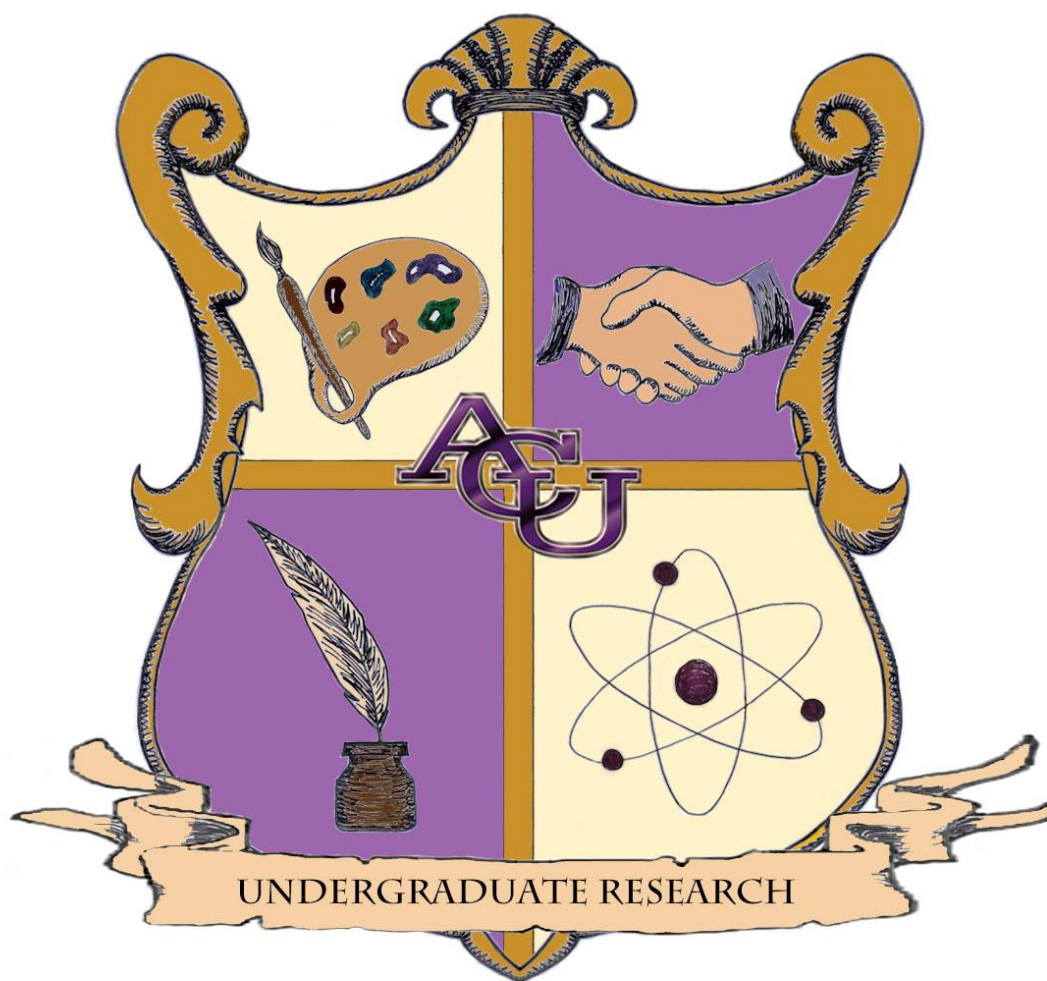


2014 ACU

Undergraduate Research Festival



Abstracts

SESSIONS

Tuesday, April 1, 8:30 – 9:20 AM

Session A1: Mental, Physical, and Nutritional Health – McCaleb Room Zone A

Asset or Obstacle? Anxiety Levels in Honors and Non-Honors Students

Sarah Pelfrey

There is a prestige associated with being a student accepted into the Honors College. Students in honors programs are seen as harder working and as people who will go the extra mile. But, can this distinction, which is traditionally looked upon with such appeal, actually be detrimental to the student? Are students in the Honors College more anxious because of the extra stress being put on them to perform? Or, do these students have it easier because they tend to learn better than the students in the general population? There are many studies assessing the correlation between anxiety level and giftedness, and there are varying results. The hypothesis of this study is that students in the Honors College at ACU will have greater trait anxiety (they will be more anxious as a person) and lower state anxiety (they will be less anxious during usually stressful events such as tests) than their non-honors counterparts. The State-Trait Anxiety Inventory and the Big Five Inventory are used to assess this. Data will be collected via an internet survey from students from varying majors, classifications, and in both the general student population and the Honors College.

Understanding the Services for Treatable and Preventable Diseases: Investigating Low- Income areas in Dallas and the Effectiveness of the Health Care System

Grace McNair and Barrett Corey

This research topic explores various disconnects between a low-income individual's perception of healthcare and their likeliness to seek help. There is a gap in the literature surrounding the social awareness of individuals in low income areas regarding healthcare. The method includes interviewing multiple persons associated with CitySquare who have had interactions with the medical system in Dallas. These individuals will have had pre-existing medical concerns that have affected their lives. Their experiences with the healthcare system will be documented and analyzed showing that their perception of healthcare effects their likelihood to seek or receive help. This is important for CitySquare because it will show them changes they can make to their organization to have a greater impact on the lives of their neighbors.

Nutrition from a Child's Perspective

Jacquelyne Quinterro, Jeanette Arila, and Raychel Duncan

The purpose of this research is to investigate children's attitudes, behaviors, and feelings towards food in a food desert area. A food desert is where there is no fresh fruit, vegetables or other healthful foods in a mile radius. The method will be to have several groups of four to five children and ask them several broad questions about food and let them freely talk about their thoughts while recording the data. An example of a broad question is, "What do you think is a food that is good for you?" The place the focus groups will be from is an elementary school where we would get approval from the principal, parents, and students themselves, or from a community center so as not to interrupt the school day. By identifying these children's perspectives on food, it will help in a future project that involves talking to them about nutrition and maintaining a healthy diet.

Session A2: Religion and Spirituality – McCaleb Room Zone B

Urban Churches and Social Outreach: Perceptions of Charity

Julie Johnson, Sarah Ritchie, and Amanda Stephens

For centuries, churches have been involved in social outreach in their communities. This outreach has manifested itself in various forms of charity as each community has its own specific needs. This exploratory research will be used to discover how urban churches in Central and South Dallas perceive their effectiveness in addressing the needs of their community through charity. We will conduct interviews with various church leaders and workers in the churches of Central and South Dallas. We will also conduct content analysis of church brochures and other public information. This is foundational research in the relationship between charity and the needs in Central and South Dallas, our area of interest as members of the Justice and Urban Studies Team in partnership with CitySquare. Organized churches and their position in their communities should play an integral role in promoting justice through providing for the needs of others.

Constructing Spiritual Mattering: A Validation Study

Avia Gray

The Spiritual Mattering research conducted explores the extent to which students' perceived spiritual mattering is recognized by the university. Spiritual Mattering has been defined as how important and aware one's spiritual life is perceived to be by others. A validation study was conducted to provide a reliable tool for assessing student's perceived Spiritual Mattering to the university in respects to future retention research. Researchers devised a Spiritual Mattering scale using Rosenberg and McCullough's (1981) working definition of mattering and France and Finney's University Mattering Scale (2010). An initial number of 101 students at a southwestern, private Christian university were surveyed in a pilot study. A factor analysis revealed an initial finding of 34.709% of the variance due to spiritual mattering. A later total of 545 students (209 males; 336 females) were provided an informed consent and were administered the revised Spiritual Mattering Scale. Results were analyzed again using a factor analysis and revealed a significant finding of 61.038% of the variance due to spiritual mattering. Implications of this research suggest that students at religiously affiliated colleges and universities have a perceived sense of what it is means to matter spiritually, and that it is the institutions responsibility to recognize these perceptions in order to better meet students' spiritual and religious needs and interests.

Generation X: Leaving the Church

Kaylen Runyan

Why do members of conservative protestant churches believe Generation X is leaving the church, and why are they actually? There has been a recent influx of questions and discrepancy surrounding the topic of church-abandonment. This research will conceptualize the main themes posed to further specify what we mean by “conservative protestant”, “Generation X”, and “leaving the church”. Each of these terms will be clarified and better understood in order to accurately portray my findings. Qualitative research will be primarily based off of interviews. Members of both generation gaps will complete these interviews in order to explore varied perceptions of the given topic. The premise of this research is to understand the gap in perception between “Generation X” and elder generations regarding the church.

Session A3: Spirituality and Interpretation of Scripture – Alumni Conference Room

The Search for a Pentadic Theme

Joshua Brandon

The following study seeks to examine three interpretations of Romans 7:7-25 by utilizing the five elements Kenneth Burke’s dramatic pentad (Act, Scene, Agent, Agency, and Purpose) in order to understand how the interpretations compare and contrast in regard to identification or conveying of important information about the nature of sin and its destructive power. This study explores two historical-critical/contextual interpretations as well as one post-modern interpretation, particularly a reader-response criticism to examine whether or not the two modes of biblical interpretation reach the same conclusion using similar methods of identification.

Trusting the Spiritual Director: Gregory the Great and the Epistemology of Testimony

John Kern

In this presentation, I demonstrate that within Pope Gregory the Great’s writings, there is an epistemic dimension to the relationship between a spiritual director and a disciple. Such a relationship is epistemic in so far as it aids the disciple in the attainment of relevant epistemic goods, and it is distinctly social since the disciple trusts the spiritual director for those very goods. I will first discuss two writers in the epistemology of testimony in order to demonstrate how trusting another person can be valuable from an epistemic point of view. Second, I will offer what I understand to be the primary epistemic goal of the spiritual director/disciple relationship in Gregory’s writings: the gift of discernment and spiritual insight. The third part will explore more thoroughly the relationship between the spiritual director and disciple and how such a relationship places the disciple in the best possible position to achieve spiritual insight and discernment. Finally, I will discuss how Gregory’s insights into the lifestyle of the ideal pastor may provide a safeguard against the possibility of an unreliable spiritual authority giving false insight to a beginner. This research brings spiritual direction into conversation with current literature in the epistemology of testimony in order to better understand how religious beliefs are acquired through trusting spiritual authorities. More importantly, my research shows that trusting religious authorities is an important and necessary way people of faith acquire beliefs about God and the spiritual life.

The Beasts in Revelation 13

Gloria Paul

The aim of this project is to comprehend the significance of the beasts in John's revelation to the recipients of his letter. To grasp the image of the beasts in Revelation 13 one must first understand the genre of this book. Most scholars agree that Revelation is a mixture of three genres. John purposely uses three distinct genres to aid him in address a specific circumstance. To make his message clear to his audience John also makes several references to his cultural context. Thus, the modern reader must also have some knowledge of his cultural setting. Lastly, John uses Old Testament references to guide his audience in the right direction. Scholars believe that the Apocalypse alludes to the Old Testament more than any other New Testament book. It is essential for one to understand these references if one hope to grasp the significance of the beasts in the text. Through analyzing the different genres in Revelation, through understanding John's cultural context, and through his use of the Old Testament it is clear that John uses the two beasts in Revelation 13 to empower the Christians in Asia Minor and also to warn them of the temptations within their society.

Session A4: Reports from PHENIX – LYNAY Classroom

Studying the Internal Structure of the Proton with PHENIX

Marshall Towell

One major goal of the PHENIX detector at Brookhaven National Laboratory (BNL) is to better understand the internal structure of the proton. To study such tiny dimensions a huge particle accelerator is needed. At BNL there is a particle accelerator located underground that is 2.4 miles long and can accelerate particles close to the speed of light. After speeding up the particles, they have sections in the particle accelerator where the particles collide with each other. Our objective is to observe some of the particles produced in the collisions. Since the particles are moving so fast (99% the speed of light) there are millions of collisions every second. Because it is impossible to record data from every collision we have installed detectors to select rare events that we are particularly interested in recording. These detectors are called Resistive Plate Chambers. These triggers are relatively new so we need to know how well they perform. I helped study how well the RPC's operated during the 2013 Run and worked to determine how efficient they were. We did this by writing a programming that would compare how many collisions the RPCs recorded to the total number of collisions of interest. These results were shared with the PHENIX collaboration and will be discussed in this talk.

Characteristics of Colliding Protons

Ryan Pinson

At Brookhaven National Laboratory the PHENIX experiment at the Relativistic Heavy Ion Collider (RHIC) studies the structure of articles like the proton. PHENIX is studying the proton by colliding protons on protons. These collisions create new particles that can be studied to gain information about the internal structure of the proton. To select these rare collision of special interest from a background of millions of other events, specialized detectors called Resistive Plate Chambers (RPCs) have been built and added to the PHENIX detector. Studies on the performance of the RPCs were performed due to the important nature of

the RPCs function. This information helps us when doing analysis and provides important data about the RPCs and therein leads to information about the particles made in the proton collisions. The data and patterns of these characteristics will be the focus of this presentation.

Exploring the Proton's Spin at PHENIX

Andrew Miller

PHENIX is the largest experiment at Brookhaven National Laboratory's particle accelerator on Long Island, New York. Although we know that the proton is made up of three quarks, when these are added together, they do not account for one of the fundamental properties of matter that we measure in the proton; the spin. One of the major goals of PHENIX is to investigate the source of this discrepancy. A primary way that PHENIX is achieving this is by colliding protons and analyzing the particles produced.

An important but rare particle produced in these collisions is the W-Boson. To detect the presence of W-Bosons, a new detector upgrade has been designed to specifically record these events. One important component of this upgrade is the stations of resistive plate chambers (RPCs). These chambers were used to collect extensive data from proton collisions for the first time during the accelerator's run during spring of 2013. The data recorded from this system were analyzed to confirm that all components were functioning consistently.

Correlating changes in these recorded events with changes in the configuration of the detector or hardware will allow the data to be analyzed appropriately. By taking the detector status throughout the run into account, a more precise proton structure measurement will be attainable. This talk will present the method and results of this analysis specifically comparing recorded rates with beam intensity.

Tuesday, April 1, 9:30 – 10:50 AM

Session B1: Transcending Apparent Differences – McCaleb Room Zone A

Monomyth, Racism, and Dragons: An Exploration of "The Elder Scrolls V: Skyrim"

Daniel Archer

As video games rise in popularity and take their place as a favorite pastime in the United States so, too, does the scholarly interest in the latest popular video games. Though often scrutinized under a psychological lens and used as a scapegoat for youth violence, the newfound depth in contemporary gaming begs scholarly analysis. Though many games are able to be a focus of study, this project narrows the scope of the research by focusing only on *The Elder Scrolls V: Skyrim*, a popular role-playing game released in 2011. The results of this research yield an enlightenment of various literary elements and powerful themes such as the existence of a monomyth structure and the prevalence and impact of racism between the various races in the game. The research calls on Vladimir Propp's theory of narratology in order to apply a lens through which to analyze these games. In performing such analyses, this project will contribute to future work on similar topics.

Experience Creates Perception: How Demographic Factors Impact Perception of Other Social Classes

Taylor Bush, Wes Robbins, and Erin Zachary

In our study, we ask the question, “What demographic factors influence one’s perceptions of socioeconomic class?” We have noticed that, many times, our perceptions of members of different classes are heavily influenced by our own lives. We began to wonder if things such as race, religious preference, and socioeconomic status affect how we view those above or below us on the socioeconomic ladder. In response to this question, our group has designed a survey that aims to classify people according to demographic categories, and see how these characteristics correspond to individual opinions about the lower, middle, and upper classes. Our goal is to survey all classes, races, ages, etc., and to find which factors influence perceptions.

We will be conducting our research through an online survey and paper form/oral, if necessary. We will deploy the survey through email as well as in person through our personal iPads and hand out paper copies to people who may be uncomfortable with technology. The paper copy will also be provided in Spanish to access a wider audience.

Because we are in the process of conducting our study, we do not have our research conclusions yet. However, by the time of our presentation, we plan to have our research ready to be presented.

A Dialogical Discourse: Gaskell’s Social Commentary on a Divided Culture

Elisa Wyrick

Language plays a large role in determining societal interactions and shaping the mindset of people as they encounter those both different and similar to themselves. Using communication theories developed by Mikhail Bakhtin, Ferdinand de Saussure, Georg Hegel, and others, this paper examines the effects of communication barriers created by differing individual life factors such as class differences, gender differences, as well as locational differences during a person’s formative childhood years. I will use as a case study the communication barriers and attempted resolutions featured in Elizabeth Gaskell’s nineteenth-century British novel *North and South*. In her novel, Gaskell, drawing from personal experience with cultural and communication barriers, introduces these different concepts of communication through several different characterizations and character interactions. Within three dyadic relationships, I analyze the discrepancies in communication between those raised in an agrarian versus an industrial society, as well as those of different social classes and backgrounds.

Clipped Wings

Carley Glover

Consumerism has gripped human culture for centuries. Society today is hungry for the next new, big thing. American culture has become so consumed with jobs and appearance that they have lost sight of individual identity. In this paper I analyze Macklemore’s song, “Wings,” to determine how rhetors use music to help listeners consider what they allow to define who they are. In this song, Macklemore tells the story of a boy who believed that having one pair of Nike basketball shoes would help him achieve his dream of “being like Mike.” But deep down we all want to be loved and accepted for who we really are, instead of who we are

pretending to be, and consumerism is a deep-seated problem in society today. I argue that through “Wings,” Macklemore has done one of the most valuable things that art can do. He has made us think.

Increasing awareness of diversity through strong student leaders.

Kholo Theledi

Rhetoric of multiculturalism and diversity is a prominent aspect of life on predominantly White Christian campuses, particularly at Abilene Christian University. The impact of diversity efforts and rhetoric are beneficial if the teaching, research and service mission of the institution truly reflect the institutions dedication to increasing diversity and multiculturalism on campus. Students ought to feel involved and engaged with their university in order for the university to fulfill its mission, and for better retention and graduation rates of minority students. This article examines whether strong student leaders increase awareness of diversity on campus. The research for this article emanates from surveys with various students on campus including student leaders in the Office of Multicultural Enrichment, student leaders in social clubs, and students not in leadership positions attending the university.

Session B2: Film, Culture, and Rhetoric – McCaleb Room Zone B

The Effect of Time on Portrayal of Violence in Disney Animated Films

Jonathan McMichael, Brittney Johnson, and Laura Benson

Overtime social norms and acceptable values have shifted. The aim of this study is to determine how dramatically the changing times have influenced distinct aspects in a specific media outlet. The media outlet being examined will be the Walt Disney Animated Classics series. The focus of the researchers’ study will be to examine and quantify the changes in portrayals of physical and emotional violent behaviors over the decades.

The study will include one film from each of the nine decades that Walt Disney has produced an animated film. The films include classics such as Snow White, Pinocchio, Cinderella, 101 Dalmatians, Robin Hood, and Fox and the Hound. Also featured in the study will be The Hunchback of Notre Dame, Emperor’s New Groove, and Frozen, which are more modern films. The researchers will use a codebook to conduct a quantitative content analysis that measures the instances and changes in portrayals of physical and emotional violence.

The researchers expect to discover a gradual increase in emotional violence with a corresponding decrease in physical violence. This particular project will provide a useful resource for those who are curious about the changing influences these films are having on their young target audience.

The Dude Abides: A Perspective Of Socioeconomic Status and Power Through The Big Lebowski

Brock New

What if power and socioeconomic status were not dependent on one another? This is the question I address in my rhetorical analysis of the Coen Brothers’ film, The Big Lebowski. Despite being released in 1998, it has made a lasting impression on society and is now considered a cult classic. I used Bormann’s Symbolic

Convergence Theory/Fantasy Themes and visual argumentation to frame my analysis of the Coen Brothers' messages regarding questions of power and socioeconomic status. Ultimately, I determined that the Coen Brothers used this film to convince audience members that one's socioeconomic status does not necessarily determine his or her power or influence. Instead, *The Big Lebowski* argues that persons of lower socioeconomic status can possess true power and attract followers who are personally invested in their actions, instead of followers who are motivated by money - a conclusion that has significant implications for social movements around the world today.

Growth of the Chinese Film Industry

Kaley Knowlton

The Chinese film industry is now the second largest in the world and, according to *The Economist*, could soon be the largest. Despite this apparent success the industry has struggled to compete with Hollywood and thrive internationally. This may be partially due to the strict controls the Chinese government has put on the production and the content of its films. Modifying the movies to meet these regulations can be costly and often removes the content that sells movies. Often the films cannot make enough to recoup the production cost. Cultural theorist have written on the government controls, however there is little information on how the strict government regulations have hindered the international growth and success of the industry. Is Chinese cinema living up to its potential or are the regulations holding back the industry? I will argue that the regulations have slowed down the growth and limited the international appeal of the industry by causing financial strains on filmmakers. My research will demonstrate the how the government regulates the film industry, the international appeal of Chinese films, the potential for growth, and how the industry has grown despite these regulations. I will do this by reviewing data and articles regarding the industry and conducting interviews to discover personal views on the films.

Exploring the "Strong Female Character": An Analysis of Audience Attitudes Towards Gender On-Screen

Toni Maisano

In recent years, mainstream entertainment has seen the rise of a new star: the "Strong Female Character." Appearing in films such as "Brave" and "The Hunger Games," these tough female protagonists are redefining our expectations for representations of gender in film. Seen as a rival to the classic "damsel-in-distress" character, Strong Female Characters have been hailed as the heroes of women's equality in entertainment. However, are these characters actually doing the work we think they are? In analyzing audience's descriptions of such characters, it becomes clear that a Strong Female Character is still not the equivalent of more complex male characters. Through my research, I seek to answer the following question: do "Strong Female Characters" adequately demonstrate gender equality in entertainment?

Different Directions: Analyzing Champion's Final Show

Alex Whitten

Throughout this paper, I analyze how rhetors use certain rhetorical tools to assist in effectively communicating a message that is unpopular to the strong public. I begin by giving a brief background on the message that is being presented. In the text, the rhetor is attempting to persuade an audience to pursue a drug and alcohol free lifestyle. This lifestyle is presented through punk rock music; therefore knowledge of punk rock culture is imperative. In my analysis, I first discuss the rhetorical situation, which includes information about the rhetor, exigence and context of the film, and the audience. I then analyze the visuals presented in the film and discuss how they assist the rhetor in effectively communicating an unpopular message. I found the visuals in the text to be a great tool in setting the tone and grabbing the audience's attention and keeping their attention until the end of the film. Next I analyzed language and how the lyrics and stage banter play a major role in getting this message to reach multiple audiences. Finally I analyze the rich narratives displayed throughout the film. I found the narratives were important in creating empirical truths, which in the end make the attempt at persuasion successful.

The film analyzed in this paper has proven to assist in spreading a movement that started in Washington, D.C. to millions of people across the world. I wanted to find out how the creators of this film were able to take such an unpopular message and make it important to those millions of people around the world.

Session B3: Mevalonate Pathway and Osmium Compounds– Alumni Conference Room

Expression and Characterization of Enzymes of the Mevalonate Pathway in *Enterococcus faecalis*

Aubrey White

Gram-positive bacteria of the genus *Enterococcus* utilize the mevalonate pathway to synthesize isopentenyl pyrophosphate. In several species of these bacteria, the first and third enzymes of this pathway, acetoacetyl-coenzyme A thiolase and 3-hydroxy-3-methylglutaryl-coenzyme A reductase, exist as one single fusion protein. *Enterococcus faecalis* is among the bacteria that have this fusion protein. Ultimately, the successful characterization of these enzymes may lead to an antibiotic targeting the enzymes of the mevalonate pathway in *E. faecalis*. The first three enzymes of the mevalonate pathway (acetoacetyl-CoA thiolase, HMG-CoA synthase and HMG-CoA reductase) have been expressed and characterized. However, while HMG-CoA reductase has been expressed alone, acetoacetyl-CoA thiolase has only been expressed as part of the fusion protein. Therefore, a stop codon was inserted into the fusion protein gene, *mvaE*, in order to isolate acetoacetyl-CoA thiolase so that it might be characterized separately from the attached reductase enzyme. The thiolase-encoding gene, *mvaT*, was expressed in *Escherichia coli*. SDS-PAGE showed a new band in the *mvaT* samples that was not present in *E. coli* which only contain the expression plasmid, pET28. Enzyme activity assays appeared to show acetoacetyl-CoA thiolase activity in several *mvaT* samples. Current efforts focus on the purification of the enzyme expressed by *E. coli* containing the putative *mvaT* gene.

Investigation of transient interactions between mevalonate pathway enzymes in *E. faecalis* using FRET spectroscopy.

Maxwell Moore

The mevalonate pathway is instrumental in the production of dimethylallyl pyrophosphate (DMAPP) and isopentenyl pyrophosphate (IPP) which serve as precursors to cell membranes, hormones, and steroids. Wildling et al. established that the mevalonate pathway is essential for the survival of several strands of gram-positive cocci bacteria, including *Enterococcus faecalis* because they can only produce IPP via the mevalonate pathway. The first and third reactions in the mevalonate pathway are catalyzed by Acetoacetyl-CoA thiolase and HMG-CoA reductase, respectively, and Hedl et al. discovered that these enzymes are synthesized together as a fusion protein. It is hypothesized that this fusion protein may have a transient interaction with the second enzyme in the mevalonate pathway, HMG-CoA Synthase. Fluorescence resonance energy transfer (FRET) is a technique that can detect transient interactions between some proteins. If interactions were detected, the data might lead to a model of the active sites of these proteins that could aid in future enzyme inhibitor (antibiotic) development. However, FRET showed no conclusive evidence of transient complexes between the Fusion and Synthase proteins.

Preparation of Coordination Polymers Containing Osmium

Soo Hun Yoon

Chemists have recently been interested in linking metal atoms together with organic molecules to form one-dimensional chains, two-dimensional rectangles and three-dimensional boxes. Such assemblies, called coordination polymers, are potentially useful as enzyme mimics and as molecular devices including magnets, wires, sensors, catalysts, light harvesters, and liquid crystals. We have been attempting to create coordination polymers containing osmium atoms, which are rare despite the fact that they show particular promise as photoluminescent materials. Our primary focus has been the syntheses of diosmium complexes in a microwave reactor, followed by the addition of linking molecules containing multiple nitrogen atoms to produce one- and two-dimensional polymers. We have successfully prepared several new assemblies. We will present the details of our synthetic methods and the proposed structures of the products from our reactions.

Synthesis of an Osmium-Organic Framework

Audrey Fikes

We are attempting to create the world's first examples of metal-organic frameworks (MOFs) containing osmium atoms. Metal-organic frameworks (MOFs) are chemical compounds in which metal atoms and organic linkers form porous networks with surface areas higher than any other known materials. They are being used for the storage and separation of various gases and gas mixtures including carbon dioxide (a greenhouse gas) and hydrogen gas and natural gas (fuel sources). MOFs have been made from almost all metals except osmium. Our research group has recently discovered an efficient way to make building blocks containing two osmium atoms, and this has allowed us to create the first examples of two-dimensional osmium-based hoops with Os₂ units bridged by organic linkers. These new hoops may be considered as small MOF precursors. Our presentation will describe the reaction details that represent this first step in creating three-dimensional MOFs with linked osmium atoms.

Session B4: STEM Potpourri – LYNAY Classroom

An Analysis of the Harmonics of Notes with Multiple Fingerings on the Clarinet

Kristin Holz

This research delves into the physics of the clarinet, specifically analyzing differences in the acoustics of various fingerings for the same notes. These observations are specific to the interaction between the embouchure and vocal tract of the clarinet player and the characteristic properties of the wooden Buffet R-13 Bb clarinet used. Sound recordings of notes having multiple fingerings were made and analyzed to observe the amplitudes, frequencies, and phases of the harmonics as well as inharmonicities within each note. While this experiment was specific to the player and the instrument, it also aided in producing a larger picture describing the acoustics of the clarinet.

Designing and Demonstrating Vocal Recognition Software

Ryan Castillo

The human-computer interface is an industry of growing significance. One milestone of this industry is the ability for a computer to distinguish and understand human language. Such technology is complex and difficult to produce, but highly sought after. We investigate the processes involved in speech recognition technology by designing a voice recognition system. Our program interprets input sound data and identifies a human voice from noise. Then, using Bayesian statistics, it constructs decision criteria to distinguish between different speakers. We will present the processing techniques that operate our program, demonstrate the program itself, and discuss the challenges and implications of language interpretation in general.

Linear Programming Problems with Multiple Optimal Solutions

Jesse Luebbert

We develop an algorithm that enumerates every optimal integer solution to linear programming problems using Excel. This algorithm addresses the issue of the Solver finding only one optimal solution to problems with multiple optimal solutions. The ability to choose between solutions can be valuable when making managerial decisions.

Using optical character recognition as a tool for biblical scholars

Travis Cramer and Elizabeth Carlisle

Ge'ez, an ancient Ethiopian dialect, is a major witness to the biblical text. It offers insight into the underlying Greek text at various stages, some of which are very early and provides a window into the transmission and development of the Bible. Most of these texts remain in manuscript form in remote monasteries and have not been digitized. We seek to implement an Optical Character Recognition (OCR) system to use in the effort to digitize these manuscripts. We have investigated several options, and have settled on Tesseract-OCR, an open-source solution sponsored by Google. We will attempt to train the OCR system to understand Ge'ez and make it so that the user of the system can select the appropriate characters if the system cannot

determine it with a reasonable degree of accuracy. We will adjust our training data to compensate if at all possible, and hope to have a deliverable, working set of training data that can be used by anyone. This will allow biblical scholars to speed through the difficult work of textual collation. Eventually, this project also aims to build upon Tesseract-OCR to further machine learning for semantic linguistic research.

Modeling the interaction potentials of alkali-rare gas pairs

Adam Simpson

Noble gas atoms do not form stable molecules with other atoms, but at sufficiently close proximity, alkali-rare gas pairs can form loosely bound states. Alkali-rare gas lasing systems rely on these states, but current models of these systems do not fit data well. We are interested in optimizing the characterization of this interaction to better understand the lasing process in alkali-rare gas laser systems. Our technique for determining the excited-state interaction potential in these systems involves simplex minimization of a highly nonlinear function which returns the sum of squared error between model predictions and experimental data. We do our preliminary work on Cs-Ar, but test our program on other alkali-rare gas pairs. We will present the theory that supports our modeling techniques, the computer code we used to produce our model for Cs-Ar, and comparison of its predictions to existing experimental data.

Session B5: Communicating for Better and Worse – AT&T Theater

"Say It Loud!": The Power of African American Protest Music in the Twentieth Century

Justin Webb

This essay examines how three artists used song as a weapon against the tyrannies of racism in 20th century America. Billie Holiday's "Strange Fruit," Nina Simone's "Mississippi Goddam," and James Brown's "Say It Loud - I'm Black and I'm Proud" each played a pivotal role in the fight for Civil Rights. A wide range of primary and secondary sources was used in the research. Along with the three songs, I also examined various magazine and music industry publications from the time periods. I also found several sources in which the artists themselves talked about the social/political nature of their songs. Scholarly articles and books helped build up a background from which I could have a greater level of understanding as I wrote about the struggle for equality. I found that all three singers came from humble beginnings, and they all experienced racism firsthand as they were growing up. Each singer was also gifted with exceptional ability. The daily realities of racism, coupled with the delivery system of the song, allowed these songs to be broadcast to a wide audience. Additionally, all three songs showed clearly the vitriol that African Americans felt for their servile posture in the days of Jim Crow. Overall, I found these three songs serve as some of the most potent examples of using song to protest one's lot in life. Not only were these songs of protest; they also served as a call to action, as well as to assure their brethren that change was coming.

In the Shadow of Bayreuth: How the Music of Wagner Influenced the Architect of the Third Reich

Parker Gordon

At certain moments in history, the spheres of music and politics have collided to produce some of the most influential, inspiring, and devastating occurrences. Particularly in the twentieth century, the Cultural

Revolution in China and rise of Beijing Opera, the Stalinist censorship of composers and musicians in Soviet Russia, and impact of music in the American Civil Rights movement all function as examples of how music and politics work together and how one can have an influential role upon the other. In Nazi Germany, the music of Wagner was used as a propaganda tool. It was played at rallies, played in the concentration camps, and played in Hitler's home. Hitler's connection with Wagner's family and legacy shows more than just a passive appreciation, but instead a form of devotion that went beyond agreeing with the man's politics. I hope to show that for Hitler, the music of Wagner was not so much as valuable to him solely because of the views that Wagner held that were similar to Hitler's, but rather that the music itself and the environment of social and cultural high class served as an inspiration for Hitler's climb to power.

Why You Should Trust Your Doctor: Medicinal Cannibalism of the 16th& 17th Centuries

Adam Lubbers

For a paper originally written in a historical methods course, I have done research on European medicinal cannibalism of the 16th and 17th centuries and found a large amount of physicians and experts engaging in the practice of prescribing the drinking of blood or consumption of flesh with several recipes, ideas, and suggestions for the preparation of human flesh or liquid that will be used for the purpose of healing. Surprisingly, the hack medicine seemed to be working in the healing process. This opened up the research from historical to medical—what role does the brain play in healing the body? Through comparing the results of history and knowledge of modern medicine and the placebo effect, I concluded that it didn't matter what the medicine was, for as long as somebody received medicine from a trained and notable medical expert, the brain will mimic the healing process. I looked at the writings of Paracelsus, Robert Boyle, Johann Schroeder, and Edward Bolnest; experts for their time in medicine and advocates of corpse medicine. I compared their results with medical accounts and descriptions of the placebo effect which proved that their medicine, proven to be harmful to people, was healing people.

Preserving Their Voices

Sarah Agee

This research provides access to oral histories of the aged African American Church of Christ preachers from the mid 20th century that are held in Special Collections. The methodology used in my research includes editing draft transcriptions of original oral histories of African American preachers interviewed from 1968 to 2003. The methodology also includes developing descriptive material for these recordings based on research in literature by and about African American Churches of Christ. This descriptive material documents an extensive thesaurus on names and backgrounds of many African American's in the Churches of Christ. The purpose of this research is to preserve and give access to new material on the rich history of African American's in the Churches of Christ. As a Pruett Fellow, I believe promoting these oral histories gives the aged a voice and provides and promotes a way for others to hear and connect personally with these histories.

Tuesday, April 1, 11:40 – 12:25 PM

Poster Session I: Hunter Welcome Center Atrium

Nature's Presence in Mondrian's Geometric Abstraction

Brandy Rains

Piet Mondrian, creator of the Neo-Plasticism movement, is typified as being one of the artistic forces who pushed Expressionism further into the realm of complete abstraction and therefore marked one of the most distinguishable shifts in artistic representation following World War I. However, to fully understand his work beyond that of an acclaimed artist, it is necessary to explore his projections onto nature that resulted from the process of abstraction. Mondrian's ideas of nature are exemplified by his own transitional work from naturalism to abstraction, the meaning of his work as discovered through his ideas of unity through harmony, theosophical beliefs, and the implications of his artistic expression on his view of the relationship between nature, reality, and the universal. These characteristics were observed through a qualitative study conducted by analyzing art history journals and publications, critiquing Mondrian's paintings compared to that of his time, and discovering and applying the principles of Theosophy to Mondrian's work. These characteristics of Mondrian's work informed modern art through the groundbreaking deletion of nature in art and allow for a better understanding of nature and reality seen through an artist's paradigm. After this research, I concluded that Mondrian and nature seemed to be two disparate forces. His theosophical beliefs were the connection, or absence of a connection, with nature. With this assumption, it could be decided that Mondrian portrayed nature as having structure that did not homogenize with his notion that the world must leave room for accident and imperfection.

Art and Civil Disobedience in Iran

Amanda Bitner

Determining what role art plays in the civil unrest in Iran and how it shapes and creates a political identity for the country. Purpose it to unearth how art can be a form of civil disobedience, as well as a type of protest, how art can call for disobedience, and whether art can promote change in the country by bringing people together. I will also define what art means in Iran and compare its impact there and on a global scale. By using art based research and by showing that art, as a process, is a constant call and response, I will be able to prove that art can, in fact, be a movement for social change in the form of civil disobedience.

Texas Children's Hospital Design As Therapy

Kaitlin Pegoda

Texas Children's Hospital worked with FKP Architects to create an environment of bright colors, family friendly play rooms and examining rooms, and a variety of other design aspects that encourage a positive environment. This design is important for the health and healing of the patients by encouraging positive attitudes and feelings about their visit or stay in the hospital. In the context of the Texas Children's Hospital in Houston, Texas, my goal is to find out how FKP Architects uses the design of Texas Children's Hospital

as a form of therapy and how this impacts the perceptions, attitudes, and resiliency of the patients and their families.

FKP Architects effectively uses color, artwork, and scenes to create a visually intriguing and calming environment that provides patients with the ability to escape into a different world. In similar ways, FKP Architects uses social truth, comic frames, and fantasy themes to construct a reality that is different from what would usually be found in a hospital. This use of design as a form of therapy requires patients, family members, and even the general public to reevaluate their preconceived notions of the role of a hospital in the healing process. FKP Architects takes this into serious consideration. As a result, they use design as a form of therapy by creating a vibrant, scenic, and kid-friendly atmosphere that significantly differs from the normal hospital experience and radically transforms previous social truths through comic frames and fantasy themes.

Culture is Power

Richard Elmore

As the longest surviving ancient civilization in the world, China's global influence has been acknowledged for many ages. The sheer size of the nation, including its growing economic output, has put China on the world's radar as an emerging superpower. In the present day, Chinese influence is exercised heavily throughout the world by means of hard power, but to an even heavier extent in East Asia. However China is not alone in East Asia; to the east reside Japan and South Korea, two nations that boast extraordinarily large amounts of hard power, but on a global scale are inevitably overshadowed by China. China's manifestation of hard power, through political and international influence, has been well documented and studied. However, this research will investigate a relatively new phenomenon: in a region dominated by Chinese influence, how the neighboring governments of Japan and South Korea are now emphasizing soft power, through cultural and economic exports, as a way to cultivate their own influence in what seems to be an ever-increasing Chinese-dominated global network. This will be measured by analyzing foreign perception of and reaction to both Japanese and South Korean cultural exports abroad, with most emphasis on China.

To Hell and Back Again: Christianity's Influence in Horror and Adventure Films

Hailey Hendricks, W. L. Walker, and Kyle Knapp

Each year, millions of people see blockbuster movies. These films saturate culture. This study will compare the ways Christianity is represented in blockbuster movies of the Horror/Thriller and Action/Adventure genres.

We will conduct a quantitative content analysis measuring Christian references, allusions and representations per film. We have chosen five American-made films from each genre that were number one at the box office in the years between 2009-2013:

Action/Adventure:

- Man of Steel (2013)
- The Hunger Games (2012)
- Harry Potter and the Deathly Hallows Part 2 (2011)
- Inception (2010)
- Avatar (2009)

Horror:

- The Conjuring (2013)
- The Possession (2012)
- The Roommate (2011)
- Shutter Island (2010)
- Paranormal Activity (2009)

The same codebook will be used to evaluate each film.

We project that references found in movies under the Horror/Thriller genre will be more negative and predominantly serve to scare the audience. Anticipated examples include mentions of hell, demons, superstitions, and prejudices of the Church. These negative connotations will be juxtaposed to the more positive representations we expect to find in the Action/Adventure movies. We predict that Christian influences in this category will be revealed in the hero through trials, redemption, self-sacrifice, and other Christ-like archetypes.

The Obamacare Conundrum: How Framing of the ACA by Media Outlets Affects Viewer Perceptions

Marissa Jones

Americans are turning toward news stations to provide comprehensive information about the Affordable Care Act, a law that affects most Americans. But news programs wield the power to influence their viewers, no matter how unbiased they appear.

A recent poll found that when the health care act was referred to as the Affordable Care Act, 45 percent of those polled approved of the law, but when called Obamacare, it only received a 38 percent approval rating (Gallup, 2013). Because people's opinions of the health care act are influenced by the name, it is clear that the way networks report on this act affects perceptions about it.

This study intends to examine how the nightly news shows from ABC, CBS, and NBC choose to report the Affordable Care Act. The content analysis will measure the amount of time news shows dedicate to the Affordable Care Act, whether they treat the topic positively or negatively and the names referring to the act (Obamacare v. Affordable Care Act).

The researchers will examine two weeks of the 5:30 p.m. national news broadcasts from ABC, CBS and NBC in a stratified random sample from the month of February. During this study, we expect to find differences in the reporting treatment of the act between networks which may point to biases. These findings may help illuminate flaws in the way the Affordable Care Act is being presented to news consumers.

Multidimensional Aspects of Language Learning in America and Japan

Sarah Gubachy

Why is there a sense of jealousy when Americans talk about Asian students? Our students are not only lacking in foreign language skills, but in their native language skills. American educators are trying to better their foreign language programs through training their teachers and increasing the longevity and intensity of their teachings. Many research revolves around keeping the system that is already in place. They are researching the programs themselves, yet no one is discussing the mindset behind these programs. They are not discussing the possibility of starting their language training in a different manner, in a different stage of their life. They do not consider having a new program in place. My research will be a comparative study between foreign

language programs in the United States and in Japan. To evaluate this multidimensional problem, I will research native language studies and social structures - familial and cultural - in both countries. This research will be conducted through interviews, personal experiences, non-fiction articles, and research studies. There is a great difference between language learning in the United States versus Japan, and it is not as simple as they are better students, or they start language learning earlier. There is a much deeper understanding that we must learn about before we can change or give up on our language learning programs. We must look to other successful programs such as the Japanese study of English to ensure that the United States language learning becomes successful.

Marine Biodiversity: The Rocky Tide Pools of Cozumel

Jessica Bryan and Bailey Gaspard

A significant problem in marine biodiversity studies as stated by the United Nations General Assembly is the need for a regular process for global reporting and assessment of the state of the marine environment. Numerous studies have attempted this by surveying the biodiversity of various marine ecosystems. In this study, we surveyed species diversity in several small rocky tide pools in Cozumel, Mexico during March 2013. A total of four tide pools were surveyed for both biotic and abiotic factors, including number of different species, population count of each species, tide pool size, and wave exposure of the tide pools. The Shannon Weaver diversity index was used to assess tide pool diversity characteristics. Crustaceans, fish and two mollusc groups, polyplacophorans and gastropods, were present in most tide pools. A total of 17 species were recorded from the four tide pools. Nerites (gastropod molluscs) were the dominant species, and the most diverse tide pool observed contained only nine species. Two tide pools were heavily dominated by nerites (>85% of all individuals present), while two others were more even in diversity. However, no abiotic factor correlated with this diversity measure. More studies on the biodiversity of this region are needed in order to fully understand the species diversity and the human impact on this environment.

Creating a Differential Medium for an *Aeromonas salmonicida* clp Mutant that is Deficient in Transformation

Jacob Woods

Natural transformation is the process by which bacteria directly uptake, incorporate, and express free genetic material from the environment as a result of the bacteria being in a state of competence. The Huddleston lab previously isolated an *Aeromonas salmonicida* strain with a mutation in the *clp* genes that cannot be naturally transformed. The *clp* genes in bacteria normally function as a chaperone protein which degrades damaged or misfolded proteins created in response to environmental stresses. This particular set of proteins has not been associated with natural transformation in any other genus of bacteria. The first objective of this study was to develop a growth medium that can differentiate *A. salmonicida* strains with the wild type *clp* genes from those with mutant *clp* genes. The development of this differential medium allows for future investigations by other members of the Huddleston research team, including screening for mutations with site-directed mutations of the *clpA* and *clpS* genes. The second objective of this study was to perform growth curves to compare the growth patterns of the wild type and the mutant strains in different types of media and in different growth conditions. The results of this research allow for further investigations into other functions of the *clp* genes.

Range and Distribution of Large and Meso-Mammals

Darryll Morley

Habitat fragmentation and the spread of urban environments are a major threat to native wildlife populations. We chose Dyess Air Force Base to study these effects due to its unique interface of urban, military, and native environments. Using the scent-station method, we distributed 42 stations throughout the installation with five different scents: bobcat urine, coyote urine, bobcat gland, catnip, skunk musk and a control. These stations were placed in a grid format to record the relative abundance and distribution of large and meso-mammal populations on base. We discovered four large mammal species: *Lynx rufus*, *Canis latrans*, *Axis axis*, and *Sus scrofa* and eight meso-mammal species: *Mephitis mephitis*, *Didelphis virginiana*, *Procyon lotor*, *Urocyon cinereoargenteus*, *Lepus sylvaticus*, *Erethizon dorsatum*, *Dasyopus novemcinctus*, and *Felis catus* inhabiting Dyess AFB. Our data suggests both coyotes and bobcats exhibit spatial avoidance and adjust their habitat selection due to anthropocentric activity. Some of the prominent findings were that *L. rufus* showed an equal attraction to bobcat gland as it did to the skunk musk. *C. latrans* showed a preference to catnip over coyote urine. The most effective of all lures appeared to be catnip but showed no significant difference. One anomaly that was found was with *L. sylvaticus*, showing it preferred the scent of bobcat urine in which the law of nature would seem to conclude the opposite. Our figures suggests large and meso-mammal populations are capable of adaptation to urban and military activities in addition to naturally occurring stimuli in their native habitat.

Investigating the Geographic Range of *Mentzelia obscura* (Loasaceae)

Gregory Ponder, Bryce Gerlach, and Landon Cook

Mentzelia obscura is an annual, tetraploid (having four sets of chromosomes) plant native to the southwestern United States. *Mentzelia obscura* is most common in the Mojave Desert in southeastern California, but populations have been reported as far north as the Great Basin in northern Nevada and the Sonoran Desert in southeastern Arizona. However, confusing patterns of morphological variation cause us to question the accuracy of these sightings. *Mentzelia obscura* is a small, weedy species that is extremely similar to several other taxa with different ploidy levels. Preliminary work has suggested that these phenotypically similar species can be distinguished from *M. obscura* using chloroplast DNA sequences, including the *ndhF-rpL32* intergenic spacer. We gathered samples from populations of *M. obscura* and other similar species throughout its alleged range. We extracted DNA and performed PCR to amplify the *ndhF-rpL32* region. We quantified the DNA and sent samples to be sequenced. We compared sampled sequences with known sequences from *M. obscura* in order to test identifications. Locations of verified populations of *M. obscura* were used to test previous geographical hypotheses.

The Search for Genetic Variation Within the Species *Mentzelia veatchiana* (Loasaceae)

Victoria Pannill

Mentzelia veatchiana is an annual, hexaploid (having six sets of chromosomes) plant in the Western United States. It is the most widely distributed hexaploid species in the genus *Mentzelia*. In this study we look to see

if this large distribution is associated with a high level of genetic variation. We gathered samples from populations of *M. veatchiana* throughout its range. We extracted DNA and performed PCR to amplify the *ndhF-rpL32* intergenic spacer region of the chloroplast. We quantified the DNA and sent the samples to be sequenced. After analyzing the DNA, we found very little genetic variation. This suggests that the wide distribution of *M. veatchiana* has not resulted from or caused high genetic variation. One reason for the low genetic variation in *M. veatchiana* could be its tendency to self-fertilize. Another reason for low genetic variation might be that all populations of *M. veatchiana* have a recent common origin. These explanations are consistent with a theory of a possible northern expansion following the most recent ice age event.

Isolating *Aeromonas* from Rainwater

Sally Hays

Members of the genus *Aeromonas* are ubiquitous aquatic bacteria that play several environmental roles and are associated with a number of opportunistic infections in humans. These organisms have been isolated from a variety of aquatic samples worldwide, as well as found in food and soil. Rainfall samples were taken at multiple sampling points to test for the presence of *Aeromonas*. Preliminary results show that *Aeromonas* species are present in rainwater and can be isolated using *Aeromonas* Blue Medium. A positive test presents as creamy yellow colonies that are gram-negative, facultatively anaerobic rod-shaped organisms. After the bacterial cells were cultured, polymerase chain reaction (PCR) and DNA sequencing were methods used to identify the *Aeromonas* species. The positive existence of *Aeromonas* in rainwater provides insight into the ubiquitous nature of this genus and the potential role of rainfall in the transmission of the bacteria.

Evidence for the Geographic Origin of *Mentzelia dispersa* Based on DNA Sequences

Latonia Smith and Kristen Clemons

Mentzelia dispersa is an annual plant found throughout western North America, extending from California to British Columbia and as far east as the Dakotas. Population genetic theories suggest that patterns of genetic variation can be used to reconstruct geographic origins of species. In this study we examine chloroplast DNA in order to determine the origin of *M. dispersa*. We gathered samples from populations of *M. dispersa* throughout its range. We extracted DNA and performed PCR to amplify the *ndhF-rpL32* intergenic spacer region of the chloroplast. We quantified the DNA and sent samples to be sequenced. DNA sequences were used to construct a haplotype network and compare populations of *M. dispersa* geographically. We found an apparent geographic structure to the genetic diversity of *M. dispersa*, with similar haplotypes usually found in the same region. The greatest genetic diversity was found in California, compared to the Pacific Northwest and central regions of the United States, where few other haplotypes are found. This suggests that California is the geographic origin of *M. dispersa*, a conclusion that is consistent with a possible northeastern expansion from California in the aftermath an ice age.

Calvin Klein's Obsession for Men Cologne as an attractant for West Texas wildlife species

Reece Wells and Catherine Longest

We conducted field research to determine whether Calvin Klein's Obsession for Men (CK) was an effective attractant for West Texas wildlife species, especially bobcats (*Lynx rufus*). In order to test this, we placed twelve different scent stations in the area surrounding the Abilene Waste Water Treatment Plant and ACU's Rhoden Farm, near Abilene, TX (32.5,-99.6). Each scent station had a cotton ball that was laced either with CK, bobcat urine, or was an unscented control. Each station was monitored by a motion detection trail camera. It became evident that coyotes (*Canis latrans*) were most often attracted to CK, with five times as many sightings at those scent stations than at control sites. Raccoons (*Procyon lotor*) were responsible for most of our sightings at all of the scent stations and they were most attracted to control sites. Bobcats did not seem attracted to CK and investigated control sites seven times more than bobcat urine. We found that the majority of sightings occurred at dawn and at dusk, with the fewest sightings happening during the day. In the future we would like to do larger studies in other areas that would provide less incidental sightings than in this research. Future studies might also provide the chance to study other wildlife species.

Application of ITS Sequences to the Biogeographical Study of *Mentzelia thompsonii* (Loasaceae)

Rachel Ritchie and Maxwell Moore

Mentzelia thompsonii is a small plant from the family Loasaceae found in badlands along the Colorado-Utah border. *M. thompsonii* is a self-compatible annual that has barbed hairs on its leaves and fruit, which allows for seed dispersal via animal activity. A previous study from Lurz et al. used sequences from the plastid intergenic spacer *ndhF-rpl32* to support the hypothesis that the Colorado River presented a genetic barrier for *M. thompsonii*. Additional genetic sequencing will point toward one of two outcomes: further support of the Colorado River barrier hypothesis, or the need for a new hypothesis to explain the abnormal biogeographical distribution of *M. thompsonii*. Lurz et al. used DNA from chloroplasts, a region of relatively low mutagenesis, while this study used ribosomal DNA from the nucleus, a region of relatively high mutagenesis. Individuals were collected from eastern Utah and western Colorado, north and south of the Colorado River. DNA was extracted from tissue samples and PCR was used to amplify the Internal Transcribed Spacer (ITS) region of the DNA. The PCR product was cloned through competent *E. coli* cell transformation. These clones were amplified through PCR and sequenced. The resulting sequences were edited and compared for variation between individuals using haplotype networks. The haplotypes were mapped onto the range of *M. thompsonii* and compared with previously observed patterns. The implications of the data are discussed, including possible explanations for dispersal patterns.

The Investigation Genetic Variation in the Species *Mentzelia pectinata* (Loasaceae)

William Morales, Elliot Klar, and Micheal Kellar

Mentzelia pectinata is annual wildflower native to the foothills of the southern Central Valley in California. *Mentzelia pectinata* is easily identified by its distinctive flower, often with bright orange petals. However, geographic variation exists in petal color with more northwestern populations exhibiting yellow petals and southeastern populations with orange petals. Due to the possibility of genetic variation suggested by patterns of petal color, this study has investigated genetic diversity in chloroplast DNA. Preliminary data suggests that a number of genetic variations do exist in chloroplast sequences of *M. pectinata*, but sampling has been insufficient to determine whether geographic patterns exist. Further, preliminary investigations suggest that *M. pectinata* has exchanged genes with species that are not currently sympatric, implying that *M. pectinata* may not have always existed in its current range. Therefore, we will use genetic variation to investigate patterns of migration in *M. pectinata*. We gathered samples from populations of *M. pectinata* throughout its range. We extracted DNA and performed PCR to amplify the *ndhF-rpL32* intergenic spacer region of the chloroplast. We quantified the DNA and sent samples to be sequenced in order to find any patterns in *ndhF-rpL32* associated with geography or hybridization.

The *tapY1* gene and natural transformation in *Aeromonas*

Christina Lee

Horizontal gene transfer is an important field of study as it refers to the transmission of genetic information between two different organisms by means other than traditional reproduction. Transformation is a type of horizontal gene transfer in which a cell is capable to uptake foreign DNA found in its environment and incorporate it into the cell's genome for expression. Some species of bacteria, such as *Aeromonas* are capable of doing this naturally, which accounts for both gaining and losing of characteristics, including antibiotic resistance. The *tapY1* gene found naturally in *Aeromonas* encodes a type IV pili biogenesis protein which allows the cell to be able to adhere to neighboring cells and surfaces. This gene is hypothesized to play a role in natural transformation by giving the cell the ability to bind to DNA. The *tapY1* gene was targeted and amplified using primers and polymerase chain reaction to allow us to target the region the *tapY1* gene occupies for replacement. Removal of the *tapY1* gene and insertion of the gentamicin resistance gene will result to the loss of the type IV pili protein and its ability to adhere to surfaces but gain expression of gentamicin resistance. The *tapY1* mutant constructed for study can then be tested for a change in natural transformation ability.

Ecological Climate and Niche Comparisons of *Danaus gilippus* and *Danaus plexippus* in North America

Bailey Gaspard

Danaus gilippus (queen butterfly) and *Danaus plexippus* (monarch butterfly) are ecologically similar North American butterflies. Although these species have similar geographic distributions, *D. plexippus* is a migratory species and *D. gilippus* is not. The purpose of this study is to determine if there are additional significant ecological differences between the two species that are related to climate.

In this study, GPS coordinates of butterfly sightings and climate data from worldclim.org were used to create niche models for these species. We used niche modeling to determine and compare the expected current environmental niches.

Climate prediction for the year 2080 was also used to make future niche models.

We then compared future niche models to current niche models to determine the expected effects of climate change on the distribution of these species. It was determined that both of the observed current niches based on butterfly sightings and the expected current niches have substantial overlap indicating that there is a high chance of accuracy in the niche models. The migratory *D. plexippus* had a more northern and more southern niche than *D. gilippus*. Due to climate change, both species had expected distributions shift northward. However, *D. plexippus* is projected to lose a critical winter ground with the predicted climate change.

Isolation and Characterization of Hydrocarbonoclastic Bacteria from Rail Bed Soil

Karen McAlister

Diverse communities of hydrocarbonoclastic microorganisms often develop at sites of chronic petroleum exposure. Rail bed soil is potentially such a site since it is chronically exposed to petroleum; however, there appears to have been little or no reported work done to isolate, characterize, or identify potential hydrocarbonoclastic organisms from those soils. This study, therefore, appears to be one of the first of its kind. A soil sample collected from a rail bed in Abilene, TX was used as the source for isolating hydrocarbonoclastic bacteria. Three different methods of isolation yielded five different microorganisms. Four of which were tentatively identified as members of the bacterial genus *Pseudomonas*. These four isolates were able to utilize a variety of hydrocarbons including crude oil, mineral oil, benzene, toluene, and m-xylene. Two of the isolates were able to utilize naphthalene while one produced a diffusible pigment with an absorbance at 430 nm. The fifth isolate was a nocardioform bacterium that could utilize 10W-40 motor oil, but it was not further characterized. Washed cells of all four presumed *Pseudomonas* isolates were able to adhere to crude oil. Also, the cells of each isolate either produced an exogenous emulsifier or were able to emulsify oil by direct contact between the cells and oil. Results from the sampled site indicate, a small number of bacteria within a narrow taxonomic range have adapted to utilize a variety of hydrocarbons to which they gain access by adherence and emulsification.

Understanding the Wolbachia Genome in Relation to the Horn Fly

Savannah Vincent and Jennifer Acuff

Wolbachia is a bacterial endosymbiont found in most arthropods, including the horn fly. *Wolbachia* is responsible for a number of reproductive alterations, which provides the endosymbiont with the potential to be used as a pest control. The horn fly pestilence is a major area of concern to the agricultural industry, because these parasites feed on blood from cattle, which inadvertently produces negative effects for the cattle, including a lack of appetite and decreased milk production. In order for us to investigate the relationship between *Wolbachia* and the horn fly, it is important to analyze the *Wolbachia* genome. Using the RACE (Rapid Amplification of cDNA Ends) PCR and internal PCR methods with the differential primers, we have successfully cloned new segments of the *Wolbachia* genome. For this research, we will amplify the *Wolbachia* Surface Protein encoding gene in order to better understand the *Wolbachia* genome in its entirety.

Genetic Identification of *Mentzelia crocea* and *M. lindleyi* (Loasaceae)

Jaime Gordon and Tabitha Lewis

Mentzelia crocea Kellogg and *M. lindleyi* Torr. & A. Gray are large-flowered, annual plants inhabiting foothills in western and eastern California, respectively. These species have very similar flowers and overall morphology, but inhabit distinct ranges separated by the Central Valley. Further, at least one of these species (*M. lindleyi*) has been dispersed commercially by seed and has an artificially increased range. Therefore, more effective techniques for identification of these similar species outside of the original species ranges are necessary. A previous study revealed that the chloroplast intergenic spacer *ndhF-rpl32R* showed consistent differences between the two species, allowing identification with this sequence. Here we expand our sampling for *ndhF-rpl32R* in these species and consider alternative methods for identification. While sequencing can be expensive, the smaller intergenic spacer *trnH-psbA* is a cheaper alternative. We will compare *M. crocea* and *M. lindleyi* using *trnH-psbA* to test for differences that can be used to identify them.

PHYLOGENETIC RELATIONSHIPS IN THE ORYZOMYINI (RODENTIA: CRICETIDAE)

Carter Hayes, Jack Hamilton, and Rachel Hurst

Oryzomyini is a tribe of rodents distributed in South America and southeastern North America. In this study we test previous hypotheses of phylogenetic relationships in Oryzomyini based on sequences from the mitochondrial cytochrome b gene. New sequences were collected primarily from animals in Ecuador and combined with sequences from GenBank. These sequences were generated using the primer pairs p484–p485 and MVZ05–MVZ14 and the newly synthesized primers CT1F–CT1R and CT2F–CT2R for cytochrome b. We extracted DNA and performed PCR to amplify the cytochrome b region. We quantified the DNA and sent samples to the Yale DNA Analysis Facility to be sequenced. We reconstructed phylogenies using maximum likelihood (ML) searches performed with gaps treated as missing data and each codon position treated as a separate partition. Bootstrap support values were estimated by 1000 ML replicates. Finally, we have evaluated biogeographic hypotheses that are compatible with our current phylogenetic model.

Reconstruction of Phylogenetic Relationships in *Thomasomys* (Rodentia: Cricetidae) Based on Cytochrome c Oxidase Subunit I

Kirsten Smith, Beth Reiser, and Amberly Grothe

Thomasomys is a genus of mouse-like rodents in South America. Phylogenetic relationships in *Thomasomys* were previously analyzed based on sequences for the mitochondrial cytochrome b gene and the nuclear RAG1 gene in order to test taxon descriptions for creation of an updated key to the mammals of Ecuador. Results based on RAG1 and *cyt b* showed that nodes at the species level were well resolved and that most species of *Thomasomys* were monophyletic. However, these analyses showed similar patterns of poor resolution and short branch lengths at deep nodes of the phylogenies, suggesting a rapid radiation early in the diversification of *Thomasomys*. In this study we add sequences from the mitochondrial gene cytochrome c oxidase subunit I (COI) to better resolve relationships at deep nodes of the phylogeny. New sequences were generated using the universal primers LCO1490 and HCO2198 for COI. Maximum likelihood (ML) searches

were performed with gaps treated as missing data and each codon position treated as a separate partition, in order to test the hypothesis that there has been a rapid radiation early in the evolution of *Thomasomys*.

Tuesday, April 1, 12:35 – 1:20 PM

Poster Session II: Hunter Welcome Center Atrium

The relationship between gendered toys and stereotype threat in girls

Caitlyn Spain

Subjects were 60 girls in third, fourth, and fifth grades. Subjects were randomly assigned to one of four groups. Each group played with a different type of constructor toy or a gendered female toy that was not constructive. These groups included a LEGO gendered neutral non-scientific toy, a LEGO gendered feminine scientific toy, a LEGO gendered feminine non-scientific toy, and a non-LEGO gendered feminine non-scientific toy.

Increasing School Attendance Through Parent Motivation

Kylee Craggett and Karli Southward

After conducting a community assessment of a local Early Childhood Center (predominately made up of students from low socio-economic standing), it was determined that attendance was a significant issue among this population. The researchers determined that a model based on Skinner's Theory of Applied Behavior could be beneficial in motivating parents to bring their children to school. Applied Behavior suggests that positive reinforcement yields higher outcomes of compliance (Skinner, 1971). Some literature suggests that most programs, even those utilizing positive reinforcement, still focus mostly on child behavior or services centered around the child (Ford & Stephen, 1996). While this could be beneficial on some level, children of this age realistically have little control in their attendance of school. Due to these facts, it was determined that focusing on the reinforcement of parents through a token economy could result in higher numbers of attendance within this program.

This poster will present details of the research and review of literature that resulted in the implementation of a parent reinforcement program designed to increase attendance. Included in the presentation will be how the undergraduate researchers secured an external grant to fund the project, met with community stakeholders, and determined the best plan of action for implementation. Challenges and benefits of working on the macro level with the school administration and community will also be provided.

Ambition: Virtue or Vice?

Tyler McCuiston, Caroline Nikolaus, and Marvin Norman

This study explored the general trait of ambition versus a virtuous ambition depending upon Big-5 personality traits. An author-developed instrument was used to measure general and virtuous ambition among

college students. The Mini Marker, Brief Big-5 Assessment was administered to explore personality characteristics. Participants were 125 students from Abilene Christian University. The sample was 65% female and 81% Caucasian. Classification were 11% Freshmen, 20% Sophomore, 22% Junior, 45% Seniors, and 2% Graduate. Participants were offered a chance at winning a \$25.00 as an incentive. The hypotheses that: (1) Two types of ambition (general and virtuous) would emerge was supported; (2) The overall pattern of Big-5 traits associated with general ambition was positively correlated with Conscientiousness $r(125) = .25, p > .01$. and Neuroticism $r(125) = .42, p > .01$. as predicted. However, the Agreeableness was not significantly negatively correlated as predicted; (3) The pattern of personality traits associated with virtuous ambition positively correlated associated with Agreeableness $r(125) = .26, p > .01$ and Openness $r(125) = .22, p > .05$ but not negatively correlated with Neuroticism, as predicted. Extroversion was positively correlated with the virtue scale, $r(125) = .28, p > .01$. Business majors and health/science majors scored higher on classic ambition and Bible and Education majors scored highest on the subscale of virtuous ambition. While ambition is generally associated with career success, it is also true that virtuous ambition directed towards accomplishing change in the world could be fostered among college students. Future studies should focus on broadening demographics and using a more sophisticated measure of Big-5 traits.

Screen Potato: Technology Addiction Could be Ruining Your Health

Sarah Kirby, Kyle Levenick, and Mindi Gonzales

With the explosion of technology over the last several decades, the study of healthy versus unhealthy use of technology has followed. According to Essigs (2011) unhealthy habits stem from characteristics not largely influenced by the use of technology. On the other hand, Tarafdar, Gupta and Turel (2013) stated that there are many negative outcomes that come from extended technology use, including poor health outcomes. We were interested in investigating the effect of unhealthy technology use. The authors hypothesized that college students, as heavy technology “consumers” would be especially at high risk for technology addiction.

In order to further study these questions, an instrument was developed to measure technology addiction among college students. Specific factors of interest were measures of Excessive use, withdrawal, tolerance, and negative effects, all of which were included on a 20-item questionnaire ($\alpha=0.87$). The Health Promoting Lifestyles Profile II (HPLP-II) was used as a second dependent variable in order to compare technology addiction and health behaviors among college students ($\alpha=0.94$). Participants were 92 students from a medium-sized, private, religious-affiliated university. The sample was 79% female and 76% Caucasian. The overall hypothesis that technology would negatively impact health behaviors was supported, $r(92) = -.34, p > .002$. The results also suggested that men reported lower levels of problematic technology use and better habits. Findings suggest that technology use, can in fact, be problematic. Further research is needed to investigate if the closer contact impairs decision-making or overall maturity level, as conventional wisdom about the Millennial Generation seems to suggest.

Lack of Services for Those Affected by Autism in the UK:

Adelaide Rich

Purpose: The purpose of this study is to raise awareness of the growing prevalence of Autism in the UK, and the need for more resources for these children, teachers, parents, and the general public. These resources include, more education for teachers, and staff working in main stream schools. More information for parents

and families who have children with Autism. As well as better access to early intervention for children affected by Autism.

Method: Primary research was not feasible while I was performing this analysis. However I was able to access other literature in the field, and formed a secondary analysis on the concerns about the mainstream schools in the UK, the needs of those with Autism, and specifically how research in America on early intervention could potentially solve problems that the schools and families are currently facing.

Results: My results from this research were shocking, there are many difficulties that these children and families are facing, and they could theoretically be solved through early intervention, and more training for the teachers and staff in main stream schools. As well as the need for access to other programs if they are not able to participate in main stream schools. I would like to further my research, and look into more of the possible interventions that could be used for children with Autism. I also would like to see if there is a way in which the UK and America can benefit from one another in this particular area.

Disappearing Rural China

Kaitlyn Tuiasosopo

The introduction of industrialization in China has seen the rise of a new economic empire in the East. However, the rapid growth of the Chinese economy has overshadowed and begun displacing rural and agriculturally focused communities throughout China. More jobs are being outsourced to China, a movement of machination is taking the place of people, and the spread of urbanization is beginning to overwhelm China's agricultural economy. With over 160 cities with populations over one million, China's urban areas are expanding, an estimated 40 million farmers have been removed from their land, and eight different cities in China's Southeast quadrant predict a combined growth of 29.8 percent growth per year until 2020. Modernization has brought with it to the country's agricultural population a loss of farmland to industry and the onset of industrial pollution. What affects will the loss of agricultural life on China have and how will the economy shift to support the jobs displaced by urban sprawl? Using a combined retinue of statistics, anthropological studies, and geomapping comparisons, this paper will uncover the imminent removal of Southeast China's agriculture, economy, and way of life.

Microwave synthesis and characterization of oxovanadium salophen complexes

Stephanie Martin

Oxovanadium complexes containing a VO₂⁺ core have potential as catalysts for some organic reactions. Synthesis of oxovanadium salophen complexes have been reported in the literature and interest is growing in substituted salophens that might alter the electronic environment around the vanadium core enhancing catalytic behavior. We have been exploring the efficient microwave synthesis of oxovanadium salophens in an effort to optimize the synthesis of a series of substituted complexes and have prepared several in high yields with significant reduction in time and amount of required solvent when compared with traditional synthetic methods. We will present the details of our synthetic approach and characterization of these complexes.

Microwave Synthesis of Osmium (I) Acetylene Complexes

Erin Fry

The triosmium cluster $\text{Os}_3(\text{CO})_{12}$ is a common starting material for osmium cluster synthesis. $\text{Os}_3(\text{CO})_{11}(\text{NCMe})$ was synthesized using a simple microwave reactor procedure and immediately reacted with substituted acetylenes Ph_2C_2 , PhC_2CH_3 , and $(\text{Si}(\text{CH}_3)_3)_2\text{C}_2$. Products of the acetylene reactions include dimers $(\text{Ph}_2\text{C}_2)_2\text{Os}_2(\text{CO})_6$, $(\text{PhC}_2\text{CH}_3)_2\text{Os}_2(\text{CO})_6$, and the cluster $\text{HOs}_3(\text{CO})_9\text{C}_2(\text{SiMe}_3)$. While these products have all been previously reported, the traditional synthetic approaches gave small yields. We were able to produce them with yields of 45%-55% via microwave synthesis and obtained the first crystal structure of $(\text{Ph}_2\text{C}_2)_2\text{Os}_2(\text{CO})_6$. The structure of $(\text{Ph}_2\text{C}_2)_2\text{Os}_2(\text{CO})_6$ confirms that the two acetylene units dimerize and coordinate with the one osmium atom in the compound to form an osmocycle.

Using Fourier's Method to Find Effects of Diffraction

Carson Brown

Even though light has been studied for centuries it remains today as one of the most mysterious and interesting topics in the field of physics. Predicting its behavior can be a very tricky process and often requires much careful analysis. In our research, we concerned our selves with this very thing. We attempted to use Fourier's Method to predict the change of an illuminated image as we manipulated it at its Fourier transform plane after passing it through a lens. The process is fairly basic in theory but we found producing physical results to be quite tedious. We first created the image to be manipulated by etching a grid on to a painted lab slide with a laser etcher. We then illuminated the grid with a He-Ne laser and produced an image of the grid on a wall by focusing the beam with a lens. After that, we located the transform plane between the grid and its image on the wall by using a flat, movable surface and observing where a sharp diffraction pattern (or, the spatial Fourier transform of the object) appeared. By masking off different parts of this diffraction pattern, we were able to modify the image of the grid formed by the lens. Through the manipulation of this image, we demonstrated that it is possible to predict the effects of spatial filtering—a key concept in the discipline of Fourier Optics—on images.

End Group Functionalization of Di-block Polymers Used in Making pH-Activatable Nanoprobes

Nigel Gwini

Highly sensitive pH-activatable nanoprobes are very important medical imaging tools that take advantage of deviations from physiological pH to detect acidic tumor regions. These nanoprobes also provide a means to study the complex events involved in pH-regulated cell processes like the endocytic trafficking pathway. Essential to the pH activation function of the nanoprobes is the chemical structure of the probes. Each nanoprobe is made of a micelle that is an aggregation of multiple unimers. A single unimer comprises of a di-block polymer that is attached to multiple dye molecules. In this study, an attempt to modify the chemical structure of the unimer $\text{MeO-PEG}_{114}\text{-b-PDPA}_{85}\text{-Br}$ was performed with the aim of improving the contrasting capacity of the probes. Several approaches were taken to design unimers with a single dye molecule to reduce the "turning off" effect that results when multiple dye molecules are in close proximity.

The Effects of Remaining Hydrocarbons on Vegetation Following Bioremediation of a Crude Oil Spill

Jacob Windsor

In 1999, a crude oil spill occurred in tallgrass prairie vegetation at The Nature Conservancy's Tallgrass Prairie Preserve (TGPP) in Osage County, Oklahoma. Bioremediation consisting of fertilization and tilling or only tilling was performed from May 1999 to October 2001. However, surveys in 2011 suggested that the spill zone still differed substantially in plant growth and species composition when compared to a tilled control site and 38 undisturbed prairie sites. Preliminary analyses also suggested that total hydrocarbon levels (consisting primarily of nonvolatile or semivolatile compounds) were substantially higher in all samples from the spill zone than in the tilled control and that soil hydrocarbons were associated with plant species that indicate a recent disturbance including ragweed (*Ambrosia artemisiifolia*) and the exotic species, Bermuda grass (*Cynodon dactylon*). In this study, we increased the number of soil samples from the tilled and control sites using a cyclohexane extraction method to thoroughly test for petroleum hydrocarbons. We analyzed soil extracts using a GCMS to measure the amount of hydrocarbons at different sites. We use the increased sampling to test for fine scale relationships between variation in total hydrocarbons and plant species composition using direct gradient analysis in order to determine if increased hydrocarbons could be the cause of the altered vegetation.

Nutritional Status in Honduran Children Living in Rural Villages

Taylor Newhouse, Kelsie Andrews, and Emily Karibian

Background: Families living in isolated villages in Honduras without electricity and/or running water have limited access to a variety of foods due to limited transportation and scarcity of money. Limited data through research are available concerning whether nutritional problems exist among the children of the villages.

Objective: The purpose of this study was to assess nutritional status of children in two villages in Honduras.

Design and Analysis: ACU Nutrition students took measurements for heights and weights, hemoglobin levels, and urinary ketones of children ages 2-15 (N=129). Heights and weights were plotted on growth charts.

Results: One child showed a trace amount of ketones and one showed a small amount. Twelve percent indicated low hemoglobin levels and presence of anemia, and 32% showed high levels of hemoglobin.

Thirty-five percent plotted below the 5th percentile height-for-age (indicating stunting), 72% percent plotted lower than the 25th percentile height-for-age, 27% plotted between 25th-75th percentiles height-for-age, and one percent plotted above the 75th percentile in height-for-age. Fifty percent were lower than the 25th percentile in weight-for-age, 49% fell between 25th-75th percentiles, and 1% was over the 75th percentile. Weight-for-height plotting indicated 81% were in normal ranges.

Conclusions: Low hemoglobin levels were not significant, and some readings were surprisingly high. Ketone levels were normal overall, indicating starvation was not present. Although most children were lower than the 25th percentile height-for-age, and numerous children measured lower than the 25th percentile in weight-for-age, most weight-for-height measurements were normal, indicating that calorie intake was adequate.

The Investigation of Genetic Variation in the Species *Mentzelia affinis* (Loasaceae)

Alexander Rose, Matt McGowan, and Kevin Warner

Mentzelia affinis is a weedy, annual plant native to the far southwestern United States. Neither morphological nor molecular variation has been thoroughly investigated in *M. affinis*. There appears to be some geographic variation in flower morphology in *M. affinis*, with larger flowered populations found in California and smaller flowered populations in Arizona. However, due to small sample sizes in previous studies, no clear geographic patterns have been found in the genetic variation in *M. affinis*. Previous studies have also suggested a rare hybridization between *M. affinis* and *M. thompsonii* based on a small number of comparisons using the nuclear gene isocitrate dehydrogenase. However, these two species are currently regionally isolated, and no evidence of this hybridization has been found in chloroplast DNA sequences. More thorough sampling of chloroplast variation is likely necessary to find evidence of these rare hybridizations. We gathered samples from populations of *M. affinis* throughout its range. We then extracted DNA and performed PCR to amplify the *ndhF-rpL32* intergenic spacer region of the chloroplast. After the DNA was extracted, we quantified the DNA and sent samples to be sequenced in order to find any patterns in *ndhF-rpL32* associated with geography or hybridization.

Influence of Entomocidal Protein Gene on Germination of of *Bacillus thuringiensis* and *Bacillus cereus* Spores

Heather Rawls

Bacillus thuringiensis (Bt) is an endospore-forming bacterium that produces an insecticidal crystal protein during sporulation. The research emphasis for the organism stems from its long-term use as a bio-control agent for Lepidopteran larvae and the subsequent cloning of the crystal protein gene into farm crops. Less central to Bt studies has been investigation of how the insecticidal protein, which also is found in the bacterial spore coat, impacts spore behavior. The focus of this investigation conducted as an Honors capstone project was to determine whether removal or insertion of the crystal toxin protein gene modifies the activation and germination of spores of Bt and its close-relative *Bacillus cereus* (Bc), which does not produce the toxic protein crystal. The outcomes of this study are important to understanding the potential impact of Bt toxin cloning on the physiology of recipient organisms. Spores of the wild type Bt and Bc, and genetic strains where crystal-production genes were either deleted or inserted, were tested for their response to spore activation using sublethal heating and to exposure to alkaline pH (a method for activating spores unique for Bt) to determine how presence or absence of crystal protein impacts germination response. Germination was followed using established spectrophotometric techniques to detect the loss of refractility or spores as a measure of activation and germination to determine whether presence of the crystal affects germination.

Effects of Growth Media and Crystals on *Bacillus thuringiensis* and *Bacillus cereus*' Spore Sizes

Miranda Nguyen

Bacillus thuringiensis (Bt) and *Bacillus cereus* (Bc) are endospore-forming bacteria differing only in the synthesis of an insecticidal protein crystal by Bt at the time of sporulation. Understanding the structure, nature, and activity of the toxin has dominated Bt research for decades. Besides forming a unique crystal in sporulating cells, the protein also is a component of the Bt spore coat. The insect-specific toxin of Bt has been genetically engineered into a variety of microbes for research and into crop plants to improve yield, providing the basis for debate on genetically-modified organisms in foods. Little has been discovered about

the ecology of the spore, though prior studies have demonstrated that spore properties such as spore volume can be influenced by the nutrients available to cells during growth. In this investigation, spores were grown on nutritionally rich and poor media to study how nutrition influences spore volume. Spores used were wild-type and genetically-engineered strains of Bt and Bc, to see whether (1) extremes in quality of the medium (soil extract vs. nutrient agar) and (2) presence of the crystal gene influence the size of spores produced. The study was conducted by analyzing micrographs of spore preparations using ImageJ software to determine the volumes of spores from the genetic and wild type strains grown on nutrient rich and poor media. Variation in volume due to the presence of crystal protein genes or quality of the growth media were discovered and are reported by this work.

Investigation of Germination Inhibitors Present in Disposable Labware

Christina Barr

Bacillus thuringiensis (Bt) and *Bacillus cereus* (Bc) are endospore-forming bacteria that are distinguishable by the production of an insecticidal protein crystal by Bt. This crystalline protein is included in the structure of the Bt spore, but is absent from Bc. Spores of Bt and Bc have been studied to understand the process of activation, germination, and their return to normal growth. The method most commonly used is a spectrophotometric assay that follows the absorbance loss of a suspension of spores at 600 nm as the spores germinate.

Approximately 15 years ago, scientists working around the world found the normally dependable spectrophotometric germination assay become inconsistent and unreliable for the study of Bt. In 2013, a McMurry student discovered evidence that the inconsistency was due to the preparation and storage of spore cultures in disposable polypropylene centrifuge tubes. Spores prepared and stored in normal glassware gave similar results to previous studies that were successful. Subsequent experiments have shown water held in the disposable polypropylene tubes is able to disrupt germination of spores of Bt and Bc.

The focus for this investigation was to ascertain the chemical from sterile polypropylene centrifuge tubes responsible for the interference with normal germination of Bt spores. Identified possible chemical contaminants associated with tubes were tested to determine which might interfere with Bt and Bc spore germination. The causative agent is of potential importance for applications where spore germination is not wanted, and its identification may sound a warning for others who are conducting germination research.

Distributed Drug Discovery

Dru Collins

Certain tropical diseases are considered to be “neglected diseases”, since there is little profit motive for the pharmaceutical industry in the developed world to research and market treatments for them. The Distributed Drug Discovery project founded at Indiana University-Purdue University Indianapolis aims to aid in the development of drugs for the developing world through collaboration amongst many institutions across the globe. As a collaborator in chemical synthesis, our team at Abilene Christian University has synthesized many unnatural amino acids as potential antimalarial drugs through resin-based combinatorial chemistry. These compounds are analogs of compounds previously shown to inhibit the growth of the malaria parasite *Plasmodium falciparum*. Proton Nuclear Magnetic Resonance Spectroscopy and High Performance Liquid

Chromatography have been used to characterize the compounds. We have synthesized and characterized over 40 novel compounds and are preparing them to be sent for biological assay.

Analysis of kdr Mutation Prevalence in Texas Mosquito Populations

Kyle Stainsby

Given the increased usage of pesticides in Texas, pesticide resistance is likely to have increased in a number of insect species. This research studies mosquito DNA samples of the species *Culex pipiens quinquefasciatus* in order to measure the presence of pesticide resistance levels in Texas mosquitoes. Using Polymerase Chain Reactions on these mosquito DNA samples allows for the analysis of the Knock-Down Resistance (kdr) mutation. The kdr mutation is responsible for pyrethroid resistance in this sub-species and many other species of mosquitoes. Pyrethroids are one of the most widely used insect pesticides used in the United States, therefore over abundant resistance to this pesticide family could result in larger, less manageable populations of mosquitoes. By measuring the presence of the kdr mutation in DNA samples taken from different mosquito populations of Texas, population resistance prevalence can be measured. The KDR mutation has proven to be present in various mosquito populations in various regions of Texas.

Antibiotic Resistance of Escherichia coli Isolated from Canada Geese Feces and Urban Playa Lake Water

Nolan Rutherford

Abstract:

This investigation was conducted in West Texas urban wetland areas known as playa lakes during the time when Canada geese were in great abundance, and findings suggest a high incidence of antibiotic resistant *Escherichia coli* in the feces and water. The Kirby-Bauer Antibiotic Disk Diffusion Susceptibility Test was used to determine the antibiotic resistance or susceptibility of 100 *E. coli* isolates from Canada geese feces and playa lake water using 10 antibiotics known to be effective in the treatment of gram-negative bacterial infections. Antibiotic resistance was found in 84% of *E. coli* isolated from feces and water. Isolates were completely susceptible to 5 antibiotics and susceptible, intermediate, or resistant to the other 5 antibiotics. Complete resistance to tetracycline, streptomycin, ampicillin, and amoxicillin with clavulanic acid was found in some isolates. This research is important because antibiotic resistance is a growing concern in the treatment of infections. With the high incidence of antibiotic resistant *E. coli* in the feces and water, pathogenic and opportunistic microorganisms might possibly be present. Therefore, finding antibiotic resistant *E. coli* in Canada geese feces and playa lake water poses potential health issues because these lakes are used recreationally where there is possible contact with both sources.

Ecological Climate Change Comparative Analysis of *Microtus Pennsilvanicus* and *Microtus Ochrogaster*

Jesse Leon

It has been suggested that temperature changes due to global warming will be greatest at high latitudes, but the greatest biological impacts will be in lower latitudes. In this study we tested the above assertion by

comparing the effects of predicted climate change on two species of voles found at different latitudes. The prairie vole *Microtus ochrogaster* is found in the central United States and the meadow vole *Microtus pennsylvanicus* is found in the northern United States and Canada. We used GPS coordinates of museum specimens and climate data from worldclim.org to create niche models for these species. We used niche modeling to determine and compare the expected current environmental niches. We then used predicted climates for the year 2080 to make future niche models in order to determine the impact of climate change on the future distributions of these species. Our models predicted that both species will move north due to increasing temperatures. However, the northern species *M. pennsylvanicus* is predicted to lose substantially more of its current range than the southern *M. ochrogaster*. This suggests that the greater temperature changes at high altitudes will also result in greater biological impacts of these vole species.

Creating a Diffraction Grating

Case Herndon

Diffraction gratings are very important in physics and have many uses. We decided to try to create a diffraction grating using the laser etcher in the Maker Lab. Ultimately, we were successful in creating a diffraction grating which we then characterized using a HeNe laser. The procedure used to create this grating will be presented, as will comparisons of its performance with more sophisticated diffraction gratings.

The Power of Machine Learning: A Simple Demonstration

Jonathan Shouse and Frazier Mince

We take the sheer power of our brain for granted. The ability for the brain to recognize a person, to tell a male voice from a female voice, or even to play a simple dice game like farkle is an amazing feat of unseen computation, approximation, and prediction, and yet our brains can do this practically instantly. Computers, while undisputed computational masters, have traditionally been terrible at discriminating between similar objects or adapting to changing environments. However, machine learning has enabled computers to become not only capable, but quite proficient at these very skills.

This research is a simple demonstration of machine learning, where we develop a program that uses Bayesian statistics to make the best decisions in the dice game of Farkle. Bayesian statistics, when applied correctly, can reach a decision by calculating probabilities that depend on the successes or failures of previous attempts, on the current game's status, and other factors that change as the game progresses. This research demonstrates the potential for machine learning in a relatively simple context which many people can relate to.

Improving Timing for SeaQuest

Lacey Medlock

SeaQuest (Fermilab 906) is an experiment that uses the Fermi National Accelerator Laboratory in Batavia, IL. One of its primary goals is improve our knowledge of what makes up a proton. A previous Fermilab experiment, E866/NuSea measured this asymmetry and indicated possible surprising behavior when a specific part of a proton carries a larger fraction of its momentum. SeaQuest will investigate this behavior. The SeaQuest detector relies on plastic scintillators, which are pieces of plastic that give off light when

charged particles pass through them, to provide signals to know when a particle goes through the detector. The scintillators are up to 72" in length and thus can give signals that last 20-25 nanoseconds (ns), which is an issue because the accelerator delivers protons every 19 ns. This gives a possibility of confusion of scintillator signals from two different proton collisions. In order to reduce the signal length and in turn the number of missed events, we had to make the electrical pulses shorter, so we attached short wires and a resistor called a "clip line" that reflect an inverted pulse. This presentation will show how this was done and explain the basics of how this was done.

Tuesday, April 1, 1:30 – 2:50 PM

Session C1: Research on Teaching – McCaleb Room Zone A

The Effect of Structured Divergent Prompts on Knowledge Construction

Laura James

Discussion forums are a widely used activity in online courses. However, knowledge construction within online discussion rarely reaches higher levels. Knowledge construction refers to the acquisition of knowledge through processes of exploration and discovery. Knowledge construction can occur in both collaborative and individual environments. In online discussion, it is important to understand which aspects will encourage the highest amount of knowledge construction and learning. Our study investigates the effect three Structured Divergent prompts (playground prompts, brainstorm prompts, and focal prompts) have on knowledge construction as compared to Convergent prompts. Participants (N=58) were required to post in an online discussion thread during a graduate education course at a private university. We used The Interaction Analysis Model to determine the levels of knowledge construction demonstrated within students' posts. The posts were given a score using the following codes: 0-no post/no understandable post; 1-sharing information, 2-disagreeing; 3-negotiation of meaning; 4-testing co-construction; 5-agreement of the constructed meaning. The analysis revealed that two of the three Structured Divergent prompts (focal and brainstorm) yielded significantly higher levels of knowledge construction as compared to Convergent prompts.

Effects of the iPad on Teaching and Improving Social Skills of Children with Autism Spectrum Disorders

Kara Nestle

An estimated 1 in 88 children have a diagnosis of autism spectrum disorder (ASD). Because communication deficits are among the defining characteristics of ASDs, professionals and caregivers are seeking the best intervention strategies to help these individuals communicate as effectively as possible. The iPad is becoming an increasingly popular tool for the treatment of communication disorders in those with ASDs. Although the use of iPads in the treatment of social skill disorders is a relatively novel concept, its use has proven beneficial with this population. Interviews with three speech-language pathologists and one parent, coupled with information from five studies investigating use of the iPad for deficits in social skills, revealed a broad spectrum of outcomes and ideologies about the iPad as a tool for social skills intervention. Results of the

present study indicate that using the iPad during social skills intervention is only as effective as the motivation, abilities, and individual needs of the child who utilizes the device.

Complicity and Resistance: Understanding Teachers' and Administrators' Responses to a High-Stakes Testing Policy in Reading

Tara Lowe

During this session, the presenter will share the findings of a multiple case study conducted in a semi-rural Georgia elementary school, focusing on the teachers' and administrators' responses to Georgia's high-stakes testing policy in reading. Although the teachers and administrators appeared to support various aspects of the high-stakes policy, they undermined the test-based retention component of that same policy. In order to explore this complicity and resistance further, the researchers conducted multiple interviews with the teachers and administrators, completed field notes in over 51 hours of observations, as well as collected various documents including student work and test-related materials. The researchers then analyzed and theorized the data using the constant comparative method and French sociologist Pierre Bourdieu's concepts of field, capital, and habitus. Why did the teachers and administrators choose to reject the retention component of the policy, but not the high-stakes testing? The difference appears to be due in part to the fact that the teachers and administrators were well-versed in the research regarding grade retention but not on the unintended consequences of high-stakes testing. Secondly, the appeals procedure within the high stakes testing policy provided a legal means to override retention, but there was nothing available to circumvent the high-stakes testing requirements. Finally, some researchers have suggested that test-based retention policies are more about creating an appearance of high academic standards than about actually retaining students.

A Qualitative Study of Parent-Teacher Communication

Whitney White

The purpose of this study is to explore parents' perceptions of positive and negative experiences related to parent-teacher conferences using a qualitative lens. The study was guided by the following two questions: What explicit and implicit factors foster positive communication between teachers and parents? What explicit and implicit factors inhibit positive communication between teachers and parents? A group of 5 parents were recruited to participate in an interactive focus group of positive and negative interactions with teachers. The focus group session was transcribed and coded using qualitative methods, then analyzed using open coding methods. Analysis revealed six broad themes: key perceptions of the purpose of conferences, parent-typing, impact of experience/lack of experience in schools, silence, advocacy, and negotiation of student identity. The study suggests that: parents' perceptions of conferences are emotionally laden and dependent on their personal experience. Further, conferences require negotiation and recognition of the differences between their personal ways of relating with their children and the teacher's. Often conferences leave unresolved matters that require parents to live in a balance between advocacy and silence.

An Evaluation of the Availability of Mentorship in Dallas ISD

Rachael Kroeger, Courtney Tee, and Tessa Wolford

Mentorship of youth has been widely studied and is commonly accepted as a beneficial part of the development of young people. Much research has been done concerning the variables that contribute to successful mentorship and the outcomes of such relationships. However, few studies examine availability of a mentor in a given child's life. This study explores which people in a youth's life are most likely to be considered by him or her a trusted mentor and to what extent the youth perceives the given mentor as effective. This data is gathered from 8th grade students in Dallas ISD using a paper survey. A comparison is made between the responses of students in relatively lower income schools and those in relatively high income schools. By comparing mentor relationships and outcomes across a range of socioeconomic classes, this study seeks to develop a more complete picture of the state of mentorship for youth in Dallas ISD.

Session C2: Biology Interest – McCaleb Room Zone B

Edaphic specialization in the neoendemic plant *Mentzelia monoensis*

Tina Johnson

Mentzelia monoensis is a new species that we have recently described inhabiting pumice barrens and disturbed soils. It appears to be narrowly distributed in the Mono Craters volcanic chain in California. *Mentzelia monoensis* is hexaploid and not easily distinguished from closely related tetraploid and octoploid species. However, we have developed a PCR haplotyping technique to reliably distinguish *M. monoensis*, and we have used this information to determine the geographic distribution and soil specificity of *M. monoensis*. Our results suggest that *M. monoensis* is not only narrowly distributed geographically but also inhabits unusual soils compared to closely related morphologically similar, widespread species.

Catalogued Effects of *Wolbachia* Infections in *Haematobia irritans*

Jennifer Acuff and Savannah Vincent

Present in most arthropods, *Wolbachia pipientis*, is considered one of the most ubiquitous endosymbionts on Earth. An obligatory and intracellular and maternally inherited bacterium, *Wolbachia* forms complex relationships with its host and are currently being explored by researchers. *Wolbachia* has been seen to genetically manipulate its host by increasing fertility, male killing, cytoplasmic incompatibility, and male sterility, among many other benefits and costs. Specifically, the relationship between *Wolbachia* and *Haematobia irritans*, or the horn fly, is of particular interest, as the horn fly is a known cattle pest that negatively affects cattle populations as a result of their blood meals. To examine effects of *Wolbachia* on horn flies, colonies of flies were generated from a lab colony from the USDA Kerrville and then treated with tetracycline to rid the colonies of *Wolbachia*. To host the horn fly eggs and encourage full life cycles, donations from Rhoden Farm provided manure and bovine blood to host the horn fly and generate growth. After treating several generations with tetracycline, the use of PCR and specific primers confirmed the eradication of *Wolbachia*. A number of phenotypic effects were observed, and differences in the genome of infected and uninfected horn flies were noted.

Phylogenetic Relationships In *Thomasomys* (Rodentia: Cricetidae) Based On Mitochondrial And Nuclear DNA

Tanya Daughtry

Phylogenetic relationships in the genus *Thomasomys* were analyzed based on sequences for the mitochondrial cytochrome b gene and the nuclear RAG1 gene. New sequences were collected primarily from animals in Sangay National Park of Ecuador and combined with sequences from GenBank. New sequences were generated using the primers P484 and P485 for cytochrome b and newly designed primers for RAG1. Maximum likelihood (ML) searches were performed with gaps treated as missing data and each codon position treated as a separate partition. In the ML reconstruction using cytochrome b, nodes at the species level were well resolved, and most species of *Thomasomys* were shown to be monophyletic, with the exception of *T. baeops*. A subclade of *T. baeops* was grouped together with *T. taczanowskii* (95% bootstrap), but an additional set of *T. baeops* specimens were otherwise grouped sister to the *T. baeops*/*T. taczanowskii* clade (85% bootstrap). In contrast, most deep nodes joining multiple species into clades had bootstrap values lower than 70%. RAG1 was consistent with cyt b in all strongly supported clades and showed similar patterns of resolution and branch lengths. RAG1 did provide increased support for lower nodes, but in only one case was a RAG1 branch longer than suggested by cyt b. The small branches at lower nodes suggest a rapid radiation early in the diversification of *Thomasomys*. The RAG1 sequences from *T. baeops* and *T. taczanowskii* were virtually identical, further suggesting that these two taxa represent a single species.

A Determination of the Optimum Primers and PCR Conditions for Allele Specific PCR in Order to Investigate a Knockdown Resistance (kdr) Mutation in the Sodium Channel Gene of the Mosquito *Culex quinquefasciatus*

Andres Saucedo

The *Culex quinquefasciatus* mosquito is a major vector of the West Nile virus and can transmit various other human affecting diseases. For decades pyrethroid insecticides have been utilized to control the mosquito populations. However, many mosquitoes develop resistance to these insecticides through a kdr mutation that permits them to continue the spread of disease agents. Therefore, it has become crucial to be able to precisely identify this kdr mutation in order to best control the mosquito populations, and the spread of disease. The purpose of this experiment was to develop a reliable Allele Specific Polymerase Chain Reaction (AS-PCR) method for identifying the kdr mutation. This objective was achieved by determining an optimum set of primers and PCR conditions. AS-PCR followed by Gel Electrophoresis was conducted for different combinations of primers until an optimum blend was obtained. The data indicates that F4, F5, R2 as well as F7, R5, R6 are suitable primer sets. Although these primer sets were adequate, by performing Touch-Up AS-PCR (TU AS-PCR) it could be possible to further enhance their performance. This secondary hypothesis was tested by performing Gel Electrophoresis with AS-PCR product and comparing the quality of the image to that of Gel Electrophoresis with TU AS-PCR product for the two previously determined sets of primers. The Gel Electrophoresis with TU AS-PCR product was found to be of higher quality than that of the Gel Electrophoresis with the AS-PCR product for both of the primer sets.

Determining Genes Necessary for Natural Transformation in *Aeromonas salmonicida*

Kathryn Davis and Madeline Peterson

Aeromonas is a genus of bacteria whose members are ubiquitous in water. *Aeromonas* strains are known to be opportunistic pathogens and the causative agents of many gastrointestinal diseases. Natural transformation, the process of uptake and expression of free DNA, is a defining characteristic of the *Aeromonas* genus. The purpose of this project is to identify and confirm that the genes *recA* and *clpA/clpS* are involved in natural transformation. *RecA* is a protein that initiates recombination of broken DNA by encoding a DNA repair protein to ligate the ends back together. A group of proteins called Clp proteins are molecular chaperones that encode for a caseinolytic protease that degrades damaged proteins in response to stress. Preliminary studies in our lab suggest that these genes are important in transformation. The genes have been removed from the genome using a technique called splice overlap extension PCR in combination with transformation. The resulting mutated strains of bacteria now have gentamicin resistance cassettes in place of the genes of interest. The mutants will then be scrutinized to determine the effects of the loss of the genes on natural transformation. The genes will then be added back into the genome of *Aeromonas* and the antibiotic cassette will be removed to confirm the effects of the genes of interest on natural transformation.

Session C3: Decision Making and the Political Process – Alumni Conference Room

Political Dissent and Social Media in China

Laura Gonzalez

Political dissent and expression is a controversial topic in The People's Republic of China, especially since the Communist Party of China started its rule in 1949. Events like the one of Tiananmen Square in 1991 and revolutions that have occurred in recent years are just examples of what dissidents in China are doing to oppose their government. Researchers have explored and drawn conclusion as to why this protests have occurred and how dissidents have used protests, writing, spying, and other techniques to incite political dissent. But now there is a new tool at hand, social media; creating a new battlefield for the government and the dissidents. Social media has become the new go-to for political dissidents, working around government censorship to accomplish the spreading of political expression, using blogging and websites like Weibo, known in the west as the "Chinese Twitter". This research will explore the relation between dissidents and social media, and how social media is a new way for younger generations to express their political views and arguments. Different methods will be required for this research, such as exploration of different social media the young Chinese generation is using, interviews with fellow students, and in depth research of how the government is censoring Chinese internet and how people can work around that. For a better understanding, it is important to understand also the history of political dissent, who are this dissidents and what they are advocating, and the consequences of their actions.

By the People, For the People?: The Effect of Area Median Income on Political Connectedness

Caleb Orr and Alex Gabriele

This exploratory research finds the extent to which area median income affects political connectedness in the Dallas metropolitan area. Much focus in political science research has been placed on the growing disconnect between Americans and their elected officials, and while this has largely been highlighted through analysis of

disparity in policy, the field has yet to measure the foundations of disparity through disconnection in the electorate. The target of this research is especially unique when applied to the political landscape of Dallas, an urban area with a mix of racial tensions and economic disparity that is symbolic of the rising political divide witnessed throughout the urban South. We examine the correlation between area median income and measures of political connectedness to elected officials in the U.S. House of Representatives, which allows for the analysis of inequalities in contact among different constituencies in the area. We will gather this data through a targeted survey of constituents in congressional districts that have boundaries in Dallas County. Our research fulfills the purpose of isolating the factor of area median income through the use of the high quantity of zip codes in Dallas County, which is uniquely beneficial to the specificity of the data. We aim to highlight this factor as key to understanding the disparity in connection between constituents and their elected officials, and then engage in a path model that finds a resultant correlation with political efficacy.

Can There Be Too Much Choice? Empirical Explorations of Theoretical Predictions

Levi Ritchie

Since its first observation 14 years ago, the too much choice effect has frequently appeared in business and psychology literature. A meta-analysis of the existing literature, however, indicated that observations of the effect were due to chance. Jessup et al used simulations to test psychological explanations for the too much choice effect, and integrated the findings of that research into an existing model of choice called decision field theory. We tested two hypotheses in this extension of decision field theory using a task where participants took the role of a human resources manager hiring virtual applicants from either small (3) or large (15) sets of candidates across 80 total trials. These virtual applicants were either uniformly (i.e., all approximately equal quality) or exponentially (i.e., one option was dominant) distributed. Additionally, participants were randomly assigned to two groups: A short (5 seconds) or long (120 seconds) decision time, indicating the length of time allowed for making the decision. The two different explanations for the effect -- time out and lead change -- predict that the length of time available for a choice and the manner in which options are distributed, respectively, will have an effect on whether or not participants adhere to the too much choice effect. Repeated measures analyses yielded significant effects supporting both explanations.

Session C4: Health in Humans and Felines – LYNAY Classroom

Parental concerns about early childhood vaccinations

Mathew Molina

Objective

This exploratory study attempted to identify parental concerns regarding early childhood vaccinations.

Methodology

An investigator-created survey was administered through SurveyMonkey.com. Parents of children ages 0 to 6 years old were eligible to complete the survey. Questions related to parents' opinions about delaying or refusing vaccinations and other concerns. An open-ended question at the conclusion of the survey was offered where parents could share any other comments.

Results

With a 91% (N=262) completion rate, 32.4% (n=85) delayed vaccinations and 23.3% (n=61) refused vaccinating their children. The majority of parents who delayed vaccinating their children were concerned about the safety, the amount of vaccines recommended, and serious side effects. Of the parents who delayed,

50.6% believed the influenza vaccine causes the flu and 45.9% believed the varicella vaccine causes chicken pox. Of the parents who refused, 59.0% believed the influenza vaccine causes the flu and 54.1% believe the varicella vaccine causes chicken pox. Major themes analyzed in the open-ended question included parental concern about vaccines being under researched and potentially causing autism.

Conclusion

The majority of parents did not delay or refuse vaccinations, but more reported becoming concerned.

Significance

Health professionals need to be aware of parental concerns about vaccinations in order to guide parents in making informed decisions.

Maternal Hypertension and Associated Diagnoses: Epidemiological Look at Maternal Hypertension in Texas 2010

Dulce Lopez

A rise in maternal chronic hypertension continues to complicate pregnancies in the United States. The purpose of this study was to observe associated diagnoses occurring in pregnant women with chronic hypertension in order to better understand the medical issues surrounding pregnant women with hypertension. This two-part study included a data collection and review of literature. The data collection came from the Texas 2010 discharge information included in the Nationwide Inpatient Sample, Healthcare Cost and Utilization Project, Agency for Healthcare Research and Quality. Medical diagnoses were interpreted using ICD-9 insurance billing codes. Information gathered from the database was then used to compare the different frequencies of illnesses in pregnant women with and without hypertension. A variety of medical diagnoses were measured including nutritional problems, thyroid dysfunctions and poor fetal growth. The research demonstrated obesity as a commonly associated diagnosis in pregnant women with chronic hypertension. This study also showed maternal hypertension increased the health risks for the fetus. Risks to the fetus included poor fetal growth and a higher incidence of hypertension later in life.

Practicality and Validity of an iDevice-Operated Blood Pressure Monitor

Nicholas Sterling

Introduction: Blood pressure (BP) is an important clinical marker. Many patients could benefit from a simple, accurate BP monitor that self-records and exports data on demand. The iOS-operated Withing's BP monitor has this capability. Purpose: The objective of this study was to determine the ease-of-use and accuracy of the Withing's device. Methods: Fourteen females and thirteen males (27.8 ± 11.7 yrs.) volunteered. BP was taken concurrently on opposite arms (Withing's monitor or auscultation). After a 5-minute resting interval, the arrangement was switched. To improve technician accuracy, use of a dual-headed stethoscope was employed. Results: Three sets of data were lost (failure of the Withing's monitor to detect a BP). Correlations between the methods were significant ($p < 0.02$) for the systolic and diastolic pressures on both arms ($r > 0.607$). The mean difference in pressure (2.54 mmHg) for the systolic reading on the left arm was significant ($p = 0.013$). Conclusions: Although the outcomes are subjective and anecdotal, technicians favored the simplicity of the Withing's device over standard equipment and some subjects commented on its comfort and speed. The simplicity and comfort are of secondary importance, however, as the data leave in question the accuracy of the monitor.

Identification of Feline Leukemia Virus, Feline Immunodeficiency Virus, and Common Internal and External Parasites in Unowned, Free-roaming cat populations on Abilene Christian University Campus

Emily Schuster

Internal and external parasites as well as Feline Leukemia (FeLV) and Feline Immunodeficiency (FIV) viruses are potential issues in unowned, free-roaming (feral) cat populations. These factors also pose threats to the surrounding owned-cat populations, wildlife, and even humans. The objective of this study is to identify the pathogens and parasites present in the feral cat population on the Abilene Christian University campus in an effort to allow for better-informed management practices and veterinary care. The cats tested were captured for the Trap-Neuter/Spay-Release program already in place on campus. A general description of the population including weight, breed, age, color, percent volume of red blood cells, and the pregnancy/cryptorchidism rate of captured cats are given. Parasites and protozoa were identified by visual confirmation under magnification, and the viruses were assayed by ELISA antibody/antigen testing (Idexx's SNAP FIV/FeLV combo test). This data will allow program managers and veterinarians to make more informed decisions concerning the management of the feral cat population that will provide a safer environment for students, wildlife, and other cats living in ACU campus community.

Session C5: Gender and Sexuality – AT&T Theater

Social Subversion and Shakespearian Drag

Erik Ringle

Throughout many of Shakespeare's plays, challenges to authority figures and social structures are consistently included. While the reason for these indictments against cultural norms remains unclear, repeated examples of cultural subversion function as commentary on the ways in which society shapes public perception, especially regarding gender conventions. Although he employs various techniques to achieve strong motifs of social destabilization, Shakespeare often employs characters who exhibit behavior which would have been considered appalling, frequently strong-willed females who breach gender expectations and couples that defy the tradition of paternally arranged marriage. While examples of characters who challenge normative social conduct are pervasive in the majority of Shakespeare's plays, this paper focuses on illustrations of destabilization found in only four: *The Taming of the Shrew*, *Much Ado About Nothing*, *Romeo and Juliet*, and *The Winter's Tale*. By applying Judith Butler's theory on gender and identity to the plays, a better understanding of how culturally inflammatory themes were received by the audience emerges. Following a thorough analysis of subversive instances in the four plays, this paper ultimately concludes that Shakespeare's plays functioned as social commentary, acclimating the Elizabethan audience to more liberal definitions of gender and marriage practices.

Hysteria in Nineteenth Century Feminist Literature

Brandy Rains

Hysteria was a commonly diagnosed ailment in the early 1900s and epitomized patriarchal oppression at the time. Pieces of feminine literature such as Kate Chopin's novel *The Awakening* and Charlotte Perkins Gilman's short story "The Yellow Wallpaper" make powerful statements about the oppression of women in

the nineteenth century by portraying hysteria from their perspective as diagnosed patients. Typically, hysteria is discussed as a social and gender oriented issue; however, this leaves the medical knowledge, or lack thereof, somewhat undiscovered. Analyzing these pieces of literature in conjunction with the medical principles used in diagnosing and treating this ailment is imperative to understanding the social implications this diagnosis had on society and therefore forces one to question the medical validity of the diagnosis and whether or not the men and doctors of the time contributed to an illness rather than alleviated it. To complete this study, I researched medical journals of the time period alongside current medical journals, literature analyses and articles on Kate Chopin and Charlotte Perkins Gilman's life and work, and compared my findings with the symbolic and literal meanings in *The Awakening* and "The Yellow Wallpaper". Ultimately, my findings concluded that the social conventions of the masculine roll of the early 1900s contributed to hysteria in such a way that women exhibiting symptoms of the disease were more physically, emotionally, and mentally unhealthy after male intervention.

Queer Ecologies and Sexual Stratification in *The Scarlet Letter*

Dylan Brugman

This research centers around the role of sexuality in the novel *The Scarlet Letter* by Nathaniel Hawthorne. Using content analysis of the novel, the research draws from a queer ecological perspective on the role of sexuality and natural/unnatural spaces to address sexual stratification and the division of the sacred and profane. Through this perspective, research concludes that the novel is a narrative of queer spaces and a manifesto speaking out against repression of sexuality in Puritanical American society. The research then draws applications to sexual stratification today, and the role that Puritanical notions of sexuality continue to marginalize populations and establish heteronormative spaces that exclude queer bodies and non-normative sexuality.

Tuesday, April 1, 3:00 – 4:20 PM

Session D1: Conflict and Power in International Relations – McCaleb Room Zone A

China and the Arab-Israeli Conflict

Caitlin Phillips

With all that has gone on in the Middle East over the last several years with the Arab Spring and all that is continuing to go on in Syria, it is not surprising that there has been talk amongst political scientists, journalists, and authors about China and their political and economic relations within the Middle East. However, most of the discussion has either been focused on China's consumption of oil from the region or their opinion of the Syrian regime and whether or not the UN should interfere in Syrian matters. There has been little discussion on the Chinese, their relationship with Israel, and the Chinese position in the Arab-Israeli conflict. In this paper I will look at professional journals, research centers, statements made by Chinese and other government officials, and recent news stories, to focus on the Chinese and their relations in the Middle East, paying close attention Israel and the Arab-Israeli conflict.

Terrorism in China

Brittney Tunnell

With the War on Terror currently occurring across the world and headed by the United States after the September, 2001 attacks, it is no surprise that terms like al Qaeda, Jihad, and fundamentalism have nearly become household phrases. However, most of the discussion about terrorism and the news coverage centers on activities originating in the Middle East and the effects witnessed primarily in the Western World. Countries, ethnicities, and religions around the world have more access to each other today than has been historically possible due to globalization so it is extremely naive to believe that terrorist attacks and organizations only affect the countries in the West or the locations in which the attacks occur. China, part of the Global West but physically located in the far East, is regularly left out of this discussion even though they are currently dealing with their own version of terrorism. The following essay includes a compilation of research on the Uyghur people of Western China and an analysis of the factors (including but not limited to their push for Eastern Turkistan and the role of Islam in the movement) that have shaped and influenced the ethnic and national separatism that the Chinese government considers acts of terror. Scholarly journal articles, recent news coverage from both foreign and internal sources, official websites of Uyghur people in the United States and the United Kingdom, and an interview with a published professor of political science will contribute to the discussion that follows.

The effects of China's Military Modernization

Josi Flores

Over the past decade, China has been engaged in efforts to create a larger and more modern military. There is much uncertainty as to China's ultimate intent in modernization and whether it seeks to project its military power throughout Asia. These feelings of uncertainty were further heightened with the controversial "air defense identification zone" in which China declared international airspace over the East China Sea Nov. 23, 2013, demanding that all foreign aircraft flying through it should obey Chinese air-traffic controllers' instructions. While there is much talk of how China's suspicious actions have shaped the responses of the U.S. and other Asia-Pacific nations toward China's military modernization, there is not much mention as to how this modernization will affect the balance of these powers in future years. Chinese military power may still pale in comparison to the US armed forces, but it has grown significantly, and will likely continue to grow over the next ten to twenty years. This report provides an overview of the dramatic shifts in the Asian balance of power as a result of China's military modernization over the last decade and the implications of what this means for the surrounding region as well as the U.S. in their fight for power. The analysis in this report draws on the work of experts inside and outside of government, various research centers, and NGOs.

Chinese employment of soft power in Brazil

Nikolai Rabinovitsj

Economists are always discussing how China is investing heavily into developing countries, and most recently, Brazil. China and Brazil's economies are naturally complimentary because China is a manufacturing economy focusing on imports, whereas Brazil is an economy based on natural resources and exporting. The Organization of Economic Co-Operation and Development (OECD) recorded that in 2008 Brazil received

the most FDI (Foreign Direct Investment) of any South American country. Of the \$45.1 Billion dollars invested, \$12.6 Billion came from China.

The spread of culture has always been a bi-product of economic investment due to migration, and language needs in order to conduct business. China is famous for investing heavily into resource rich developing economies. However, the idea that China uses soft power as a means to influence its cultural and economic standings remains largely unexplored.

Soft power is a new approach for China, and Brazil has served as one of its biggest testing grounds.

China has already opened five Confucius centers in Brazil (the most in any developing country) where people can come learn about the history and culture of China. This research will focus on three ways in which China promotes its culture through soft power to influence the developing country of Brazil in order to increase economic relations. First, it will explore language as a means for increasing economic relations. Secondly, it will discuss China's education and Confucius centers. Lastly, it will discuss China's use of sports in Brazil.

Session D2: Physics Interest – McCaleb Room Zone B

Experimental Upgrades of Phonon Imaging Apparatus and the design of a Sn sample holder

Francisco Teran

Experimental Upgrades of Phonon Imaging Apparatus and the design of a Sn sample holder .

FRANCISCO TERAN, TIM HEAD, Abilene Christian University.

This presentation will discuss work done to upgrade the hardware and associated software of a phonon-imaging Apparatus. We completed the design, testing, and fabrication of a plastic holder for a 10 mm diameter x 1 mm thick Sn crystal. We discuss the creation of 3 C# programs to interface a digital to analog controller with two galvo-mirrors used to scan the laser beam across the sample surface, and creation of a graphical user interface. A phonon imaging experiment was performed but we were unable to detect ballistic phonons.

Development of Mobile Lens Platform for Phonon Imaging

Erik Forrister

Phonon-imaging experiments use a laser beam to excite phonons in a sample of interest. The laser spot size is controlled by a lens system with a variable lens. One challenge of the phonon imaging apparatus was moving a lens to accurate positions repeatedly to change the focus position of the laser. Our objective was to move a lens platform to accurate positions along a track consistently. A driver circuit was designed and built, the track and platform were designed and assembled, and a micro-controller and user interface were programmed. The result was a lens platform that could be moved hands-free accurate distances repetitively.

Analyzing the Hodoscope Signal-width of E-906/SeaQuest

Noah Kitts

SeaQuest is an experiment at Fermilab, located near Chicago Illinois. It is a fixed target experiment whose main purpose is to learn more about what is inside the proton. The structure of a proton is extremely complex, and is not yet fully understood. Inside a proton there is a "sea" of particles. Each of these particles can divide into a pair of different particles. These pairs collide and destroy each other, producing two particles known as muons. Through a process, these muons can provide information about the structure of the

proton. SeaQuest is designed to count the number of muon pairs that pass through the detector in order to gain information about what is inside a proton. The SeaQuest detector has 8 important detectors called "hodoscope arrays". SeaQuest receives a beam of protons from Fermilab's Main Injector that comes in bunches 19 ns at a time. According to the hodoscope setup, signals with a width of 10 ns to 15 ns have been expected. During the commissioning run in 2013 signals were observed that were much longer than what was expected, which could help prevent the detector in making accurate measurements. This presentation will go over the data that was analyzed in order to investigate the source of these signals.

Construction of Prototype B for the COMPASS II experiment

James Mallon

While there has been significant progress in the past years of understanding the Standard Model, such as finding the Higgs boson, many important questions more basic things remain open; in particular, we have only elementary understanding of the origin some of the properties of the proton. The COMPASS project is a nuclear physics experiment at CERN which explores the inner sea of the proton. COMPASS II's experiments will be exploring how the inner sea of subatomic particles influences the spin of the proton. Several drift chambers must be constructed to replace older, faulty straw chambers. Smaller prototype drift chambers were constructed, one in Saclay, France, and the other Prototype B (PTB), at the University of Illinois at Urbana-Champaign. PTB is 16.5" wide, 72" long, and 3.03" tall, with 66 wires across two separate wire planes. This poster will detail the methods used to fully assemble PTB.

Fabricating and characterizing a Fabry-Perot Etalon

Andrew Boles

Fabry-Perot etalons are widely used in lasers, telecommunications, and spectroscopy fields to control and measure the wavelength of light. Etalons are characterized in general by their finesse, which is essentially a measure of their spectral resolution. A simple method to fabricate a Fabry-Perot etalon was devised and the characteristics of several devices created using this method will be presented, along with a systematic characterization of the coating of the devices. An initial etalon was fabricated using these methods and subsequently characterized with a finesse of about 1.5. This initial device prompted improvement of the fabrication methods used, and these improvements will be presented along with a new etalon fabricated using the improved method. Finally, a comparison between the initial and final Fabry-Perot etalons will be quantitatively shown.

Session D3: Families and Rights – Alumni Conference Room

Equality in Ephesians Household Codes

Darren Hughes

The household codes in the New Testament have been controversial for many Americans as we fight for equality in every arena of social life. The appearance of the household codes in Ephesians is unique in that the letter is full of, what would later be deemed, Trinitarian language. This paper seeks to ground the relationship of husband and wife in this language from the perspective of Christian Theologian Stanley Grenz who writes

in his Theology for the Community of God that God's nature "forms the paradigm for the life of the Christian." If God's nature creates a lens through which the Christian views life, then equality between husband and wife can possibly be established if the Christian can envision hierarchy and equality within the nature of God.

Fathers and the Daughters Who Defy Them: An Exploration of the Father-Daughter Relationship in Shakespeare's Tragedies

Alikay Wood

One of the main reasons William Shakespeare's plays have retained such an enduring literary presence is Shakespeare's ability to capture the essence of human nature and relationships. In "Fathers and the Daughters Who Defy Them: An Exploration of the Father-Daughter Relationship in Shakespeare's Tragedies" I explore the relationships between fathers and daughters in four of Shakespeare's most famous tragedies.

Father-daughter relationships in Shakespeare's tragedies are characterized by the father's refusal to accept the disobedience of their defiant daughters, usually resulting from their inability to treat their daughters as independent adults, and the role this estrangement plays in the daughters' death. Shakespeare emphasizes the innocence of the daughters, casting the blame for their deaths on their prideful fathers.

The father-daughter relationship is crucial to understanding Shakespeare plays because of the depth and complexity of these relationships. In each instance the father's inability to recognize his daughter as a reasoning human capable of disobedience eventually leads to her death. At the time of publication this reversal of gender roles (placing the blame on the male instead of the female) was especially unique.

The paper draws on several books on the subject but most of my conclusions were reached through careful study of Shakespeare's plays. Understanding the pattern of father-daughter relationships in these tragedies provides a new context for understanding the portrayal of gender roles in Shakespearean tragedies and emphasizes Shakespeare's writing skill and incredible ability to portray dynamic relationships.

Ceremony and Obedience: Fathers and Daughters in Shakespearean Tragedy

Emily Moses

Paternal society in the sixteenth and seventeenth centuries glorified the bond between fathers and daughters because the bond preserved males' social power. The traditional ceremony of marriage, in which a father gives his daughter as a bride to another man, typically illustrated the shift in power over the woman from the father to her new husband. However, often in Shakespearean tragedy, the traditional model of the marriage ceremony is abandoned in order to show disrespect to or manipulate either the father or the daughter. Some literary scholars argue that the daughter's decision to obey or disobey her father's wishes depends heavily on her loyalty to her husband or lover, but Shakespeare consistently uses the traditional model of a marriage ceremony to expose where her obedience is truly distributed. In Shakespearean tragedy, most specifically *The Tragedy of Othello, the Moor of Venice*, *The Tragedy of King Lear*, *The Tragedy of Romeo and Juliet*, and *The Tragedy of Hamlet, Prince of Denmark*, Shakespeare uses ceremonial imagery of the traditional marriage ceremony to expose how the obedience, or lack thereof, of a daughter toward her father inversely models the obedience she will offer toward her husband or lover.

The effects of China's one-child policy on family and social structures

Dana Dilling

It is likely no news that the ratio of men to women in China's 1.38 billion population is disproportionate, with a birth ratio of 120 boys for every 100 girls (World Population Review). This ratio partially explains the sections of China's major cities comprised of bachelor Chinese men, many of them university students, who are open about their homosexual inclinations (Lau).

In 1979, the government of the People's Republic of China enacted the one-child policy, also known as the "family planning policy," in order to ameliorate social, economic, and environmental pressures in China. The policy has been fairly successful in alleviating the overpopulation problem, with 400 million births avoided since the policy's implementation (Liang). Scholars have studied the effects of China's one-child policy on the culture, society, economy, and environment. Recently, there has been a focus shift towards the policy's effects on family, marriage, and the social perceptions thereof. I will join these scholarly endeavors and contribute further study to patterns of marriage and singleness in twenty-first century China.

To facilitate this discussion, I will consult demographic data and historiographical sources to provide a brief history of twentieth century pre- and post-policy trends. My research will include personal interviews of Chinese persons and analysis of demographic patterns, by which I will address society's current perceptions of marriage and family, varying regional patterns, the emotional and psychological effects on Chinese home life, and the policy's influence on any changing trends of homosexual practices among men.

Session D4: Business – AT&T Theater

Of Mice and Men: Financial Calamity and Press Coverage of the Dodd-Frank Act

Jared Poole

In 2008, the United States suffered the worst economic collapse since the Great Depression. This meltdown, with origins that reach at least 30 years backward in the nation's economic history, spurred President Obama to propose sweeping reform to the nation's financial system. After 13 months of deliberation, the U.S. Congress passed and Obama signed into law the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (DFA). However, despite the bill's impressive size (more than 2,300 pages) and the severity of the crash itself, academics have found fault with the legislation, even postulating that it may not be able to prevent a recurrence of the same sort of crisis. This present study aims to shed light on this outcome—that the most significant piece of financial legislation since the 1930s may be thought of as functionally impotent—by using content analysis to examine the way in which the business press characterized the development of the DFA. The study finds that the press perceived that debates about reform were off-target, that public anger shaped the debate, and that deep ideological divisions obstructed reform.

But Where Did We Come From? Teaching Business Ethics by Journeying through the Moral Arguments of Great Economists from Smith to Galbraith

Jared Poole

Business ethics education has gained prominence after a spate of corporate scandals and the worst downturn in 80 years defined the economic legacy of the first decade of the new century. Indeed, the number of business courses that contain ethics-related material has increased over the last ten years. Still, MBA curricula require relatively few mandatory, stand-alone business ethics courses, suggesting that a chasm exists between

business schools' excited rhetoric about ethics and their actual attention to it (Rasche et. al., 2013). In addition, a meta-analysis of course outcomes found that the effectiveness of business ethics courses could be greatly improved (Waples et. al., 2009). However, much is known about how to ameliorate this problem. Daniel K. Finn argues that sound reasoning about markets and morals is predicated upon a holistic understanding of the social, cultural, and political environment in which economic activity occurs (2006). Additionally, numerous authors argue that ethical decision-making in the work place requires us to have first reflected on our own values and the way in which we must conduct business in order to be true to those values (Waples et. al., 2009; Schmidt et. al., 2009; Tello et. al., 2013; Waddock and Lozano, 2013; Crossan et. al., 2013). This project investigates the implications of these scholars' work by showing how a business ethics course that explores classical non-fiction in business and economics can nurture socially responsible leaders. In addition, Finn's framework for moral reasoning, which considers the "moral ecology of markets," is examined and evaluated.

Streamlined Bureaucracy: A Comparative Study of the E-Government System of the United Arab Emirates Relating to the Petroleum Services Industry

Stewart McGregor

This paper explores the advanced system of e-Government in the United Arab Emirates and how their system makes it easier for international businesses, specifically petroleum companies, to interact with the government. Through the use of a hypothetical case study, this article explores how the United Arab Emirates has diversified their e-Government system to be more intuitive and user-friendly for businesses. Through a comparative study with a few nation members of the Organization of the Petroleum Exporting Countries (OPEC), this paper seeks to understand the correlation between a robust e-Government system and a strong political economy. More specifically, the e-Government systems of the three most populous emirates, Dubai, Abu Dhabi, and Sharjah, will be explored as to how these emirates further tailor their e-Government systems to be more responsive to their respective industries and social needs. These findings present the e-Government system of the United Arab Emirates with one that is internationally competitive, efficient, and one that easily engages and attracts businesses.

China's Emphasis on English: More Than Just a Business Deal

Sarah Gubachy

China's English language education has been changing since the late 20th century, but few people understand the factors that are driving this change. Their students are known for their studiousness and their English skills and studies, but how is this foreign language education shaping China's global position in this century? Why did they move from an anti-western society to an embracing society of western society? Many people understand the business part of this. They assume when looking at these questions that the answer is simple: China is encouraging these efforts because knowing English allows you to participate in the great system of western business. They might even state that it is because English is the most important language when surviving in this world, but what no one is talking about is the deeper meaning. There are much more important aspects of this pursuit for a bilingual country. They do not discuss how this reflects on their history, goals, philosophy, politics, and family values. This research will explore these subjects and the role that China and its people play in this world. How their language education is important for the rest of the world and the future of the world. How their own language's future will be affected relative to English, and their methods for English education. The relationship between these three powerful subjects - English,

China, and the world - are things that change the course of history and the morals of major players in the world, as we know.