentation

10

Influence of Changing Environments

Tandis Hashemi, *Psychology*

Faculty Mentor: Lockwood Linda, *Psychology*

In today's society, it is very important for adolescent's to feel as if they fit in amongst their peers. In order to feel part of their peer group, most adolescent's will conform to the norms and give into peer-pressure to think and act like the peer group. The present study examines the susceptibility of individuals to conform to peer-pressure based on the number of peers in the room. Participants 18 years of age or older were selected from the Introductory Psychology Research Pool at Metropolitan State College of Denver and were broken into two groups; one group with one confederate, and the second group with three confederates to test how likely people were to conform depending on the number of confederates. The confederates in each case participated in solving a simple math problem and when asked, they provided the wrong answer. The participant's willingness to conform to the wrong answer was measured. It was hypothesized that the individuals in the condition with three confederates were more likely to conform than the individuals in the condition with only one confederate. A between subjects design with a Chi Square statistical analysis was used to test the hypothesis. The results of this study and future directions for research will be discussed.

Presentation Type: Poster Presentation

11

Metro State Biodiesel Research Project

Keith R. Hensley, Lee Foley, Jenifer Wood, Andrew Williams; *Chemistry/Biology*

Faculty Mentor: Dr. Eric Ball, *Chemistry*

For the past few decades, renewable energies have become increasingly popular due to the escalating price of fossil fuel, and increased awareness of the negative impact fossil fuels have on the environment. Biodiesel is a major component of these modern renewable energies. This alternative fuel source results from the conversion of triglycerides to their individual esters, through the process of trans-esterification. Traditional feed stocks included both waste and virgin vegetable oils, however recent interest in the use of algae has been extensively studied as well. This new found interest in algae stems from the fact that algae is nonessential to humans as a major food source, and may potentially be cultivated in areas of the world that would otherwise not be utilized. The research investigated the feasibility of the production of biodiesel from both marine and freshwater algae, as well as traditional feed stocks, for the Auraria Campus. Different aspects of the research included; algal cultivation and extraction, determination and quantification of biodiesel yield using GC-MS, and physical analysis of the fuel quality. Two species of algae, including *Botryococcus braunii* and *Tetraselmis suecica*, were cultivated through the use of a bioreactor in order to mimic natural cycles while providing a closed system. The oil was extracted from algae using a Soxhlet Extractor. A method was developed for testing the quality of biodiesel using GC-MS with a nonpolar column and using Methanol as the solvent. The heat of combustion of biofuels was determined through the process of bomb calorimetry, and the titration of FFA (Free Fatty Acids) was used to determine purity and cleanliness of the biofuel product. While our research has not yet shown that large scale biodiesel production on Auraria campus is completely feasible, there are many other aspects surrounding this sustainable liquid fuel that can be studied.

Presentation Type: Poster Presentation

12

Xenopus laevis Oocytes: Maturation and Apoptosis

Trevor D. Hostetter, Aviva A. Bulow; *Biology*

Faculty Mentor: Douglas W. Petcoff, *Biology*

Mature *Xenopus laevis* oocytes go through processes which quickly lead to apoptosis. The processes leading up to this programmed cell death include critical alterations of sphingolipid metabolism. In order to mature immature *Xenopus* oocytes, progesterone (PG) is administered extracellularly, which induces maturation events. Additionally, maturation can be brought about by treatment with sphingomyelinase (SMase), which leads to an increase in ceramide (a sphingolipid). The matured oocytes (arrested in meiosis II), die much more quickly than those that are not matured (arrested in meiosis I). The apoptotic process involves phosphorylation of the serine residue at position 128 (S128) on the protein Bad by the kinase JNK. Inhibition of JNK decreases the phosphorylation of S128 residues. The phosphorylation of S128 was demonstrated by Western blotting with a phosphospecific Bad antibody: anti-S128. Furthermore, simple morphological changes can be observed in maturing and matured oocytes. Additionally, ceramide injection was shown to increase the levels of caspase-3, which is paramount in the apoptotic process. For future research, we will be injecting immature oocytes with mRNAs involved in the apoptotic process in order to characterize how varying levels of translation (and thus the subsequent proteins) affect apoptosis in *Xenopus* oocytes.

Presentation Type: Poster Presentation

13

Why don't more people take advantage of riding bicycles in the Denver metro area?

Jarrold L. Joplin, Aina Thomas, Sam Adams, Sonja Calhoun; *Communication Design*

Faculty Mentor: Kelly Monico, *Art- Communication*

Denver is one of the healthiest cities in the nation, yet ranks #14 on the list of bicycling and walking level (www.peoplepowermovement.org). Our goal is to utilize the existing research of the benefits of bicycling including; economic, mental & physical health, and sustainability to encourage more use of bicycling in the Denver metro area. We desire to present final results to the City Council of Denver and other significant cycling advocacy groups in the city of Denver and the State of Colorado.

Many programs already exist to encourage bicycling in urban areas. We wish to continue education and awareness of these programs and initiatives. We need an increase in public support to increase the number of bicyclist and facilities. Potential client goals are; to reduce traffic congestion, parking issues, reduce CO2 emissions and toxic air pollutants, and increase the overall health among the community, and other yet to be discovered benefits.

Individuals in the Denver Metro area who do not use a bicycle as an alternative method of transportation which includes; urban and suburban dwellers, commuters who work within a 5 mile or less from their homes, and those who don't feel comfortable on a bike. This also includes consideration for children and parents riding to school, and for individuals who have a less than active lifestyle.

Cyclist vs. Bike rider? Is there a difference? The stereotype or misconception exists that if you ride a bike you can't afford a car and are poor. Unless you have a high-end bicycle and accessories, many people feel that you are one the road because of necessity, not because it was a choice. There needs to be a cultural shift in perception of bicycling, to see biking as a legitimate transportation option.

Presentation Type: Poster Presentation

27

Mass Distribution in Galactic Interactions using Computer Simulations

Robert Klados, *Physics*

Faculty Mentor: Kamran Sahami, *Physics*

A computer simulation of galactic collisions has been prepared to investigate a variety of stellar interactions between galaxies passing through a localized region of space. Interactions of two galaxies have been modeled using Matlab, simulating collisions from angles at varying initial speeds. A focus of this project will be on both the percentages of intergalactic mass transfer that occurs between two interacting galaxies and creating a catalog to aid in observations of bodies whose current state may be the result of past galactic interaction.

Presentation Type: Poster Presentation

14

Investigation of EfaR, a DtxR-homologue, in *Enterococcus faecalis*

David P. Merriam, *Biology*

Faculty Mentor: Sheryl Zajdowicz, *Biology*

EfaR is an iron-dependent repressor protein found in *Enterococcus faecalis*, a common nosocomial pathogen closely related to the *Streptococcus* genus. EfaR shows strong homology with DtxR, a repressor in *Corynebacterium diphtheriae* which has been shown to regulate expression of the potent diphtheria toxin, as well as iron uptake, and response to oxidative stress. DtxR is a key factor in expression of virulence and pathogenesis.

The goal of this study is to examine EfaR and identify genes within the genome of *E. faecalis* that are regulated by this protein. We will generate a reporter system in *Escherichia coli* to analyze the regulatory effect of EfaR on a variety of genes involved in oxidative stress response or iron uptake, utilizing promoter regions for these genes and a reporter gene (*lacZ*) in an expression vector (pSPZ). The outcome of this system will give us a more clear understanding of the regulatory effects of EfaR in low iron or oxidative stress conditions, such as in the host body, and its effects on virulence.

Presentation Type: Poster Presentation

15

Preparation of Pharmacy drugs, Acetaminophen, Aspirin, and Sulfanilamide

Max M. Minnig, Mulualem Asmare; *Chemistry*

Faculty Mentor: Susan Shelble, *Chemistry*

Aspirin was synthesized from salicylic acid. Acetaminophen was synthesized from p-aminophenol. Sulfanilamide was synthesized from aniline. The final products, aspirin, acetaminophen, and sulfanilamide were tested by IR, pNMR, melting point, solubility, and thin layer chromatography. Intermediate products of sulfanilamide such as acetanilide were tested by IR, pNMR, and melting point.

Presentation Type: Poster Presentation

16

New Tools to Detect and Investigate the Proteins of the Childhood Cancer Retinoblastoma

Kathryn Norquest, *Chemistry*

Faculty Mentor: Andrew Bonham, *Chemistry*

Retinoblastoma is a destructive childhood cancer that develops in the retina of the eye and often results in blindness. Interestingly, a large portion of children with the disease have a mutation in the gene RB1, which codes for a tumor suppressor protein. The retinoblastoma protein plays a critical role in regulating cell cycle progression by binding members of the E2F family of transcription factors. These are proteins that regulate gene expression. To gain insight into the means by which Rb dysfunction affects the cell, we are investigating recombinantly expressed and purified constructs of Rb and E2F1 to determine the impact of Rb on E2F1 DNA-binding activity. In order to observe this process, we are simultaneously developing sensitive, DNA-based bio-sensors that allow rapid detection of these interactions with a simple fluorescent readout.

Presentation Type: Poster Presentation

17

Antimicrobial abstract of *Geum rossii*

Kelly Norris, *Biology*

Faculty Mentor: Nancy Duteau, *Biology*

Geum rossii, known as Ross' avens and alpine avens, can be found in North America. It has a distribution that extends across northern Canada and the high mountains of the western United States, in high-elevation habitats. This plant is common in the Colorado Rockies. Anecdotal evidence suggests that it has antimicrobial agents. In this project we treated dried leaves with boiling water, 95% ethyl alcohol, or acetone to extract potential antimicrobial agents and tested extracts for activity against *Escherichia coli* and *Staphylococcus aureus*.

Presentation Type: Poster Presentation

18

The Wright Foundation

Michael J. Piccone, *Aviation Management*

Faculty Mentor: Jeffery Price, *Aviation and Aerospace Science*

Each generation since the baby boomer has become more aware and also has internalized the environmental reality that the world's future needs energy sources must minimize the carbon footprints left by humans. The green environmental movement, with its strong emphasis on sustainability, is becoming a part of everyday life. The Wright Foundation will showcase the advantages of green aviation by providing practical educational experiences to high-school students with an interest in aviation and in environmental sustainability.

Continued on next page.

THE WRIGHT FOUNDATION (TWF) mission is to promote, teach, train, and encourage Colorado's youth interested in sustainable (green) aviation. We encourage all who participate in TWF program to do so fully with an open and receptive mind. Wright Foundation participants act on their Inspiration, willingly engage in Exploration, and value Innovation.

The Wright Foundation will showcase and introduce the world of green aviation to a group of individuals who could become pioneers in the field of sustainability. TWF allows young adults to participate in a practical, future focused, and interactive education experience. The Wright Foundation participants are ambassadors for not only the aviation industry but for sustainability efforts. Participants will use their Wright Foundation experience to become active participants in designing a more sustainable world. There is a very perceptible change occurring in America with the need to incorporate sustainability principles into all aspects of life. The Wright Foundation will provide participants an introduction to sustainability in aviation; this newly emerging field will need leaders and The Wright Foundation is pleased to be working with individuals who will be leading this change.

Presentation Type: Poster Presentation

19

Superconducting Cyclotron: Coil Windings and Radio Frequency Systems.

Katherine E. Piele, Chris Ray; *Physics*

Faculty Mentor: Grant Denn, *Physics*

We discuss preliminary results in the design and manufacture of a 12 inch cyclotron, which is to be built as a tool for undergraduate physics pedagogy. This part of the design concentrates on the (a) coil winding and (b) radio frequency system. The coil windings will be made of superconducting yttrium barium copper oxide wire surrounded by liquid nitrogen and housed in a vacuum chamber. The radio frequency system controls the acceleration of the particles and includes the signal generator, a power amplifier, and the control circuitry.

Presentation Type: Poster Presentation

20

Optical Observations of Active Galactic Nuclei

Hannah I. Rafle, *IDP - Aerospace Physics*

Faculty Mentor: Alberto Sadun, *Physics*

Active Galactic Nuclei (AGN) are distant objects which are a large part of the theory of galactic formation. AGN are not yet well understood but it is thought they are formed by the accretion of material into super-massive black holes and that AGN are the early stages of the formation of a galaxy in the young universe. Therefore to observe AGN one must look into the far distant universe, and thus the distant past. AGN emit radiant energy across the frequency spectrum, including the visual frequencies. The observations made using telescopes from New Mexico Skies observatory equipped with CCD cameras. The images were then processed by using Mira Pro 7, photometry software. This allows for the luminosity of the object to be determined. The data is the used to make a light curve for the object. It is hoped that continued observation of AGN would give a better understanding of how these objects form and change over time.

Presentation Type: Poster Presentation

21

Does your short term memory deceive you?

Ramona C. Ruibal-Kurylas, *Psychology*

Faculty Mentor: Leslie Hathorn, *Psychology*

Previous change blindness studies have shown that people have limited ability to detect changes between scenes when attention is disrupted. The purpose of this study was to evaluate whether participants with a higher working memory capacity were better able to detect changes than those with a lower working memory capacity.

Presentation Type: Poster Presentation

22

Fur-like Protein Characterization in *Streptococcus agalactiae*

Shane E. Smithee, *Biology*

Faculty Mentor: Sheryl Zajdowicz, *Biology*

Streptococcus agalactiae is commonly known as Group B *Streptococcus* (GBS) and has been implicated in several different pathologies including infections causing mastitis in cows, septicemia, meningitis in neonates, and has also occasionally been isolated in infections involving domesticated pets, frogs, and fish. *S. agalactiae* rapidly adapts to many different stress conditions including iron depletion, oxidative stress, nutrient depletion, and alterations in temperature. Little is known regarding the regulatory mechanisms involved in these responses. Analysis of the genome of *S. agalactiae* reveals a gene encoding a Fur-like protein, SAK_0465. In other bacteria, Fur is an important regulator of a variety of cellular functions, including iron uptake and oxidative stress response. The role of the Fur-like protein of *S. agalactiae* has not been investigated. Our current research involves constructing a SAK_0465 gene knockout mutant of *S. agalactiae* in which we will determine its effects on stress adaptation. Additionally, to further this research, we PCR-amplified the fur-like protein gene from *S. agalactiae* and cloned it into His-tagged protein expression vectors, pMHV and pET22b. The resulting expression vectors were transformed into *Escherichia coli*, and protein expression was induced. Following induction, the protein fractions were observed for induction of the predicted 43.9 kDa His-tagged SAK_0465. The His-Tagged protein was purified using metal affinity column chromatography and the elution fractions were observed by SDS-PAGE. While observed in the cell lysate, following metal affinity chromatography, no apparent Fur protein was isolated, which may indicate that it shares similarity with several other Fur proteins that bind tightly to columns using His-tag isolation.

Presentation Type: Poster Presentation

23

Misconception and Myth of Psychology

Ribka Frisa Tadesse, *Psychology*

Faculty Mentor: Lesely Hathorn, *Psychology*

Several myths are imbedded in cultures, society and individual way of life. Prior research has shown a robust effect for misconceptions about psychology. In part, this is due to media effects as a source of misinformation. This study evaluated student beliefs about psychology and their ability to judge what they knew to be true.

Presentation Type: Poster Presentation

24

Detection of Archaeal amoA Gene Sequences in Enrichment Cultures from a Constructed Sewage Treatment Wetland

Piper Wedman, Shane Askar; *Biology*

Faculty Mentor: Rebecca Ferrell, *Biology*

In 2006 samples were collected from CEA-I, a constructed sewage treatment wetland (CSTW) located in Akumal, Mexico. CSTW have been found to be an effective method of removing nitrogen from wastewater in order to prevent environmental pollution. We are using these samples to investigate the presence of nitrifying Archaea in the CEA-I wetland. Enrichment cultures were inoculated with water from this CSTW, and grown under high ammonia conditions. DNA extracted from these CSTW enrichment cultures was used as a template for PCR, indicating the presence of ammonia oxidizing archaea (AOA) in our samples. We used specific primers to amplify the AOA ammonia monooxygenase A (amoA) gene in DNA from enrichment cultures, showing the presence of AOA in the CSTW. AOA are typically reported in low ammonia environments, with only a few previous reports of AOA from an ammonia rich habitat. To further characterize these organisms, molecular cloning of PCR amplicons and DNA cycle sequencing analysis were used to examine the amoA genes, and preliminary sequencing data are currently being analyzed.

Presentation Type: Poster Presentation

25

9/11 Conspiracy Theories and The Unemployment RateSeneca Widvey, *Psychology***Faculty Mentor:** Lesley Hathorn, *Psychology*

It was hypothesized that there would be a positive correlation between the unemployment rate and uploaded 9/11 conspiracy theory videos. The unemployment rate for the last ten years since the 9/11 tragedy was compared to a Google search, by week, of uploaded 9/11 conspiracy theory videos. The unemployment information from 9/15/2001 to 11/26/2011 was gathered from the Bureau of Labor Statistic. The unemployment information was broken down by week as well as by Initial Claims: seasonally adjusted, Continued Claims, and Covered Unemployment. A Google search was performed filtering for videos within one-week increments between 9/15/2001 to 11/26/2011. Two search terms were used: 9/11 conspiracy and Sept 11th conspiracy. The number of video that appeared under the search conditions was recorded. The results of the 10-year analysis of Total Conspiracies and Initial Claims: seasonally adjusted was, $r(533)=0.200, p<.000$; Total Conspiracies and Continued Claims, $r(533)=-0.238, p<.000$; Total Conspiracies and Covered Unemployment, $r(533)=-.161, p<.000$. The correlation is significant at the 0.001 level (2-tailed). The results of the 5-year analysis of Total Conspiracies and Initial Claims: seasonally adjusted was $r(361)=0.192, p<.000$; Total Conspiracies and Continued Claims seasonally adjusted, $r(361)=0.233, p<.000$; Total Conspiracies and Covered Unemployment, $r(361)=-.341, p<.000$. The correlation is significant at the 0.001 level (2-tailed). For the 10 and 5 year analysis there is a positive correlation for Initial Claims: seasonally adjusted and Continued Claims: seasonally adjusted. This indicates that the unemployment rate is correlated with uploads of 9/11 conspiracy theories. This is consistent with other finding such as Goertzel's (1994) telephone survey showing belief in conspiracies was correlated with insecurity about unemployment. One on the limitations of this study is the proper identification of conspiracy videos versus debunking videos. Future research could evaluate this data, but a large time commitment would be needed.

Presentation Type: Poster Presentation

26

A decrease in beaver activity results in an decrease in biodiversity at a beaver lodge in Breckenridge Colorado.Angelina P. Woehler, *Biology***Faculty Mentor:** Christy A. Carello, *Biology*

The North American Beaver (*Castor canadensis*), a keystone species, plays a crucial role in biodiversity. Beavers not only help to maintain stream and river flow, decrease the likelihood of flash flooding and erosion, but also create vital habitat for other wildlife. We analyzed photographs taken by a permanently mounted motion sensor camera aimed at a beaver lodge in Breckenridge Colorado from 2008 to 2011. We quantified the number of visits animals paid to the lodge and the number of species that visited the lodge. We found a significant decrease in the number of total animals and number of species visiting the lodge over the four years. We also found a significant correlation between the decrease in the numbers of beaver's and the number of other animals visiting the lodge. Habitat augmentation during the four year time period has been dramatic with changes in the overall hydrology of the system from large-scale human development upstream of the wetland system. Since beavers are a keystone species and have an effect on the biodiversity of an area, their presence is extremely important. Our data shows that not only are beaver ponds a valuable resource for other species, but that beaver lodges are too. Conservation actions should be taken to make sure beavers remain in wetland habitats in order to maintain biodiversity.

Presentation Type: Poster Presentation

Oral Session IV 3:15 pm - 4:00 pm

ROOM 1315 *Social Sciences*

3:15 - 3:30

Terror Management Theory Approach to the Explanation of Why People May Avoid People with Disabilities

Gene M. Balzer, *Psychology*

Faculty Mentor: Robert Schatz, *Psychology*

This study examined avoidance that occurs when participants see someone in a wheelchair. The study used a 2x2 between-subjects factorial design. There were two independent variables: mortality salience and wheelchair salience. To manipulate wheelchair salience the participants were greeted by the researcher in either a wheelchair (wheelchair salience condition) or a standard chair (control condition). To manipulate mortality salience participants completed a survey in which they wrote about their own death (mortality salience condition) or dental pain (control condition). After a brief delay, participants completed a death thought accessibility measure using a word stem completion task. Then the participants were asked to move their chair next to the researcher and complete a bogus "find the faces" in the picture task. They were instructed that after completing the picture task they were free to go. The avoidance dependent variable was measured by the distance the chair was placed from the researcher and the time spent on the picture task. Death thought accessibility was measured by the number of death related words solved in the word stem completion task. The predictions were that wheelchair salience and mortality salience would result in greater chair distance from the researcher, and quicker completion of the picture task which would allow the participant to leave the presence of the researcher. In addition, we will test the role of death thought accessibility as a mediating variable. The findings will be discussed in terms of factors that elicit avoidance of people with disabilities, especially the potential role of mortality salience.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

3:30 - 3:45

Women at Home, The Backbone of the Civil War

Lyric Stott, *History*

Faculty Mentor: Patricia Richard, *History*

The Civil War was an exciting and divisive time in American history. Romantic scenes of brave soldiers fighting for their values and bloody battles with brother fighting against brother paint an interesting, but incomplete picture. While the fighting was between men, the women at home were the backbone of the cause. Women's role on the home front was crucial in aiding the soldiers and the cause in both the North and South during the Civil War. Women "recruited" men, wrote letters, participated in Soldier Aid Societies and made sacrifices with food and clothes for themselves and their children.

In reading through the war diaries of women and the works of Dr. Patricia Richard, the impact of women on the war will be highlighted in a way usually not usually emphasized in Civil War history.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

3:45 - 4:00

Empathy-Based Assistance

Liliana Pascal, *Psychology*

Faculty Mentor: Robert T. Schatz, *Psychology*

Past studies on helping have shown that empathy and reciprocity can increase helping behavior because they generate a pro-social motivation to assist others.

Our study explored the effects of empathy and reciprocity on helping. In order to create a helping situation and feelings of empathy the experimenter acted worried as she forgot to give her previous participants from a different research study a word formation task to perform, and told the participants that without it her paper cannot be turned in time. She asked participants to complete as many word formation tasks as they were willing to do to help her. The number of tasks completed, the total time spent, and the amount of words were used to measure the effort that participants put into helping. The participants were randomly assigned to one of two experimental conditions: (1) the empathy only condition - where the experimenter requested help on the word formation tasks or (2) the reciprocity condition - where the participants also had been informed at the beginning of the study that the experimenter is doing them a favor by only giving them four of the ten questionnaires assigned by the professor for purposes of the experiment. In reality all participants completed the same four questionnaires. We predicted that participants in the reciprocity condition would put more effort into helping than participants in the empathy only condition.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session IV 3:15 pm - 4:00 pm

ROOM 1326

Humanities

3:15 - 3:30

Don Juan: investigación del mito.

Samantha Kidd, *Modern Languages*

Faculty Mentor: María Rey-López, *Modern Languages*

Conocido como uno de los mitos literarios más famosos, el de Don Juan ha sobrevivido tras los siglos y hoy en día mantiene una imagen bastante fuerte en la conciencia del público. Desde que Tirso de Molina publicó *El Burlador de Sevilla y convidado de piedra*, este personaje ha inspirado obras de "Molière, Dumas, Byron, Espronceda, de Musset, Zorrilla [y] Shaw", entre varios otros. Para poder entender porque este mito sigue siendo tan fuerte, será importante estudiar las raíces del mito popular, entre ellos las obras de Tirso de Molina y José Zorrilla. La figura de don Juan es el enfoque de ambas obras y, aunque hay varias semejanzas, también existen distintas diferencias que influyen la formación del mito. Mientras el personaje don Juan no es único a estas obras, esta investigación enfocará en aquellas dos para dar énfasis a las dos obras españolas más destacadas en su desarrollo de las características la persona que mejor representa lo que conocemos hoy día como don Juan.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

3:30 - 3:45

The Life of Calderón in "La Vida es Sueño"

Adrie A. García, *Spanish*

Faculty Mentor: María Rey-López, *Spanish*

Pedro Calderón de la Barca is one of Spain's most celebrated playwrights. His work, along with that of Lope de Vega, culminated and exemplified the Golden Age of Spanish Baroque theater. Aside from the theater, Calderón's personal life is no less noteworthy.

This paper investigates the many aspects of the dramatist's colorful life that are conveyed through one of his greatest works, *Life is a Dream*. The research depicts the parallels between the personal opinions and dilemmas of the play's characters with those of Calderón, spanning from the volatile relationship with his father and his rebellious spirit to his brushes with the law despite an amicable relationship with the King. Note: This work will be presented in Spanish.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

3:45 - 4:00

La Crisis del Agua

Sofia Solano, *Modern Languages*

Faculty Mentor: Roberto Forns-Broggi, *Spanish*

The presentation *La Crisis del Agua*, came from the final portfolio done for the course Spanish American Literature of 19th and 20th century. This course served as my senior project.

The purpose of the final portfolio was to research and reflect, in Spanish, upon one of the environmental crisis that we had either read literature about, and/or had seen peer presentations, on during the course.

The presentation, in Spanish, *La Crisis del Agua* focuses on the world's water crisis. The research focuses on the role that globalization and corporations have played, and continue playing, on the world's lack of potable water. The presentation introduces the term ecological racism, and is a call to action for education, activism, and equal ecological/humanitarian rights for all!

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

Oral Session IV 3:15 pm - 4:00 pm

ROOM 1325

Engineering & Technology, and Mathematics

3:15 - 3:30

Mobile Windmills for Emergency Response

Steven R. Chance, *Mechanical Engineering Technologies*

Faculty Mentor: Devi Kalla, *Mechanical Engineering Technologies*

While doing research for a technical writing course, I stumbled upon a little gem; a Vita publication from two members of The University of California who developed a working prototype design of a low-tech windmill, using readily available materials, like recycled sheet metal and auto parts. They published the complete design, parts lists, assembly drawing and performance results.

What I suggest is a duplication of this prototype for validation of the performance results. A “validation experiment” serves two purposes; Along with a working full scale windmill, this project would lay the ground work for the making and testing for any windmill. Colorado has real relationships with windmills and many jobs are available in the state for college graduates with skills and knowledge in the field!

The working wind mill prototype, built in its simplest described and defined design interpretation, provides for all predicable projected results, in its most expedient and affordable construct; a 2 meter rotor on a fixed turntable, without feathering brake system (using a manual brake system) or directional vane is sufficient to accomplish the validation of performance results.

Beyond this validation experiment are practical experiences from conducting wind speed test to performing the final performance analysis; along with acquiring, storing and inventorying required parts for the 5 major sub-assemblies are practical skills like carpentry, welding, machining and assembling the as well as the logistics of transportation and deployment.

If Metro State wished to retain this first prototype windmill, a permanent location on campus grounds could be found with adequate sustained winds for conducting the performance tests, the windmill could be assembled and tested on site. Metro State would have a truly unique sculpture which could be rendered inactive until perhaps following engineering students would complete the windmills full design potential, with predictable historical results to be bettered!

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

3:30 - 3:45

Investigation of 7-Edge Polygonal Chains, Stuck Unknots and Stuck Trivial Chains

Susannah Coates, Alees Seehausen; *Chemistry*

Faculty Mentor: John Carter, *Mathematics*

The space of all polygonal chains, Ch_n , without length restrictions is trivial, that is, all knotted chains may be un-knotted and straightened. However, when length restrictions are included, the space $\text{Ch}_n(l_1, \dots, l_n)$ has a variety of interesting topological properties. Using physical modeling and topological methods, we investigate the equivalence classes and properties of the space of 7-edge chains, $\text{Ch}_7(l_1, \dots, l_7)$. We also investigate "stuck" unknots, loops which contain no knots and yet are not isotopic to a convex polygon; and "stuck" trivial chains, chains which contain no knots and yet are not isotopic to a straight trivial chain.

If LaTeX code is allowed, then the following should be used instead of the above:

The space of all polygonal chains, $\text{Ch}_{\{n\}}$, without length restrictions is trivial, that is, all knotted chains may be un-knotted and straightened. However, when length restrictions are included, the space $\text{Ch}_{\{n\}}(l_{\{1\}}, \dots, l_{\{n\}})$ has a variety of interesting topological properties. Using physical modeling and topological methods, we investigate the equivalence classes and properties of the space of 7-edge chains, $\text{Ch}_{\{7\}}(l_{\{1\}}, \dots, l_{\{7\}})$. We also investigate "stuck" unknots, loops which contain no knots and yet are not isotopic to a convex polygon; and "stuck" trivial chains, chains which contain no knots and yet are not isotopic to a straight trivial chain.

Presentation Type: Oral Presentation (10 minute maximum +3 minutes for questions)

INDEX of PRESENTERS

A

Acevedo, Yesenia, 71
Adams, Sam, 77
Akotaobi, Chukwuemeka, 16
Allard, Christina, 7
Al-Shaer, Layla, 46
Anderson, James, 45
Andrus, Mary, 18
Arends, Tessa, 72
Armas, Camille, 40
Askar, Shane, 82
Asmare, Muluaalem, 29, 78
Atty, Linda, 48
Auger, Jeff, 21
Ausmus, Daniel, 70

B

Balas, Margaret, 72
Balzer, Gene, 84
Barela, William, 58
Barstow, Jennifer, 21
Bathe, Grant, 22
Becker, Jennifer, 62
Berg, Eric, 75
Berglund, Majken, 10
Beyette, Bitel, 43
Bondch, Simon, 72
Bott, Jasmine, 73
Bradford, Corbin, 60
Brewer, Bronwyn, 62
Broussard, Kristin, 38, 64
Bucani, Peter, 22
Bulow, Aviva, 19, 77
Burrows, Vanessa, 61
Burtard, Alicia, 30
Burton, Anna-Belle, 40

C

Calhoun, Sonja, 77
Carlile, Melissa, 26
Carpenter, Chris, 48
Caruthers, Cary, 18, 45
Chance, Steven, 87
Chavez, Irene, 49
Chlumsky, Jeramie, 73
Coates, Susannah, 88
Collins, Crystal, 63

Copley-Smith, Trelawney, 39, 49
Courtney, Cory, 24
Crout, Brianna, 73
Crowe, Keith, 12
Cupit, Nicki, 38

D

Dahlstrom, Meredith, 23
Deering, Sarah, 66
DeGeneres, Aleah, 32, 50
Dehmel, Ian, 8
DeLao, Andrew, 32, 50, 71
Dever, Meghan, 73
Dobie, Kendra, 66
D'Oench, Holly, 50
Drake, Diana, 37
Dunki, Nicole, 23

E

Edwards, Shericka, 32, 50, 74
Egeland, Heather, 13
Ennis, Clare, 24
Eubank, Jason, 74

F

Farazandeh, Zahra, 51
Farrera, Vanessa, 36
Fauth, Matthew, 73
Faux, Amanda, 24
Feese, Amber, 51
Fiegl, Jacki, 36
Finch, Shanna, 23
Fitt, Ryan, 47
Foley, Lee, 76
Forland, Blake, 45

G

Gallegos, Stephanie, 52
Gallegos, Rebekah, 18
Gamble, Alicia, 75
García, Adrie, 86
Gates, Patrick, 11
Gebru, Amanuel, 52
Gete, Yantnew, 24
Gill, Jayson, 7
Gipson, Stephanie, 33
Gonzalez, Amber, 14

Goring, Jenny, 15
Grant, Brian, 17
Guidry, Alyssa, 25

H

Hackney, Brandon, 44
Hager, Emily, 75
Hankins, Carrie, 11
Hardtke, Christen, 58
Hashemi, Tandis, 12, 36, 76
Heilman, Karl, 53
Hensley, Keith, 76
Hernandez, Miguel, 69
Hess, Alek, 38
Hill, Emily, 70
Hill, Scott, 47
Hoag, Brett, 17
Hoffman, Ryan, 32, 50
Hornbostel, Kaitlin, 51
Hostetter, Trevor, 19, 77
Howard, Alexander, 8
Howe, Jamie, 15
Huang, Mi, 25
Hustead, Danielle, 63

I

Ingram, Tracy, 36, 61
Intarakamhang, Thai, 35
Iwerks, Samantha, 53

J

Jackson, James, 30
Jaksic, Arijana, 32, 50
Joplin, Jarrod, 77
Jostes, Ashley, 26
Juhnke, Beth, 26

K

Kahle, Troy, 58
Kane, Jennifer, 51
Kanzenbach, Jessica, 15
Keeney, Ryan, 15
Kidd, Samantha, 85
Klados, Robert, 78
Klein, Eric, 30
Kyer, Melissa, 26

L

LaBarbera, Jacqueline, 64
 Lambert, Keith, 54
 Lankovska, Kristine, 40
 Lapel, Martin, 54
 Larson, Dave, 46
 Lauten, David, 55
 Leddy, Brittany, 15
 Lee, Kyung, 73
 Lieberenz, Sarah, 30
 Linqvist, Dustin, 68
 Lohaus, Richard, 24
 Love, Megan, 18
 Lucero, Vincent, 14
 Lussier, Jonathan, 36
 Lustig, Erin, 34

M

Madera, Rocio, 68
 Madron, Soloman, 55
 Malchow, Natasha, 27
 Marini, Rachel, 75
 Markina, Julia, 68
 Martin, Shaun, 27
 McBride, Ralph, 47
 McKenzie, Devon, 15
 McLaggan, Parker, 61
 Melone, Lauren, 35
 Melrose, John, 28
 Merriam, David, 78
 Miller, Anah, 30
 Miller, Morgan, 56
 Miller, Katherine, 35
 Minnig, Max, 29, 78
 Morales, Christina, 15
 Morrison, Cory, 41

N

Nakajima, Michiko, 28
 Nelson, Nickolas, 29
 Nolan, Keely, 56
 Norquest, Kathryn, 79
 Norris, Kelly, 79

O

O'Donnell, Darcy, 57
 Oquendo, Elizabeth, 67
 Orman, Magens, 16
 Overcash, Cody, 73
 Owen, Maureen, 43

P

Parker, Kelly, 30
 Pascal, Liliana, 85
 Paschall, Jacob, 57
 Persing, Jessica, 32, 50
 Piccone, Michael, 79
 Piele, Katherine, 80
 Pitet, Colin, 42
 Pitillas Estévez, Alejandro, 67
 Pluta, Jennifer, 26
 Porter, Alexander, 30
 Preusser, Mason, 58

Q

Quinn, Jessica, 26

R

Radulovich, Michael, 47, 58
 Rafle, Hannah, 80
 Rattray, Jeffrey, 9
 Ray, Chris, 80
 Reeser, Corie, 29
 Regan, Denise, 65
 Reither, Ashlie, 66
 Remmert, Autumn, 46
 Rivera, Laura, 30
 Rowan, Sarah, 30, 65
 Ruibal-Kurylas, Ramona, 81

S

Sanderson, Jordace, 66
 Schiewe, Jessica, 49
 Schleicher, Stephanie, 38
 Schrand, Nick, 16
 Schroeder, Mitchel, 18, 45
 Schubert, Rodrick, 43
 Seehausen, Alees, 88
 Shapiro, Josie, 42
 Sharpe, Mary, 31
 Smithee, Shane, 81
 Solano, Sofia, 86
 Sowa, Wanda, 56
 Stacy, Maggy, 64
 Stamps, Ashley, 30
 Stephens, Jody, 20
 Stephenson, Thomas, 9
 Sterns, Jillian, 10
 Stevens, Greg, 45
 Stoddard, Matthew, 19
 Stott, Lyric, 84
 Stovall, Kyle, 31

Strawn, Dan, 45
 Svalberg, Tarayn, 32
 Swanson, James, 68

T

Tabugadir, Dara, 66
 Tadesse, Ribka, 82
 Tafoya, Ean, 59
 Tai, Yee, 16
 Thomas, Aina, 77
 Tomlinson, Lydia, 30
 Torrez, Sara, 32, 39, 50, 71
 Turner, Terian, 68

U

Underwood, Wesley, 59

W

Wade, Mary, 32
 Walsh, Jessica, 60
 Wedman, Piper, 82
 Wharton, Sharon, 32, 50, 64
 White, Erin, 60
 Widvey, Seneca, 30, 61, 71, 83
 Wiegert, Michelle, 47
 Williams, Anesha, 33
 Williams, Andrew, 76
 Woehler, Angelina, 83
 Wood, Jenifer, 76
 Woodfork, Jason, 13
 Wyborny, Ann, 33

X

Xiong, Kham, 17

Y

Yacovetta, Sara, 66
 Yapuncich, Savannah, 61
 Young, LaShon, 32, 50

NOTES