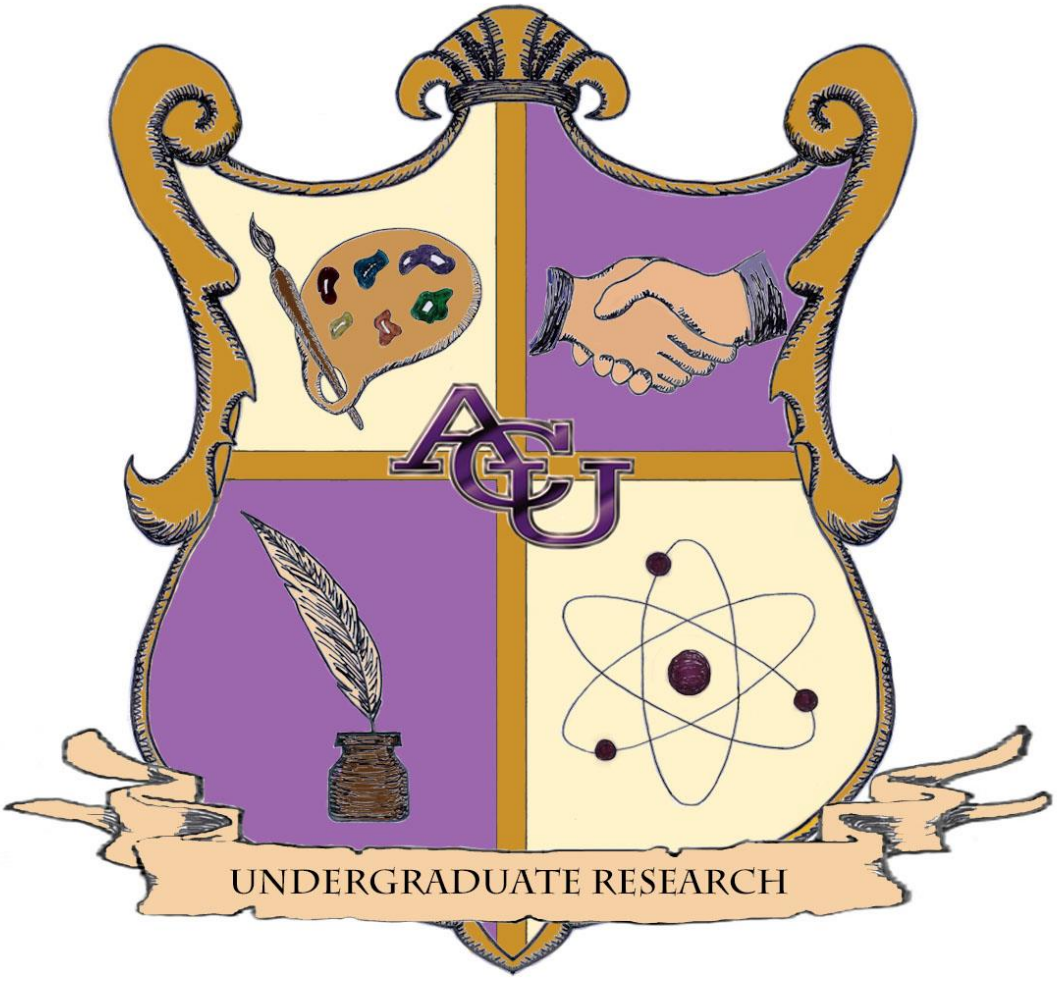
2017 ACU Undergraduate Research Festival Abstracts



April 4, 2017

MORNING SESSIONS

Tuesday, April 4, 9:30 – 10:50 AM

Session A1: Issues in Education - McCaleb Room Zone A

The Characteristics of a successful AVID teacher

Ivana Munoz
Mentor: Dana Mayhall

The purpose of this study is to identify specific characteristics that are imperative for an AVID elective teacher to possess, in order to enhance student success. Additionally, through the interviews completed by the educators a variety of situations will reflect the method in which the AVID system was implemented by the educator and the reflection it had on their principal's rating of the success of the system. Four interviews were conducted to further analyze the understanding, knowledge, and practice of the AVID elective teachers; asking them questions in reference to their classroom, goals, opinions, and beliefs about AVID.

Will It Stick? Understanding the Decision Making of Second and Third Year Teachers Regarding Reading Assessment and Instruction

Denae Shake
Mentor: Andrew Huddleston

During this session, the presenter will discuss the findings of a longitudinal study focused on understanding the decision-making process of novice teachers regarding reading assessment and instruction. The purpose was to follow beginning teachers who received their training through the ACU Teacher Education Department into their second and third years of teaching to examine how their reading assessment and instructional practices change over time. Research suggests when teachers enter their second and third year they are better able to implement practices learned in their teacher education programs. In order to understand this change over time, we are observing and interviewing the participants three times throughout the course of two school years. As we collect data from the observations, interviews, and artifacts we categorize and code the findings into themes using the constant comparative method. Three distinct themes have emerged thus far from the research collected in the second year. We have found the participants have an increased confidence in themselves and their abilities, an increased consistency in their instruction, and the added opportunity to take on new roles. Kristy (all names are pseudonyms) has become more consistent and consequently confident in classroom management. Sarah has taken on a new role as the instructional planner for ELAR with a more confident focus on balanced literacy and guided reading. Megan has remained consistent in successfully implementing balanced literacy resulting in an increase of confidence and skill. Julie has increased her confidence to take on a new role to try new instructional approaches and to express suggestions gently to influence the veteran teachers at her school.

Factors of Sex Education that Contribute to Less Risky Sexual Behavior

Bobbie-Jean West
Mentor: Stephen Baldridge

Sex education is a topic that has been addressed through many different avenues. While there are several standardized methods of teaching sex education, many organizations rely upon other methods of instruction, ranging from abstinence/religious based to simple health and anatomy education (Grossman, Jennifer M.; Tracy, Allison J.; Charmaraman, Linda; Ceder, Ineke; Erkut, Sumru., 2014).
This exploratory study examined the relationship between methods of sex education in schools, challenges that prevent sex education from being successful, factors that contribute to effective sex education, and their relationship to sexual activity later in life. After IRB approval, a convenience sample (N=115) was surveyed about types and methods of sex education, sexual beliefs, knowledge, activity, and behaviors.

Initial results support the growing body of literature that abstinence only education does not decrease risky sexual behaviors in adolescence.
Results indicate that there was no significant difference between students who had abstinence only education and those with no education at all in certain sexual behaviors such as the age in which they first had sex ($p=.759$) and number of times they engage in sexual activity in the last 6 months ($p=.727$). Additionally, students who received sex education including appropriate use of contraceptives reported a significantly higher amount of contraceptive use when engaging in sexual behaviors than those receiving abstinence-based education only ($p<.05$).
Study limitations and implications are also addressed and presented.

Language Modeling vs Enhanced Language Modeling

BriTanya Brown
Mentor: Brenda Bender

The current standard procedure for speech-language services and communication interventions for non-verbal or low verbal children with Autism Spectrum Disorders (ASD), include using augmentative and alternative communication (AAC) such as speech generating devices (SGDs) or the Picture Exchange Communication System (PECS) (Simpson & Ganz, 2012; Wegner, 2012). Although, these procedures are standard, they may not be the most effective treatment for increasing the child's speech productions. More importantly, these forms of communication may not implement a vocabulary that conveys the child's basic wants and needs. The purpose of this study is to compare live language modeling and Enhanced Video Language Modeling (EVLM) in teaching Functional Core Vocabulary to non-verbal and low verbal children with Autism Spectrum Disorders. The preliminary findings support the claim that EVLM facilitates the acquisition of highly individualized vocabulary terms. In addition to contributing to the literature, research on EVLM provides implications for clinical speech-language applications.

Community Factors to Reduce Risky Behaviors in LGBT Youth Following a Hate Crime

Regine Yaites
Mentor: Stephanie Hamm

Lesbian, gay, bisexual, and transgender youth are among the overlooked and underrepresented populations in the United States. They are at risk for drug use, mental health problems, homelessness, and other disparities. The intent of this research is to identify positive community factors to reduce risky behaviors in LGBT youth following a hate crime. After conducting a systematic review, the most prominent areas of concern were used to identify positive resources for the LGBT communities following a hate crime. Contrary to literature, family support programs were not among the methods of LGBT support following a hate crime. Further research would include a longitudinal study following LGBT youth's responses until adulthood and their responses to positive community programs specifically for LGBT youth.

Session A2: Biochemistry & Physics - McCaleb Room Zone B

Impact of Liposomes on Macrophage Differentiation and Cytokine Production

Rebecca Stark
Mentor: Ninh (Irene) La-Beck

Traditional cancer chemotherapy drugs are cytotoxic and have serious side effects due to unspecific tumor targeting, thereby forcing limits on dosages. Liposomal anti-cancer therapies offer advantages over traditional anti-cancer therapies, specifically increased drug delivery to tumors, but despite the first liposomal drug being approved in 1995, there have been only modest gains in clinical efficacy when compared to conventional formulations of anti-cancer therapies. One reason for this may be that the immune modulatory effects of liposomal drugs are not well understood; however, it is known that liposomes activate and inhibit components of the immune system. Based on our previous work showing that liposomes increased alternatively activated type II tumor-associated macrophages in mice bearing implanted tumors, we hypothesized that liposomes have the potential to suppress anti-tumor immunity. In this study, we

investigated the impact of liposomes on macrophage differentiation and cytokine production in vitro using bone marrow derived cells from a murine model. After optimization of the in vitro macrophage differentiation protocol, myeloid cells were treated with either PEGylated liposomes, equivalent volume of vehicle, or 30% L929-cell conditioned media. The adherent cells and supernatant cells were each evaluated on day 4 and day 7 for CD11b, F4/80, and viability using flow cytometry. We found that liposomes have a moderate effect on macrophage differentiation, but may have more important effects on macrophage cytokine production. We plan to continue investigating how liposomes affect cytokine production in vitro and in vivo, specifically looking at anti-tumor versus pro-tumor cytokines. Acknowledgements: This project was funded by the National Institutes of Health - National Cancer Institute (grant #R15CA192097).

Exploiting yeast genetics to discover new partners of the essential Spn1 protein

Austin Parsons & Tim Kang

Mentor: Sarah Lee

Tim Kang, Austin Parsons, Julia Taylor and Sarah K. Lee

The Spn1 protein is a highly conserved and essential factor composed of an ordered core domain and disordered N- and C-termini. While current appreciation of Spn1 function is limited, the protein has been shown to function in transcription and in controlling structure and access to the DNA template. A broader understanding of the interaction partners of this protein will help to shed light on the functions of this important and essential factor. In order to identify key interaction partners of Spn1, we took advantage of negative genetic interactions between a mutant of Spn1 containing only the ordered core domain (called mini-Spn1) and genes that encode proteins involved in chromatin structure or gene expression (HTZ1, GCN5, RTT106 and DST1). We selected for spontaneous suppressors of these negative interactions and isolated several novel yeast strains capable of alleviating the negative genetic interactions of mini-Spn1. Characterization of these strains and eventual revelation of the novel mutation will provide valuable insight into the interaction partners of the essential Spn1 protein.

Sub-cloning Genes of the Mevalonate Pathway from Enterococcus faecalis into pDUET

Elisabeth Danelski & Madison Harris

Mentor: Autumn Sutherlin

All organisms are capable of synthesizing isopentenyl pyrophosphate (IPP), a precursor to many different biomolecules. Two pathways, the mevalonate and non-mevalonate pathway, can synthesize IPP. Unlike most eubacteria and similar to mammals, low-G+C gram-positive cocci bacteria solely use the mevalonate pathway. This pathway is a potential target for future antibiotics against nosocomial infections caused by Enterococcus faecalis. Unique to enterococci is a fusion protein (encoded by mvaE) made of the first enzyme (Acetoacetyl-CoA thiolase) and the third enzyme (3-Hydroxy-3-Methylglutaryl-CoA reductase) of the pathway. This research looks specifically at the fusion protein, and conducts a series of sub-cloning experiments. Sub-cloning of the gene for the fusion protein (mvaE) and gene for HMG-CoA Synthase (mvaS), which is the second enzyme in the pathway, into pDUET was attempted. The sub-cloning experiments followed a double restriction digest, gel electrophoresis, DNA purification, ligation of insert and vector, transformation, and mini-preparation of plasmid DNA. Results were inconclusive.

Detection of Fusion Protein Synthase Protein Complex

Chandler Graf

Mentor: Autumn Sutherlin

In bacteria, the mevalonate pathway serves a critical enzymatic pathway utilized in the synthesis of isoprenoids. The first three enzymes of this pathway are acetyl Co-A thiolase, HMG Co-A Synthase, and HMG Co- reductase. Two genes, mvaE and mvaS, have been isolated to code for the fusion protein (containing both acetyl Co-A thiolase and HMG Co- reductase), and synthase proteins of this pathway respectively. Because the synthase protein acts in the pathway between the thiolase and reductase proteins it implies a possible association between the two proteins. Previous studies have shown that an interaction between these two proteins could be of both structural and functional importance to a potential protein

complex. Current research has focused on establishing this association by means of physical examination of the interaction. Using Förster resonance energy transfer (FRET) studies have indicated the existence of a physical interaction due to decrease in expected emitted light intensity.

Construction and Testing of Advanced Particle Detectors

Cecily Towell
Mentor: Rusty Towell

For years, scientists have been trying to determine what are the fundamental particles that make up all matter. Experiments that endeavor to answer this question have discovered a new state of matter called the quark gluon plasma (QGP). This new state of matter exists at a temperature of about 5 billion times the temperature of the sun, and therefore has not occurred in nature since the Big Bang. To create the QGP, accelerators are used to collide particles at almost the speed of light and extremely sensitive and intricate detector systems are used to observe the results. To continue the effective study of the QGP, accelerator and detector upgrades are being pursued. One type of detector used in this kind of experiment is called a Time of Flight (TOF) detector. These detectors measure particle speeds, which are then used in combination with other measurements to identify the particle. A new design for one such TOF detector has the potential to improve the accuracy of the timing measurements by an order of magnitude. The methods for producing these new detectors and their performance will be discussed.

Session A3: Particle Physics Research - Alumni Conference Room

Tracking Particles and Determining Magnetic Field Strength at the SeaQuest Experiment

Paul Carstens
Mentor: Michael Daugherity

The experiment, SeaQuest, at the Fermi National Accelerator Laboratory by Chicago, primarily studies the internal structure of the proton because its properties are not fully understood. In order to accomplish this task, the experiment collides a high energy proton beam in a four second pulse with seven different targets, with the primary targets being liquid hydrogen and liquid deuterium. The beam collision produces a shower of subatomic particles which pass through the two magnets and four detector stations of the SeaQuest spectrometer. The first magnet has a solid iron core which acts the beam dump and absorber by stopping the proton beam and absorbing nearly all of the unneeded particles. The second magnet has an open aperture and acts as the analysis magnet by slightly bending the path of charged particles that travel through it. A tracking program then reconstructs the flight paths of the particles. By knowing how strong the magnetic field is and how much the particles' paths were bent, the particles' momentum can be solved. In order to accurately analyze the particles, the magnetic fields of the two magnets must be precisely known. Once the particles' kinematics are known, we can extract information about the structure of the proton by counting the particles produced by the different targets. Here is presented a study of the determination of the magnetic field strength by altering the tracking program's inputs until both simulated data and real data agreed with the accepted values. One can then compare to that of other studies and measurements.

Dark Photons Simulations at SeaQuest

Caleb Hicks
Mentor: Micheal Daugherity

Evidence from astronomy suggests that over 95 percent of the universe is composed of Dark Matter and Dark Energy, but these have never been observed in a lab. The SeaQuest experiment at Fermi National Accelerator Laboratory, a particle accelerator near Chicago, studies the properties of quarks and antiquarks inside protons and neutrons using easily detected particles called muons. One potential component of Dark Matter called a Dark Photon. If it is produced, it can also decay in a process that produces muons, which SeaQuest is designed to detect. Thus SeaQuest could look for the signature decay of a Dark Photon, which could help better understand Dark Matter. In order to ensure that SeaQuest's spectrometer is able to detect

these theoretical particles, this project uses an existing simulation of the experiment with some modifications to determine both the criteria needed to detect Dark Photons and what those events might look like.

Track Reconstruction at SeaQuest

Reuben Byrd

Mentor: Michael Daugherity

SeaQuest is a high energy nuclear physics experiment that takes place at Fermi National Accelerator Laboratory. It is a fixed target experiment that utilizes the Drell-Yan process to measure the ratio of particles, specifically the anti-particles of up and down quarks, inside of a proton. A naïve assumption is that the number of anti-up to anti-down quarks is the same. However, evidence shows that this is not true. The goal of SeaQuest is to more accurately measure this asymmetry in what is called the nucleon sea, the "sea" of particles inside of a proton. In this process event tracking is an integral step in analyzing the data collected. This is difficult due to the physical setup of the experiment's detectors. The target and the detectors are separated by a five meter block of iron in order to protect the detector from the proton beam. However, this makes tracking events from the target very difficult. SeaQuest uses a rigorous event tracking system that contains several different types of detectors to accurately track events back to the target. This talk will discuss the methods of tracking and the process of measuring residuals, or detector alignment.

Study of the trigger efficiency for SeaQuest Drell-Yan Dimuons

Zhaojia Xi

Mentor: Mike Daugherity

The SeaQuest (E906) experiment, using the 120 GeV proton beam from the Main Injector at the Fermi National Accelerator Laboratory (FNAL), is studying the quark and antiquark structure of the nucleon using the Drell-Yan process. SeaQuest uses a two magnet focusing spectrometer with four detector stations that include fast plastic scintillator hodoscope planes. The hodoscope arrays along with Field Programmable Gate Arrays(FPGAs) are used to make the SeaQuest trigger system. It is designed to measure events with dimuon pairs from the Drell-Yan process. The signals from each hodoscope, which have adequate timing resolution to determine which 18.9 ns beam pulse
the event occurred, are sent to the FPGA trigger modules. In order to get a correct hit pattern, each channel is aligned to the beam RF clock. The trigger is formed when the hits fulfill a dimuon pattern. A program has been developed to analyze and calculate trigger efficiency by using data from hodoscopes. It is important to study trigger efficiency to be used in physics results, such as the cross section of the Drell-Yan process. The method, programming, measurements, and results of this study will be presented.

Fermilab SeaQuest(E906)'s Detector Tests to Prepare for a Search for Dark Photons

Joshua Martinez

Mentor: Donald Isenhower

The SeaQuest(E906) experiment uses a beam of protons to hit a fixed target to produce interactions in order to study the internal components of protons and neutrons. It has been found that when the proton beam interacts with a 5m long Iron Magnet, instead of the target at the very front of it that this experiment, there is potential to produce particles known as dark photons. Dark photons could be one of the particles that would help account for the 95% of the mass of the universe that we cannot detect; except by its gravitational effects on stars and galaxies. When a dark photon is produced, it can decay into particles that the SeaQuest(E906) detector was designed for, except they will be coming from a very different origin. Thus we must add a new type of detector that will produce signals of ordinary photons that can be operated in a high magnetic field, not possible by any existing component of the SeaQuest(E906) detector. The detector system will be made of a plastic material capable of carrying photons and Silicon capable of turning photons into electrical signals. This presentation describes the construction and operation of a test stand that was used to study the efficiency of the new detector components before they are installed in the SeaQuest(E906) experiment.

Session A4: History & Theatre - LYNAY Classroom

The Cry of the Cymry: Celtic Nationalism as a Response to Industrialisation and Class in 19th Century Wales

McKinley Terry
Mentor: William Carroll

This paper traces the development of nationalism in Wales during the 19th century, particularly focusing on the resurgent interest in Celtic traditions, literature, and language. Beginning with an overview of the state of Wales in the late 18th century, it addresses the connections between Romanticism and Wales, as well as the prominent role of antiquarians such as William Owen Hughes and Edward Williams. From there, the paper analyses the relations between the English landowners and their Welsh workers, demonstrating how these class tensions spurred on nationalism through cultural, political, and religious non-conformity. Industrialisation played a significant role in this development, especially with the rise of factories and mines in what was previously a nation dominated by agriculture. In the face of such drastic alterations to their lives, a Welsh national identity began to coalesce around the Celtic heritage of the people. Festivals began to be held in the Welsh, Nonconformist religious revivals provided a democratic opportunity for civic participation, and the percentage of the population fluent in Welsh increased throughout the 19th century. Utilising original texts and the writings of contemporary Welsh scholars, this paper provides a thorough examination of the rise of nationalism in Wales and its foundation in its Celtic past.

To Wring Tears from the Stars: The Suicides of Emma Bovary and Hedda Gabler

Valerie Kocsis
Mentor: Mikee Delony

The death of Emma Bovary in Gustave Flaubert's Madame Bovary is one of the most well-known suicides in literature. A dissatisfied French housewife who is unfaithful to her husband, Emma strongly resembles Hedda Gabler, the title character of Henrik Ibsen's play, who also commits suicide. Not coincidentally, perhaps, both women have become two of the most despised protagonists in literature, whom readers often consider femmes fatales. Literary scholars have offered various explanations for the cause of suicide in both characters: shame, remorse, financial insolvency, womanhood, boredom, and even fate. In this paper, however, I assert that these explanations are insufficient. What many scholars suggest but fail to fully recognize is that the underlying problem of unhappiness for Emma Bovary and Hedda Gabler is a problem of language. Specifically, I explore the writings of literary theorist Roman Jakobson, who identified language as existing on a spectrum between metaphor and metonymy (the substitution of the name or attribute of a thing for what it represents), and of psychoanalyst Jacques Lacan, who suggested that an individual whose mind relies too heavily on metonymical language is doomed to discontent. Following these insights, I argue that metonymical association leads Emma and Hedda to chase abstract concepts such as "love," "passion," and "beauty"—empty signifiers that each woman associates with happiness, but which neither can hope to find. Both characters long for these words themselves, rather than for what they represent. The all-too tangible act of suicide, therefore, becomes their only means for overcoming their disappointments in a world of vague, empty signifiers. In this essay, I provide a new understanding of two classic stories in addition to what scholars have already written, and I explore the critiques that Flaubert and Ibsen offer regarding society's use of language, which one might apply to today's society.

Matriarchal Remnants: Matrilineal Inheritance and Consanguineous Marriage from Ancient Egypt to the Ptolemaic Era

Savannah Weeks
Mentor: Ronald Morgan

The concept of biological gender boils down to two separate entities on either end of a spectrum. There is male and there is female. Societies that practice gender equality have existed, especially in hunter-gatherer communities where everybody shared responsibilities to keep the community alive. Most common, however, is the trend of turning power and status towards one particular gender, making a society either a matriarchy or

a patriarchy. Ancient Egypt possesses a unique quality of being relatively patriarchal while maintaining a matrilineal line of inheritance, meaning that while men still were the dominant gender, inheritance was passed through the mother's line, giving women a relatively autonomous role in society. The Ptolemies, who later came to power in Egypt, used the actions of the ancient Egyptians to justify their own incestuous marriages; however, the context these marriages resided under differed greatly from the practice of the ancients, leaving historians to wonder: why? The trend of matrilineal succession with a patriarchal system of government encouraged consanguineous marriage among the royals as a means to retain power in one family as long as possible. At the onset of the Ptolemaic era of Egyptian life, the Greco-Roman rulers continued to practice brother-sister marriage among their royals despite the fact that the custom went against traditional practices of Hellenistic marriage and patrilineality. Through the use of historiographic works by Egyptologists, art work and translations of papyri, and other secondary sources I will explore the reasons for the Ptolemies taking on aspects of Egyptian culture that went against core aspects of Hellenistic law.

The Medicine of the Dead: A Scholarly Examination of the History of Medieval and Early European Spiritual Medicine

Adam Lubbers
Mentor: Ronald Morgan

This paper reviews recent scholarly research in medieval and early modern folk medicine, and argues that to the medieval and early modern Christian there was a great, encompassing power surrounding the dead. To prove this argument, an overview of scholarly narratives in the fields of saintly history, the medieval Eucharist, medieval and early modern medicine, and early modern medicinal cannibalism has been compiled and examined. This evidence reveals a distinct medieval and early modern mentality in medicine that saw a great power in the dead, cadaverous, and macabre. This paper argues that the religious practices of the medieval Catholic Church unwittingly helped create this mentality that would lead to a strong tradition of corpse medicine in the 16th and 17th centuries.

Music Technology Initiative

Geoffrey Driggers & Cole Spears
Mentor: Brandon Houghtalen

The ACU Music Technology Initiative (MTI) was begun in 2015 to modernize the infrastructure and course offerings of the Department of Music. In response to the mission statement of the department, specifically the first of four primary goals, the MTI helps "develop and inspire students artistically as comprehensive musicians." The presentation will discuss the activities of the MTI, specifically the repair of the Recital Hall, inventory of technology facilities, investigation of current faculty practices, and the Intro to Music Technology Honors Colloquium. Based upon our work thus far, we can report that the Recital Hall is capable of meeting the needs of students and faculty and a new course has been created. We will present samples of student work from the department and the Intro to Music Technology course and discuss the student learning outcomes of our efforts.

POSTER SESSION

Tuesday, April 4, 12:15 – 1:15 PM

Visual Analogies of a Hidden Immigrant

Allison Davis
Mentor: Robert Green

Experiencing multiple cultures between birth and adulthood deeply impacts the formation and understanding of personal identity. It is no surprise that many Third Culture Kids (children growing up outside their passport country) and Cross Cultural Kids wrestle with an unidentified orientation toward home and self. As a Third Culture individual and an artist, I combined animal hybrids, drawing similarities to cultural hybridity to visualize how it manifests itself in real people. I used the authoritative methods of scientific illustration to render abnormal, hybrid creatures. I also discovered visual means to refer to cultural hybridity through the use of symbols and images, and borrowed and used visual notations directed toward making or forming. It is my hope that the work from this series would cause people to be introspective and ask questions such as: How does one find identity? Is there an identity humans can find that transcends self and place? The work, through its depiction of hybrid identities, should lead to understanding and stimulate dialogue that could move us toward greater cultural sensitivity.

The Impact of a Free Water Protocol on Swallowing Patients' Dietary Compliance

Meagan McBride
Mentor: Lynette Austin

Properly managing texture of liquids is a key component in treatment of dysphagia. The purpose of thickening agents is to increase the viscosity of the liquid, thus prompting the length of the swallow to increase and causing the swallow to be more deliberate. The Frazier Free Water Protocol was designed to increase compliance and quality of life among dysphagia patients, while decreasing risks of aspiration pneumonia and dehydration. The controversy of the free water protocol stems from the concern that water as a thin liquid can possibly increase aspiration, however, with enforced oral care and safe supervision, the aspiration of water is considered benign; a minor disadvantage when the advantages of a free water protocol, such as decreased risks of dehydration and improved compliance and quality of life, are considered. The perception of speech language pathologists that treat dysphagia cases with the free water protocol will be essential in determining the observation of increased compliance and quality of life, due to the lack of current research in this area. By obtaining data via a survey, this project will assess the following question: Per SLP judgement, does implementation of a free water protocol increase patient's compliance with general dietary modifications (i.e. consistency) in dysphagia treatment?

Vicarious Theory

Aaron Pokluda
Mentor: Scott Self

Human emotion is an ambiguous complex well explored yet vaguely defined. Where philosophy and biology fail to reveal that which drives us forward, we seek answers among both the stars and ourselves. One interesting facet of this is Vicarious Theory, the belief that we as humans share and feel emotion through others via a multitude of means. With roots in religion, philosophy, psychology, and physiology, it's hard not to be confused or repulsed by the exploration of this complex. Many have argued over the past decades that Vicarious complexes are false, however through examining explicit definitions, exploration shared trauma studies, vicarious incidence in literature, and christian and philosophical perspectives, Vicarious Theory is a valid complex present in modern society.

Meta-Poster: A Quantitative Analysis of Successful Poster Presentations

Barrett Corey

Mentor: Ryan Jessup

Introduction:

Every year students attending Abilene Christian University work hard to create posters for the undergraduate research festival, but no research (that I could find) has actually been conducted on what specific qualities make a poster more successful than another, specifically in this context. According to research, visual appeal, and layout are sometimes even more important to the success of a marketed item than the item itself (Ries & Trout, 1981). In my research, I analyze 2016 undergraduate poster submissions to determine what specific attributes make a poster presentation successful.

Method:

In 2016, I took photos of each poster on display (n=39). Later, I then analyzed each poster for color, wordiness (specifically in the title), number of presenters, and whether or not the poster had won. I further broke down each poster into nine regions (in a 3 x 3 format) and recorded whether each section contained text, a photo, a chart, or some combination of these elements.

Results and Conclusions:

Using Naïve Bayes Classifier, Multiple Linear Regression and simple T-tests, I am currently analyzing the data to determine what variables will predict a poster to win. I am particularly interested in the positioning of specific elements in certain regions. Preliminary results indicate that the color Blue, having fewer presenters, having less text, and having more photos all have statistically significant positive correlations to winning the undergraduate research festival. In order to test my results, I plan to enter into the 2017 undergraduate research festival with a poster presentation of my poster research and will incorporate all of the elements that I have found that make a poster successful into my poster.

Designing and Building of an External Cavity Diode Laser

Megan Cromis

Mentor: Larry Isenhower

Abilene Christian University's atomic physics research laboratory has a goal of studying interactions between atoms excited to very high energy states known as Rydberg states. This work requires a custom built laser housing system optimized to provide long term stability and ease of use in order to take accurate data over long timeframes. Taking place at Abilene Christian University's Bennett Gymnasium, an undergraduate team under the advisement of Dr. Larry Isenhower designed and built a system based on a design from the Steck laboratory at the University of Oregon. Upon completion we will study the stability of the lasers as parameters such as temperature, vibration strength, and pressure are varied. This poster will cover the background of the experiment, the design process, building techniques, showcase the final product, and provide insight into the future use of the system.

Antibiotic Production of Microbes Isolated from Sorcerer's Cave, Texas

Cody Bly & Louis Sanchez

Mentor: Jennifer Huddleston

In the wake of medical advancements, caves give potential for discovering groundbreaking micro-biodiversity and may harbor the next clinically-applicable antibiotics. Microorganisms were isolated from samples collected from Sorcerer's cave, Texas, and were studied for their potential to produce antibiotics. Cave isolates were grown in tryptic soy broth and then added to wells in tryptic soy agar plates inoculated with lawns of Staphylococcus aureus and Escherichia coli. Zones of inhibition were measured, showing possible antibiotic producers in twelve of the 225 studied microbial isolates. Four cave isolates inhibited the growth of E. coli and six inhibited S. aureus. Two isolates inhibited both strains which indicates broad spectrum antibiotic activity. This data supports the hypothesis that producers of antibiotics can be isolated from the cave samples. More data should be collected to determine if previously unknown antibiotics are being produced by these unique cave isolates. Although in its infancy, this study merely touches the possibilities and

uniqueness of cave environments to help develop biomedical promises in new medicine and research opportunities.

Determining genetic mechanisms of pesticide resistance in the hornfly, Haemotobia irritans, and the Two-Spotted Spider Mite, Tetranychus urticae

Kathryn Mitchell & Abhilash Moolupuri
Mentor: Qiang Xu

Ectoparasites are an ever present threat to the agricultural industry, but preventive measures and treatments to infestations are increasingly being met with failure as pesticide resistance becomes more commonplace in populations. The Xu lab seeks to understand the genetic mechanisms responsible for pesticide resistance in two organisms: the hornfly, Haemotobia irritans, and the Two-Spotted Spider Mite, Tetranychus urticae. PCR-based gene cloning methods were used in combination with a hornfly cDNA library to generate copies of target Cytochrome p450 genes, believed to be involved in pesticide resistance. Two-Spotted Spider Mites collected from multiple locations are currently being assessed for pesticide susceptibility via bioassay.

Antibiotic Resistance and Biosynthetic Potential of Microbes Isolated from Sorcerer's Cave, Texas

Jeffrey Wooliscroft
Mentor: Jennifer Huddleston

Unexplored cave environments provide a valuable opportunity for novel microorganisms and compounds. In total, sixteen culturable microbial organisms were isolated from Sorcerer's Cave, Texas. Antibiotic resistances were studied, showing moderate to high levels of resistance in all organisms. However, this study provides an early first view of this unique cave environment and will pursue the biochemical opportunities these organisms may hold in the future.

Computer Automation of an Optical Spectrometer

Jared Barker
Mentor: Darby Hewitt

Computer Automation of an Optical Spectrometer
Jared Barker and Darby Hewitt
The Jarrell Ash ¼ -m (Ebert model) monochromator was originally designed to be hand-operated. However, it is very tedious to obtain a broadband optical spectrum using this device, because every data point must be acquired by manually turning the crank to specify wavelength and then recording the measured detector output. Our goal was to automate this process by using an Arduino UNO and a stepper motor, which were controlled via Python over a USB connection on a PC. This allowed us to write a script to control the process of spectral measurement with a computer. Instead of requiring a lab technician to turn the crank and measure the light intensity at every point, the computer can now do it autonomously. In addition to the testing and calibration procedures for this device, spectra of several light-emitting sources will be presented.

Laboratory Study of Nitrification and Denitrification in the BioSand Filter

Clint Taylor
Mentor: Timothy Kennedy

Water is a crucial element for life to exist, but in many locations clean drinking water is not easily accessible. The BioSand filter is used throughout the world to improve water quality. To date, many studies have examined the microbiological reduction capabilities of the BSF and proven its reliability and capability. Few studies have focused on chemical removal abilities of the BSF. The experiment of BioSand Filtration aims to add to the literature on nitrification and provide additional data on the severity of the problem.

Comparing Symptom and Toxicity Profiles Following Radiation Therapy for Cancers of the Skull Base: A Prospective Global Quality of Life Study Using the Anterior Skull Base Questionnaire (ASBQ) and the EQ-5D Health Questionnaire

Jeremy Aymard
Mentor: Clifton Fuller

Using patient reported and objective assessment tools, we sought to determine whether equivalent symptom/toxicity profiles exist between surgical and non-surgical patients and to determine the relative impact of surgery on patients who were treated for cancers of the skull base. Participants were assessed using the Anterior Skull Base Questionnaire (ASBQ) and the EQ-5D Health Questionnaire, with subsequent analysis. Many of the patients who received radiation therapy alone had near-equivalent symptom and toxicity profiles to patients who received both surgery and radiation therapy. This indicates that sequelae may be shared between these populations and suggests they share the same drivers. A relationship between quality of life and ASBQ results exists but could not be determined to be better or worse in either of the therapeutic arms. This is the first and largest prospective presentation of ASBQ and global quality of life information in skull base patients and is anticipated to be the initial and definitive benchmark publication for future reference in these patient populations. We recommend use of the ASBQ to interrogate specific symptoms in this region in addition to global quality of life instruments such as the EQ-5D.

The Cattle Crush

Tim Prince & Bryson Jennings
Mentor: Ed Brokaw

Agricultural businesses face a unique set of risks that include, but are not limited to, weather, disease, credit exposure and increasing amounts of market price fluctuations. Agricultural producers use financial derivatives to manage their commodity price risks and the volatility of the commodity markets. Cattle feedlots, in particular deal with a lot of risk due to their constant exposure to the grain markets for feed ingredients as well as cattle markets.

This project evaluates a cattle crush spread. The cattle crush spread is a ratio spread, which simply tests the financial outcome of buying one feeder cattle contract, one corn contract to selling two live cattle contracts. This is done by feeding the cattle from the feeder cattle contract the corn from the corn contract, adding 30,000 pounds to the cattle which allows for the sale of two live cattle contracts. The cattle crush spread is analyzed through the Monte Carlo pricing engine stress test model. Because of the wide price margins indicated by properly calculating the cattle crush spread, the indicated ratio is considered a viable way to hedge. Past researchers have used models similar to the Monte Carlo model in order to evaluate the efficiency of the hedge; however, this project tests the sensitivity to fundamental economic factors on the spread itself. The model uses multivariate geometric Brownian motion, exponential theoretical random numbers and elasticity tests to quantify risk probability and stressors. The results show that certain fundamental factors have greater stressor values than others. This model can be used as a business application to assess risk and probability for market entry and exit levels. The model may also be used with other trading strategies to manage a day-to-day investment portfolio and to anticipate the impact of future market stressors.

The Effect of Detailed Feedback Messages in Entry-Level Programming Courses

Kayla Holcomb & Alani Peters
Mentor: James Prather

Programming courses for college freshman have one of the highest failure rates across college campuses, and these usually determine a student's success within a major. To perceive a student's knowledge of the programming concepts, instructors must evaluate assignments which students have already tested for errors and corrected before submission. However, this leaves the instructor with little information as to how the student achieved a working solution. Often, instructors fear that students resort to a trial-and-error approach to fix problems with their code and don't fully understanding the problem or why their change works. Using an Automated Assessment Tool (AAT) has become a common form of evaluating student programming submissions according to a flexible metric depending on the assignment. The School of Information

Technology created and currently utilizes Athene, which is an AAT that checks for errors and assigns grades according to correctness of output for a given programming assignment. We have added a layer on top of the standard compiler within Athene to provide context-specific feedback and explanation of the errors students encounter. Recently, we have rewritten these feedback messages in more detail and utilizing only words that we expect a beginning programmer to understand, while providing definitions for any additional terms. These updated messages will be referred to as enhanced feedback messages. We seek to determine, first, whether students read the enhanced feedback messages, second, whether students understand the enhanced messages, and third, whether these messages are helpful to the students. These questions will be tested in an experiment within a timed and monitored environment, much like a proctored quiz, to observe student responses and visually follow their problem solving process. This understanding is crucial to providing a learning environment where students can develop their problem solving and programming skills without the constant presence of a tutor or instructor.

Identification of Bacteria From a Wall in Sorcerer's Cave Based on 16S rRNA Gene

Samantha Studvick, Diana Desai, & Alyssa Wilder

Mentor: Joshua Brokaw

Microorganisms are ubiquitous, living in abundance throughout all types of environments. With antibiotic resistance on the rise, bacteria are becoming a common topic of interest for researchers. While their significance in our everyday lives has been noted by many, little studies have been done to identify the interspecific relationships between various bacteria. This research aimed to construct a phylogenetic tree using bacterial specimens obtained from a cave. At 558 feet, Sorcerer's cave is the deepest in Texas, and this unique and isolated habitat is the source of bacteria in this study. The samples were collected aseptically from the cave wall and inoculated on TSA plates. The samples were kept cold until incubation and subsequently incubated at room temperature until growth appeared. Various methods of DNA extraction and PCR protocol were implemented using the 27f and 1492r primers in order to successfully amplify the DNA. Results were visualized using gel electrophoresis, and the DNA was purified and sent to Yale University for sequencing. Coinciding with previous research and preliminary identification of 16S sequences through comparisons with accessions from Genbank and the Ribosomal Database Project, the specimens were determined to be from the genus Pseudomonas. This project not only aims to identify and characterize the microbes of Sorcerer's Cave but also serves as a precursor to explore antibiotic resistance.

The Study of Gamma-ray Detection with a Plastic Scintillator

Sonia Cyuzuzo

Mentor: Tim Head

Plastic scintillators are known to be physically robust and relatively inexpensive per unit area in comparison to NaI and high-purity germanium (HPGe) crystal detectors that are widely used in gamma spectroscopy applications. For this reason, in this research, gamma-ray detection with a plastic scintillator detector was studied using a combination of bulk counting, a multichannel analyzer, and GEANT4 simulations. The objective was to incorporate the detector's geometry and compare bulk measurements to simulations. This would later help study how to increase the number and uniformity of gammas detected throughout the detector by optimizing optical photon collection from 20-1300 keV. The detector studied is 2" x 5" x 48" and has a photomultiplier tube on one 2" end with different layers of covering material.

Development of the IRBP nuclear marker for phylogeny reconstruction in Thomasomys

Paulina Sanchez, Katie Lawrence, Jacob Nelson, & Shelby Pelleran

Mentor: Joshua Brokaw

Thomasomys is a genus of mouse-like rodent species distributed primarily in northwestern South America. Previous investigations based on mitochondrial genes have provided well resolved nodes at the species level. In contrast, most deep nodes needed for reconstructing evolutionary adaptations in the geographic and ecological history of Thomasomys had short branches and low bootstrap values, suggesting a rapid radiation early in the diversification of Thomasomys. In order to further test these phylogenetic hypotheses, we have

designed new primers and obtained sequences from the interphotoreceptor retinoid-binding protein (IRBP) gene. Early results suggest that this marker is less variable than previously used mitochondrial markers but could contain significant amounts of phylogenetically informative characters. Although phylogenetic resolution has been lower, this nuclear gene can provided independent evidence supporting mitochondrially based hypotheses.

Exploring New Osmium Clusters

Kylie Wilson & John Swartout

Mentor: Cynthia Powell

Recent research has shown that organometallic complexes, including many that contain osmium, are promising anticancer agents. In order to expand the basic understanding of the chemical properties of osmium and synthesize new compounds with chemotherapeutic potential, we have explored the reactions of Os3(CO)12 in a microwave reactor with acetic or propanoic acid, phosphines, and amino acids. Products of these reactions were isolated and purified via thin layer chromatography. Several new osmium(I) dimers with bridging carboxylates and phosphine ligands have been fully characterized using infrared spectroscopy, nuclear magnetic resonance, elemental analysis, and X-ray crystallography. These include [Os-2(μ-propionate)2(CO)4P(p-tolyl)3], [Os-2(μ-acetate)2(CO)5P(p-tolyl)3], and [Os-2(μ-acetate)2(CO)4(PPh3)2]. Preliminary data on the products isolated from reactions with amino acids has been gathered and will also be presented.

Identification of Bacteria Isolated from Sorcerer's Cave, Texas

Olivia Dahl, Stephanie Sariles, Whitney Brantley, & Claire Shudde

Mentor: Diana Flanagan

In preliminary studies, bacteria isolated from Sorcerer's Cave, which is located in Terrel, Texas, have demonstrated interesting properties with regards to antibiotic resistance (Wooliscroft & Huddleston). Consequently, it is of interest to identify as many of these cave isolates as possible to determine if they represent known or unknown bacteria and further study their characteristics. In this project, bacteria isolated from mud located near a feeder spring to Sorcerer's cave were grown on 0.1X tryptic soy agar plates. Individual colonies were selected and bacterial DNA extracted. PCR was then used to amplify 16s rRNA gene sequences from the cave isolates for identification.

Effectiveness of Chlorohexidine Gluconate Scrub and Povidone Iodine Scrub in Disinfecting Pre-Operative Surgical Sites When Spaying Female Canine and Feline Patients

Emily Geller

Mentor: Ed Brokaw

In surgery, there is a risk of developing a Surgical Site Infection (SSI). To decrease the chances of a SSI, veterinarians and technicians attempt to disinfect the surgical site to minimize the presence of bacteria on the live animal's skin. Chlorohexidine Gluconate 2% and Povidone Iodine containing 0.75% titratable iodine are two common antiseptic pre-surgery scrubs. The objective of this study was to determine if one of these antiseptic scrubs is more effective in disinfecting the surgical site on the live animal. Subjects of the study were female canine and feline patients prepped for spaying at local veterinary hospitals. A skin swab from the patient, taken four minutes after the surgical scrub, was utilized to create a bacterial culture to facilitate a physical count of bacteria present in each sample. A unique number was assigned to each individual patient. Odd numbered patients were treated with Chlorohexidine, and even numbered patients were treated with Povidone Iodine. The data were analyzed to determine if there was a significant difference in the effectiveness of the antiseptic scrubs.

Visitation of Quail Feeders by Quail and Non-Target Species

Catherine Longest, Daisy Gomez, & Reece Wells

Mentor: Joshua Brokaw

The purpose of this project is to determine the percentage of use of quail feeders by northern bobwhite quail (Colinus virginicus) and scaled quail (Callipepla squapata) in comparison to other species in different seasons during a period of high quail populations. Our area of focus lies in the Rolling Plains ecoregion of Texas on the Rolling Plains Quail Research Ranch off of Highway 180 in Fisher County (32.7708391° N, 100.599247° W). Above average rainfall during 2015 and 2016 has resulted in large increases in quail populations at this site, and here we revisit patterns of visitation observed in previous studies in order to determine whether altered population dynamics in quail and non-target species result in modified patterns of feeder utilization. The project involves the monitoring of 26 stationary quail feeders and 10 game cameras. Each feeder is monitored and kept full throughout the study and the amount of feed used is measured. Game cameras were used to track the percentage of use of the feeders by different species and the presence of predators at the feeders. Our findings indicate that quail feeders continue to experience significant use by non-target species during increased quail abundance.

Investigation of potential viral DNA and RNA genes in Abilene-area mosquitoes

Amberly Grothe & Meagan Benson

Mentor: John Xu

The malaria, West Nile, and Zika viruses are currently a major concern for many public health departments. These viruses are spread through mosquito bites. The goal of our research is to collect local mosquito specimens and analyze their DNA and RNA for the presence of these viral genes. Local mosquitoes were collected from Grover Nelson Park in Abilene, TX. Our sample primarily included Culex quinquefasciatus mosquitoes as well as a small amount of Aedes albopictus and Aedes aegypti. The DNA extracted from these mosquitoes will be processed with DNA probes specifically identifying the malarial virus DNA. The RNA will be processed using RNA probes identifying West Nile and Zika disease genes.

Phylogeny of rodent genus Thomasomys (Rodentia: Cricetidae) based on the nuclear gene recombination activating gene 1

Marissa Horne & Cameron Ludwig

Mentor: Joshua Brokaw

Thomasomys is a South American rodent genus occurring in high-elevation habitats. Previous phylogenetic hypotheses describing speciation within Thomasomys have been based on morphology or mitochondrial gene sequences. However, additional evidence is necessary in order to resolve the order of several rapid speciation events early in the diversification of Thomasomys. This study adds phylogenetically informative DNA sequences from the recombination activating gene 1 (RAG1) in order to strengthen support for previously generated hypotheses. We performed PCRs to amplify RAG1 using the recently developed primers TDF2 and TDR2. PCR products were direct sequenced, and maximum likelihood (ML) searches were performed using RAxML to determine the best tree and bootstrap support for clades. Although RAG1 has proven to be less informative than previously sampled mitochondrial genes, phylogenetic results were congruent with analyses from mitochondrial genes and provided support and increased resolution for our previous hypotheses, including evidence that the taxon Thomasomys cinnameus is paraphyletic. New DNA samples of Thomasomys rodents were collected in summer 2016 and have been examined to determine the classification of these samples within the genus. This new information will contribute to the furthering of the phylogenetic story of genus Thomasomys.

Use of Olfactory Repellents to Control Encraochment of Coyotes on Protected Property

Tanner Sanderson & Neander Howard

Mentor: Ed Brokaw

Coyotes have been observed approaching within 50 meters of a particular property. As coyotes can be very destructive and deadly, the property residents want to discourage this behavior. The objective of this study was to test the effectiveness of olfactory repellents. Three scent stations were set up. Each trial consisted of two repellent stations and one control station tested over a period of 4 days with an interval of a week before starting another trial. In each trial the control and repellents alternated so each was tested at each location. Cameras were set up at each of the locations and the number of coyotes that approached the stations were recorded. Data was compiled to gauge the effectiveness of the olfactory repellents. Data was analyzed to determine if there was any difference in the effectiveness of the two repellents

Effect of the TNR Program on Genetic Diversity of the Feral Cat Population at Abilene Christian University

Kimery Hankins, Holly Richter, & Carley Johnson

Mentor: Ed Brokaw

The feral cat population at Abilene Christian University is of primary concern to the community in terms of a wildlife management perspective. Due to the Trap-Neuter-Return program (TNR), initiated to maintain the cat colony, reduced genetic variability is highly probable. As a result, the suspected narrowed gene pool could create immunocompromised animals susceptible to certain diseases affecting the population. Some of these diseases could also have zoonotic implications for society. The effectiveness of TNR was assessed by comparing the DNA sequence obtained from the mitochondrial DNA control region between 20 cats of the feral population and 20 unrelated cats collected from Taylor Jones Humane Society and the Abilene Animal Shelter. Blood samples of 1 mL were drawn from each cat. Samples were stored at refrigeration temperatures without anti-clotting factors. DNA was extracted from whole blood samples and amplified utilizing PCR techniques in order for sequences from each animal to be identified and compared. Mapping of the genetic material created a baseline for comparison of non-related cats to the colony hosted on campus. From this data, we predict that the genetic similarities among the feral cat population at ACU will be significantly greater due to TNR while those from various locations will be more distantly related. Further investigation could then determine whether similar gene sequences yield a higher percentage of immunodeficient cats predisposed to a particular disease over cats that are from various areas in town.

Relation of home range size to utilization of supplemental water sources by wildlife.

Eric Dolezalik

Mentor: Joshua Brokaw

The purpose of this study is to monitor the traveling behavior of different wildlife species over the entirety of the ACU Rhoden Farm in relation to the implementation of supplemental water sites. A 1,000m x 1,000m grid was drawn out over the entire farm with the intention of establishing game cameras at every 200m interval along the grid, totaling 38 sites. 18 of the sites were removed from the grid due to conflicts with natural water sources, cultivated land, and high human activity. Game cameras were established at the remaining 20 sites. All cameras operated between April of 2016 to September of 2016 without any supplemental water sources. After that time, 6 of the 20 grid sites were manually selected by habitat type and a water-catchment system (WCS) was installed at each of these 6 locations. These WCSs have operated solely off of rainwater since October 2016. After observing the pictures taken by the cameras, it was evident that wildlife frequented the sites that contained the WCS more often than they did before the WCSs were installed. Most of the observed wildlife species, such as White-Tailed Deer, Bobcat, Coyote, Greater Roadrunner, Fox (species undetermined), Northern Bobwhite, Rio Grande Turkey, Feral Swine, and multiple species of songbirds, were mainly observed while traveling through the camera's view. However, Striped Skunks, Cottontail Rabbits, Raccoons, and Cotton Rats were found to frequent the WCSs regularly. The WCSs seem to be utilized more often by wildlife that have a small home range compared to those that have a large home range.

Effects of Pasture Types on Cattle Weight Gain

Taylor Oxford
Mentor: Ed Brokaw

Nutrition is a cornerstone in the production of beef cattle. Raising the best cattle possible to get the highest price at the market is the goal for cattle producers everywhere. Knowing what type of pastures to place beef cattle on to gain the most weight is premier knowledge to this component of the beef industry. A study was conducted to determine differences in weight gain among yearling black angus steers grazed on two different types of pastures. One group of thirty-two steers were grazed on native grasses and the other group of thirty-two steers were grazed on wheat for the same duration of 150 days. The grazing time period started in the late fall of 2014 and continued into the late spring/early summer of 2015. Both groups were alike in conformation and had a starting weight of approximately 500 pounds and were vaccinated similarly. The steer groups were both located in Novice, Texas, for the duration of the study, therefore there are no differences in weight gain due to environmental factors. Both pastures used were similar in care management practices. The findings of this study conclude that the black angus steers grazed on the wheat pasture on average weighed approximately 30 pounds heavier than the steers grazed on native grasses.

AFTERNOON SESSIONS

Tuesday, April 4, 1:30 – 2:50 PM

Session B1: International Issues - McCaleb Room Zone A

The Speech Pathologist's Role in the Treatment and Family Management of Selective Mutism

Andrea Archer
Mentor: Lynette Austin

The purpose of the study is to determine the degree to which speech-language pathologists are involved in the treatment and family management of selective mutism. Group differences in practice settings (school vs. outpatient clinic/home health/private practice, etc.) will also be explored to analyze possible variations in the speech pathologists' perception of their role in the intervention and family counseling process. A survey was distributed to various groups of speech-language pathologists asking for their insight on these questions, and the results were analyzed and discussed.

The Effectiveness of Practices Used by Child Life Specialists for Families of Children with Chronic Illnesses

Annie Bailey
Mentor: Dale Bertram

This phenomenological study explores in-depth the descriptions of several families' lived experiences with Child Life Specialists (CLS). The researcher hoped that a picture would emerge about how families find holistic support for their needs from CLSs during their child's hospitalization. The in-depth interview method prompted specific stories about the participants' experiences with CLSs from a phenomenological method. From these stories, the researcher gathered and organized participant-specific open codes, and those fell into three broader categories called meta-themes. The selective code, benefits families perceive from experiences with CLSs, sums up the meta-themes and open codes gathered from the participants' interviews.

When Does Helicopter Parenting Undermine Your Success? Achievement Motivation and Parental Involvement

Elizabeth Banks, Ross Spears, Mari-Bree Lowe, & Alyssa Ruiz
Mentor: Cherisse Flanagan

Problem. Overinvolved parenting, colloquially called helicopter parenting, is becoming progressively more common among parents of late adolescents and emerging adults (Cline and Fay, 1990; LeMoyne and Buchanan, 2011). Finding the balance between developmentally appropriate levels of control and assistance and too much control and assistance appears to be at the core of this issue (Odenweller, Booth-Butterfield,& Weber, 2014). On the one hand, parental involvement appears to be one of the strongest predictors of positive child outcomes, such as academic achievement (Ballantine, 1999). However, some experts suggest that helicopter-parenting, or excessive parental involvement, is detrimental to development (Odenweller, 2014). This project investigates the relationship between achievement motivation and parental psychological control.

Method. The AMQ and subscale of the Dependency-Oriented and Achievement-Oriented Psychological Control (alpha = .91) will be used to assess parental psychological control (Soenens, 2010). Parental autonomy support will be measured with the Perceptions of Parents Scale (alpha = .53-.67; Grolnick,1991). Participants will be students enrolled in a private university. The hypothesis is that Hope for Success will be positively correlated with Parental Autonomy Support, while Fear of Failure will be positively correlated with Achievement-Oriented Psychological Control. Analysis will use correlation and descriptive statistics.

Implications. If fear of failure of related to elevated levels of parental psychological control, as hypothesized, then strategies can be used to educate parents about harmful over-involvement. So called, helicopter parents, may be especially receptive to data which shows that their efforts to help their adult-age child is going too far.

Marriage Games: A Game Theory Exploration of Marital Relationships

Barrett Corey & Kaleigh Borge
Mentor: Dr. Katie Wick

Introduction

The prisoner's dilemma (PD) is one of the most studied games in economics. In the game, a pair of individuals independently choose to either 'cooperate' or 'defect' and their scores depend on each other's choices as well as their own. On any single trial it is always in the best interest of a player to 'defect' but if both players choose this option, their scores are actually worse than if they had chosen to 'cooperate'.

Much research has been done on how strangers interact with one another using PD, but little research has been conducted on how married partners play the game. In this study, we look to observe the correlation between the way a couple plays PD and their self-reported marital satisfaction.

Method

Our participants are 40 married individuals from Beltway Park Church. We asked participants to complete a survey based on the Couples Satisfaction Index (CSI), which measures the degree to which a person is satisfied with their relationship (Funk & Rogge 2007). They then completed a minimum of 20 trials of a PD game with their spouse. There was a small probability of a communication "error" (answer deliver to spouse is flipped) in order to mimic miscommunication in marriage (Fudenberg, Rand, & Dreber 2012).

Results and Conclusion

We are currently meeting with participants and gathering the data. Once collection is complete, we will analyze the data using multiple linear regression. We will use scores from the PD game to predict a person's reported marital satisfaction while controlling for demographic factors such as length of marriage, income, etc. We expect to see that an individual's marital satisfaction will have a strong correlation to their scores on the PD game.

Connecting the University with Community: Identification of Aging Issues from an Intergenerational Perspectives by Organizing an Intergenerational Town Hall Meeting

Emily Adams

Mentor: Charlie Pruett Ph.D.

This presentation will discuss a case study of the establishment of protocol and social issue findings of an Intergenerational Town Hall Meeting including six generations of participants. The key goal of the event was to identify social issues and personal needs of aging community members of a city in West Texas. The main research question addressed by this presentation was: "What issues face all citizens but especially those who are age 60+ years?" A partnership between a university research center, state advocacy group, and state, county, and local community organizations provided the Public-Sphere in which six generations participated. The presentation discusses the issues identified at the town hall meeting and how those issues were used by the Texas Silver-Haired Legislature to establish resolutions eventually presented to the Texas Legislature for consideration. Suggestions will also be given that will help other universities organize a similar event.

Session B2: Science Potpourri – McCaleb Zone B

Small Mammals of Yacuri National Park, Loja Province, Ecuador

Maya Feller & Daisy Gomez

Mentor: Thomas Lee

In July 2016, a mammal survey was conducted in Yacuri National Park, Loja province, Ecuador. Yacuri National Park is located on the western slope of the Andes (4o42'42"S, 79o26'25"W). The survey area included a páramo bog 1 (3,393 m elevation), a paramo bog 2 (3,422 m elevation) a forest near the cabin (3,226 m elevation), a lower páramo (3,183 m elevation), a páramo lagoon (3,401 m elevation), a secondary forest (3,077 m elevation), and a mountain ridge (3,454 m elevation). Sherman traps, pitfall traps, and mist nets were used in collecting the specimens. 213 specimens were caught. A total of 13 species were collected including Thomasomys cinereus, T. caudivarius, T. taczanowskii, Microryzomys altissimus, Caenolestes caniventer, Marmosops caucae, Akodon mollis, Sturnira erythromos,and Anoura peruana. Two other species were observed Lycalopex culpaeus, and Sylvilagus brasiliensis. This study also compared the effects of elevation on Ecuadorian rodent diversity at the taxonomic level of tribe.

The first molecular square made of eight osmium atoms

Diego Zometa, David Marolf, James Johnstone Kristen Brehm, & Henry Touchton

Mentor: Gregory Powell

The use of dicarboxylate linkers (O2C(CH2)nCO2) to join together dimetal units into much larger molecules has been well documented. However, while multiple hexanuclear (with six metal atoms) and octanuclear (with eight metal atoms) ruthenium and molybdenum complexes of this type have been synthesized, only one triangular hexanuclear osmium complex has been prepared. We attempted to create new large molecular triangles and squares by reacting Os3(CO)12 with 1,3-adamantanedicarboxylic acid, isophthalic acid, and 2,6-naphthalenedicarboxylic acid in a microwave reactor. The syntheses and X-ray crystal structures of three new compounds will be presented. The product with 2,6-naphthalenedicarboxylate ligands is the first known example of a molecular square with eight osmium atoms.

Development of Polyurea Precursors

Joel Jackson

Mentor: Brad Rix

Polyureas are a class of polymer that find varied uses domestically and industrially. They are incredibly durable and can be formulated to have outstanding hardness, flexibility, tear strength, tensile strength, chemical and mechanical resistance. Unfortunately, the reaction between amines and isocyanates to form polyureas is so rapid that this can limit their usefulness in may applications. This research addresses this issue by converting some of the amine functionality into imines, with the goal of increasing pot life for the polymerization process. Attempts to synthesize imines under reflux conditions were made using hexamethylenediamine (HMDA) and varying ketones/diketones. Reactions of the HMDA with anthrone, tetralone, 2,4-hexanedione, and octanone have been evaluated and characterized. Product characterization has been performed using mass spectroscopy (MS), infrared spectroscopy (IR), and nuclear magnetic resonance (NMR). The loss of the ketone carbonyl for all of the studied compounds has been verified via IR, with the emergence of a peak at lower wavenumbers indicative of an imine group. In situ reduction of the new precursors during the polymerization process should enable thorough mixing of the components (amine/imine and diisocyanate) with limited gelation before conversion to amine increases the polymerization rate and conversion to polymer.

Synthesis and Polymerization of Capsaicin Derivatives

Michaela Laird & James Nix

Mentor: Brad Rix

This research is looking to synthesize molecules that interact in the same way with the TRPV1 protein as does capsaicin, with the desire to copolymerize the synthesized molecule with other monomers and create polymeric materials that may be useful as an animal repellent or as an anti-fouling agent. This research involves the development of both ester and amide derivatives of capsaicin. Guaiacol and glyoxylic acid are the precursor molecules for production of capsaicin derived esters, the combination is converted to vanillylmandelic acid, followed by a reduction to homovanillic acid. The homovanillic acid is then reacted with a vinylic alcohol to produce the vinylic ester. For the amide derivatives, 4-hydroxy-3-methoxybenzonitrile is the starting material. Upon reduction with lithium aluminum hydride or sodium borohydride, the nitrile is converted to an amine group that can be further reacted with a vinylic carboxylic acid (4-pentenoic acid) to create a vinyl functional capsaicin derivative. Chemical structures have been validated using infrared spectroscopy (FT-IR), nuclear magnetic resonance (NMR), and mass spectroscopy (MS). Both the amide and ester derivatives will be polymerized with other vinyl monomers to create chains that have pendant capsaicin-like functionality. Styrene, methyl methacrylate, and isoprene monomers will separately be evaluated to determine the copolymerizability of the new monomers, with various percentages of the capsaicin-like monomers being incorporated. Potential usefulness as a repellent will be determined via an analysis of TRPV1 activation by the synthesized polymer.

Improvements in Multi-Gap Resistive Plate Chamber Construction for sPHENIX

Haley Stien

Mentor: Rusty Towell

Located at Brookhaven National Laboratory, RHIC is a particle accelerator 2.4 miles in circumference that has been a part of many experiments for the last sixteen years. Particularly, the PHENIX collaboration has been colliding particles in order to explore the theory of Quantum Chromodynamics, investigate the Spin Crisis, and study a new state of matter called the Quark-Gluon Plasma. Now that PHENIX has concluded, researchers are trying to design and build improved detectors to be used by sPHENIX, the new and improved version of PHENIX. Many new advances to Time of Flight (ToF) detectors have been proposed. These detectors help identify the charged particles that are produced from particle collisions in the accelerator. One type of ToF detector called the Multi-Gap Resistive Plate Chamber (mRPC) has been studied in detail. In order to improve the timing resolution and thus achieve better particle identification, several novel designs have been tested including using different materials like 3-D printed gaps and extremely thin glass to create the gas gaps. The results of this mRPC research will be presented, as well as the process of constructing the prototypes.

Session B3. Mental Health- Alumni Conference Room

Is Depression Undermining Your Future? The Relationship of Achievement Motivation and Depression

Carolyn Casada, Jesse Luna, Zannah Morgan, Victoria Spooner, & Sierra Villanueva

Mentor: Cherisse Flanagan

In a competitive, achievement-focused culture, many individuals strive for success while others minimize risk of failure at the expense of success. The negative dimension of achievement motivation is fear of failure, which has consequences such as test anxiety, negative self-evaluation, avoidance, and self-handicapping behaviors (Bélanger, 2003). With the focus on academic

success to define future career paths, college students are experiencing a high level of pressure. This pressure could lead to a student feeling hopeless and exhibiting self-handicapping behaviors. Fear of failure has previously been associated with negative aspects of self-talk when failing (Conroy, 2004) which can then lead to depression (Tuominen-Soini, 2008).
Method. The AMQ and the Center for Epidemiologic Studies Depression Scale (alpha = .82 -.92) will be distributed electronically to college students who will be recruited using social media. Participants will be offered the chance to win one of two $25.00 giftcards to Amazon. The first hypothesis is that participants who score high on Fear of Failure (avoidance) will also score high on depression. The second hypothesis is that participants to score high on Hope for Success (approach) will score lower on depression. Analysis will use correlation and descriptive statistics.
Implications. Understanding the relationship of fear of failure to achievement motivation can help effective treatment early in the college career which could ultimately have an impact on educational, economic, and social outcomes.

Do Your Midnight Munchies Predict Success? The Relationship of Achievement Motivation and Health Behaviors

Madeleine Hammond, Chelsea Kigh, Kendall Mahler, & Samantha Studvick

Mentor: Cherisse Flanagan

Fear of failure has the potential to undermine achievement in academics which can snowball into unfinished education, lost opportunities in career, and long-term loss of income. On the other hand, individuals who have high achievement motivation have higher self-control and may be more capable of resisting certain temptations (e.g. overeating), as compared to those with low achievement motivation (Schuler, 2011). While there is some evidence linking poor health habits to decreased academic performance, there is limited research that explores achievement motivation and health behaviors (Champlin, 2005).
Method. The Achievement Motivation Questionnaire (alpha = .735 - .774) and the Health Behaviors Inventory (alpha=.761) will be distributed electronically to college students using social media. Participants who are not currently enrolled in college will be removed from study. Hope of Success is hypothesized to be positively associated with positive health behaviors, while Fear of Failure will be negatively associated with negative health behaviors. Analysis will use correlation and descriptive statistics.
Implications. Understanding how positive and negative behaviors associated with achievement motivation are associated with specific health behaviors may provide an avenue for intervening with college students who are undermining their present and future success.

Could Perfectionism be Pilfering Your Pocketbook? The Relationship of Achievement Motivation and Perfectionism

Sierra Villanueva & Victoria Spooner

Mentor: Cherisse Flanagan

When a seemingly positive mindset, such as achievement motivation, and maladaptive perfectionism become the strongest motivators for success in an individual, negative outcomes ensue. While individual research on perfectionism and achievement motivation has been produced extensively, far less research has been conducted on the relationship of these traits. The combination has the potential of creating larger harms in an individual's life, and the need for understanding this occurrence becomes more important. This may be particularly relevant for college populations. As many as one in three freshmen college students do not return for their sophomore year (US News, 2016). Understanding the interplay between Achievement Motivation and maladaptive perfectionism may elucidate the problem and lead to solutions. In the present study, two types of achievement motivation, hope of success (approach) and fear of failure (avoidance) are studied (Lang, 2006) in relationship to adaptive and maladaptive perfectionism.
Method and Results. Achievement motivation and perfectionism in college students was examined using the Achievement Motivation Questionnaire (AMQ; Villanueva & Spooner, 2015) and the Almost Perfect Scale-Revised (Slaney, 2001). The AMQ subscales, hope of success (HS) and fear of failure (FF) both exhibited acceptable reliability, (HS alpha = .735 and FF alpha = .774). Participants were 94 college students. Strong positive correlations existed between Hope of Success and Adaptive perfectionism subscales, Order, $r(91) = .48$, $p < .001$ and Standards, $r(90) = .74$. Also, adaptive perfectionism was negatively correlated with Fear of Failure, Order, $r(91) = -.11$, $p = .297$, Standards, $r(90) = -.37$, $p < .001$.
Discussion. The combination of perfectionism and hope of success is adaptive. Conversely, the relationship between maladaptive perfectionism and fear of failure could lead to numerous adverse occurrences.

Exploration of the Journey: Factors that Contribute to Women's Substance Abuse Recoveries

Nicolette Ford

Mentor: Amy Kalb

Substance abuse recovery research has historically been primarily directed towards males. The female research that does exist has consistently shown women have distinctive alcohol disorder recovery needs. After IRB approval and shadowing a 2009 study that incorporated different steps but the same end goal, it was found that women's recoveries were impacted both negatively and positively by factors such as peer support, self-empowerment, responsibilities of motherhood, and the stigmatization felt when compared to their male counterparts. Results stress that this population lacks safety, accessibility, self-

empowerment, and more attentive research. The overall study sheds lights on gender inequity within alcohol use disorders and gave women a voice in their own recovery journeys in hopes to influence change. To explore and better explain these factors further, this study applied a phenomenological qualitative methodology to help contribute to what little is known about female substance abuse recovery. Focus groups were utilized with women who were participating in Alcoholics Anonymous and were self-described as in recovery. Through the phenomenological methodology authentic, valid, and lived experiential data was collected. The current findings lend support to previous female recovery research. A full review of this study's findings in relation to the existing literature will be discussed.

In the Spotlight: Are Depression and Acting linked?

Braden Clark
Mentor: Kari Hatfield

At the pinnacle of today's society, there are a number of celebrities, actors, and talents who we see crumble due to the weight of depression, anxiety, and a number of societal disorders. An emerging question from all of this discourse, and the one in which my analysis is focused on, is whether or not there is a link between acting and depression. I will use research surrounding famous acting deaths, such as Heath Ledger and Robin Williams as well as renowned educators such as Kaitlin Hopkins, Head of the Musical Theatre BFA program at Texas State University, who are now beginning this discussion of mental health in the theatrical world. As a student hoping to obtain his BFA in Acting with a minor in Psychology, I will also explain how one's theatrical training effects one mentally and physiologically and how that can effect one's mental health for better and for worse. The art of theatre has an innate ability to tap into the human psyche and my research hopes to navigate how this art form can strengthen the psyche rather than disable it.

Session B4: Scripture & Theology - LYNAY Classroom

"The Tyrant in the Tiara": Pope Julius II as the Quintessential "Anti-Christ" in the Eyes of the Erasmus of Rotterdam and Martin Luther

Jackson Hager
Mentor: Tracy Shilcutt

While the Renaissance papacy achieved remarkable artistic patronage and political power, for many contemporary writers and modern scholars, this era/the Renaissance popes represent(s) a time of moral laxity and corruption. For the later Protestant reformers such as Martin Luther and Huldrych, this period offered plenty of ammunition for their polemics against the Papacy. Much of the scholarship has focused on the Borgia pope, Alexander VI, as the standard for the evils of the papacy, but this paper will argue that it in fact Pope Julius II "the Warrior Pope" who represented the lowest point of the papacy. From consolidating the realm of the Papal States to selling of offices to artistic achievements such as laying the foundations of the remarkable Saint Peter's Basilica, Julius II represents the Pope at the height of his attempt towards being a worldly prince rather a spiritual guardian. This study will look at sources such as Julius Excluded From Heaven by Erasmus, Passional Christi Und AntiChristi by Lucas Cranach the Elder, and the writings of the Martin Luther to better understand the foundations of Protestant polemics against the Papacy.

1 Timothy 3:16:Scribes, Theology, and the Relative Pronoun

Samone Smith & Brianna Rideout
Mentor: Curt Niccum

Did scribes regularly altered text for theological reasons? This question is commonly debated among biblical scholars such as Bart Erhman, Kim Haines-Eitzen, and Roger Bagnal. Often these scholars question whether the changes to the text were accidents or a common practice. One of these recurring changes to the text is the incorporation of nomina sacra, or the shortening of sacred names and words, typically formed by using the first and last letters of the word, used by the early Christian Church. Potential changes to nomina sacra would affect the Christology in passages and thus heavily change the theology derived from texts. This area of research is significant as society continues to grow in its understanding of how the Bible was formed.

In our research, we looked at a specific instance of nomina sacra in the Christ hymn in 1 Timothy 3:16 that some scholars believe was corrupted to further the theological assertion that Jesus is God. In order to further explore this idea, we looked at the background of how hymnic material in the New Testament was written. We also looked at scribal habits, the "original text" versus the "common text," patristic evidence, and manuscript evidence in relation to 1 Timothy 3:16. Our methodology consisted of establishing what we believed was the original text and then examining relevant manuscripts in light of this assertion. Next, we did an in-depth analysis of patristic evidence and how each Church Father used the passage of 1 Timothy 3:16 in theological debates in the early church. Our goal for this research was to make a definitive statement on whether the

change in 1 Timothy 3:16 was intentional or not. We completed this research with the hope that it would add some clarity to this popular debate.

Textual Criticism: Nomina Sacra

Zachary Casey
Mentor: Curt Niccum

Within the confines of biblical studies, New Testament textual criticism has become an established method of studying the biblical text. Its goal is to make guided assertions on identified textual variations within the biblical text to recover the original text and to better understand its history. These efforts in turn provide the scholarly community with an understanding into the composition of the biblical text. Controversially though, scholars like Bart Ehrman and Kim Haines-Eitzen (prominent, non-Christian scholars) through New Testament textual criticism have proposed theological alterations by the workings of a community of ancient scribes.

Consequently, the core of my research was assessing these claims. As a result, my research consists of original work that explores a text-critical issue in the New Testament. More specifically, it deals with proposed theological alterations to biblical manuscripts by means of Nomina Sacra (abbreviations of selected words in the New Testament). Scholars like Ehrman and Haines-Eitzen propose that the biblical scribes are using Nomina Sacra to theologically alter the biblical texts to manipulate the true natures of Christ and God.

Accordingly, in order to faithfully investigate these claims, my team and I went through a three level methodology. First, we searched the apparatus of both Tischendorf's 8th Edition and von Soden's Greek New Testament to see what the manuscript evidence suggested about how Nomina Sacra was being used on a scribal level. Second, we looked at four volumes of Biblical Patristica to see how the early church fathers were using Nomina Sacra. Finally, we searched four of the leading modern commentaries to see if recent scholars had addressed these claims with Nomina Sacra. In the end our conclusion, based on three levels of research, suggested Nomina Sacra was not being used to theologically alter the biblical text on either a scribal and patristic level.

Prisoner of Christ: The Argument from Paul's Identity in Ephesians 3

Nathan Jowers
Mentor: Cliff Barbarick

Contemporary scholarly consensus treats Ephesians 3:2-13 as a digression from the prayer begun in 3:1 and resumed in 3:14. While most commentators recognize that this digression enriches the surrounding discussion with it's theological content, it is generally set aside as an isolated literary unit. I assert that treating 3:2–13 as a digression is an inadequate view because it obscures the rhetorical thrust of the otherwise powerful passage. If one views the whole of chapter 3 as a single continuous unit, an argument emerges based Paul's identity as the "prisoner of Christ." By focusing on Paul's low status while simultaneously speaking about his prominent role in the proclamation of the mystery of God, the author presents Paul's humble identity as a spiritual exemplar, giving rhetorical force to his exhortation in chapter 4 that his audience should live together humbly. Similarly, the focus on Paul's suffering and labor for the sake of the inclusion of the Gentiles gives rhetorical support to the exhortation to Christian unity. This interpretation, based on a close reading of the Greek text, contributes to the study of Ephesians by connecting 3:2-13 to the surrounding text more meaningfully than treating it as a digression. In particular, linguistic evidence in 3:1 to 4:1 is examined to establish a connection between these two verses, and special attention is paid to first person statements in order to uncover the rhetorical argument of the passage.

.Session B5: CS, IT, & Physics – AT&T Theatre

Global Terrorism: Analyzing and Predicting Attacker Groups

Alicia Clark
Mentor: Rob Byrd

The war on terror has been dominating our world since October 7, 2001. Terrorism has had major effects on the United States in terms of security, trust, and loyalty to our country, as well as affecting the rest of the world. Technology has advanced greatly in order to adjust to the varying attacks on terrorism. And because of the impact that terrorism has made, data and analytics are not what they used to be. In an attempt to make a solution, we have made an interactive website and provided tools that analyze gathered data. The website provides a different look into what attacks the world has suffered as a result of this war, and the analytic tools give us an answer to the mysterious attacks. The only question is left is, how exactly do we use these tools to their full potential to help narrow down what terrorist group is responsible for an attack given some information?

The first step was research. We found University of Maryland's Study of Terrorism And Responses to Terrorism (START) global terrorism database that consists of all known terrorist attacks from 1970 to 2015, including predictions for the

next few years. Using this database, we cleaned the data to run interactive queries off of based on the information users input to our website. To perform those analytics, we are using a statistical package named R to create embedded analysis and predict attack responsibility. Our web application is developed so that any person is able to provide a few known details about a recent terrorism attack, and have a visually appealing interface to view the results – the confidence intervals that the responsible group is already known, the responsible group is unknown, and the error probability of our statistical methods.

Testing the Timing Resolution of Electronics for Time of Flight Detectors

Matthew Kimball

Mentor: Rusty Towell

Brookhaven National Laboratory is a research Facility on Long Island, NY that houses a circular particle collider. This lab has been responsible for many important experiments in the past, but as research moves forward the technology used must be improved. One of the tools used regularly is called a Time of Flight (ToF) detector. These are useful for identifying particles by measuring the time it takes for particles to travel between two locations. One type of TOF detector used is called a mRPC which stands for multigap Resistive Plate Chamber. The most important quality of these detectors is how accurately they can measure the flight time for the particles. As the timing resolution of these detectors improve, the electronics used to read out the detectors must improve also. My work this past summer was dedicated to determining the exact specifications of what the current electronics can do so that they can actually be improved upon in the future. In order to do this, I tested three distinct types of electronics: a balun board, a pre-amp, and a DRS4. A balun board is used to convert a single pulse into two opposite pulses traveling in tandem, or it combines two tandem pulses into a single pulse. A pre-amp is used to amplify the raw signal and a DRS4 is a fast analog to digital converter. In my talk I will discuss the TOF electronics, their measured efficiencies, and suggest where future improvements are needed.

3D object recognition by using a Kinect and controlling a robot arm

Zhaojia Xi

Mentor: Larry Isenhower

This project is to make a robot arm and kinect camera recognize different types 3D objects. I am using free open source software: Points Cloud Library and Processing, to process 2D/3D images from the Kinect. The program will try to identify objects placed on a table and then manipulate them appropriately. The Kinect has an image and distance sensor to create a 3D image of the environment which can be used to recognize objects. The methods, calculations, and results will be presented.

Computer Simulation of the Motion of Stars in Spiral Galaxies

Joshua Martinez

Mentor: Larry Isenhower

Modeling the stars has been a campaign in human history from the discovery of the Copernican model of our solar system to simulations of our Universe as we know it today. To better understand our galaxy astronomers have collected large datasets consisting of various information about stars they have observed. Recently the GAIA collaboration released a database containing information on over 1 billion stars, or about 1% of all stars in the Milky Way. This work uses the GAIA Archive database and other databases from several other collaborations to create a model of the Milky Way based on actual star positions and velocities. This presentation will cover the processes used to obtain the star positions and velocities from these databases and how these were used to create a galaxy simulation to help further understand the evolution of our galaxy.

Testing an Alternative Method to Distinguish Gravitational Wave Signals from Noise

Hannah Hamilton

Mentor: Josh Willis

In 2015, the Laser Interferometer Gravitational-Wave Observatory (LIGO) detected gravitational waves, confirming Einstein's 100 year old predictions from general relativity. When signals such as these are potentially identified in the data, the analysis pipeline must perform additional tests to distinguish true signals from instrumental noise. The PyCBC pipeline currently uses a goodness-of-fit test called the chi-squared statistic to downrank noise events compared to true signals. It does this by computing the signal-to-noise ratio in several nonoverlapping bins in frequency. We discuss an alternative method of downranking noise that looks only at the bin with the loudest excursion, and compare its effectiveness to the standard chi-squared test.

Tuesday, April 4, 3:00 – 4:20 PM

Session C1: Religion, Morality, & Crime - McCaleb Room Zone A

What are the differences in perceptions of effective outreach between church members and their immediate neighbors?

Abbey Bildstein, Bryn Stonehouse, &
Mentor: Suzie Macaluso

Churches are widely known for providing many successful outreach programs, especially for those affected by poverty. However, little research has been conducted on the perceptions of effective outreach. This research aims to identify the perceptions of effective outreach between church members and their immediate neighbors located in Dallas, Texas through quantitative and qualitative data collected by a survey. It was hypothesized that the members of the church will perceive their outreach to be more effective in comparison to their immediate neighbors' perceptions. In addition, it is hypothesized that the church members will perceive that they are reaching their immediate neighbors' more effectively than their neighbors perceive it. The data collected supported these hypotheses.

Implementing Testimony Videos at Calvary of Albuquerque

Haley Remenar
Mentor: Doug Mendenhall

As a nondenominational mega-church, Calvary of Albuquerque uses videos for advertisements, sermon recaps, worship introductions and announcements. Created by a professional video team, the videos are high quality but tend to create a consumer-culture and shallow atmosphere especially for guests or nonbelievers. The church needs to foster deeper relationships by implementing testimony videos. This paper reviews the literature about testimonies, testimony videos, media in the church and personal narratives. The paper gives practical reasoning to support the use of testimony videos and ways to implement the videos to build community and engage millennials. The research will help the video production team to use media to encourage the large church to build deep relationships despite its size.

The Crime and the Criminal: Perceptions of Crime Seriousness

Amanda Stephens
Mentor: Suzie Macaluso

Crime in the United States has been and will continue to be a public problem (Saad, 2007). Thus, it is important to know how the public perceives different types of crime. For the focus of this study, perceptions of crime seriousness will be analyzed based on the race of the criminal and the type of crime committed (white-collar vs. non-violent property crime) as the variables of interest. This exploratory research will be used to discover the relationship between the factors of a specific crime and the public's perception of the seriousness of that crime in terms of seriousness and punishment. Surveys will be administered to the student body and faculty of a private university in West Texas. These surveys will present questions in the form of a case study in order to identify how one's perception of crime seriousness changes as the two independent variables change. This is foundational research for directly analyzing the effects of race and type of crime on a community's perception of crime seriousness by using different case studies to present the scenarios. Other studies have looked at these variables of interest (Herzog, 2003; O'Connell & Whelan, 1996), but none have been completed here in the United States. The goal of this study is to reveal any biases present within the university's community that could explain a difference in perceptions of crime seriousness. It is likely that the public's perception of crime seriousness influences the perceived effectiveness of the criminal justice system here in the United States.

The Good, The Bad and The Dirty: A Look Into Spanish Media

Emily Guajardo
Mentor: Doug Mendenhall

Not all Hispanics speak the same type of Spanish, nor the same dialect. Rather, each individual spanish speaking group(s) within our the United States have specific language needs and barriers that require attention, specifically by the Spanish-language media. Using a mixed methodologies approach, a study was conducted in regards to researching two of the top Spanish media companies in the U.S, Univision and Telemundo. By researching the vastly diverse dialects within the Spanish language, studying the history of the companies and correlating the evidence to the needs of the Spanish speaking community, the findings suggest that not all Hispanics are being treated equally and fairly in the eyes of the Spanish-language media; only select Hispanic populations have been chosen. Because of this, Hispanics are receiving undesirable side effects from their media outlets including miscommunication, loss of personal authenticity, lack of understanding and underlying cultural segregation.

Session C2: Nursing, Nutrition, & Education - Alumni Conference Room

A Chronological Analysis on the Ways in Which Advancements in Medical Technologies have Altered the Grieving Process

Grace McNair

Mentor: Jim Nichols

Since the mid 1960s, both end of life care and advancements in medical technologies have expanded exponentially. This article explores the advancements in medical technologies and how it has altered the way that Western society grieves death. With the capabilities to prolong life, the family, the patient, and the medical team, grieve the end of life in a different way. This article provides a chronological analysis of palliative care, hospice care, and medical advancements, and parallels these changes in medicine with alterations in the bereavement process. Clinicians that have observed transition in medical technologies were interviewed, and their experiences with the alteration in bereavement is documented and analyzed. This article explores historical and anecdotal narratives of Western society's transformation of grief through the lens of medical advancements.

Zapping Zika through Education

Averi Edwards, Kenzie Mascorro, Sarah Ritchie, & Victoria Pannill

Mentor: Anita Broxson

The purpose of our two phased education intervention program is to educate the public about the Zika virus the effectiveness of the program. According to the Center for Disease Control and Prevention, the virus is in every state in the U.S. A lack of public education can lead to hysteria, confusion, and widespread fear, especially for pregnant women or women looking to plan a pregnancy. Upon approval of the IRB at Abilene Christian University, we administered phase 1 of the study, which was an education intervention about the etiology, signs and symptoms, transmission, and prevention methods related to the Zika virus. The education intervention occurred at several locations in our community with a total of 58 participants. Participants completed a pre and post-test. When asked about whether there are current treatments available for Zika, 56% answered "yes" on the pre-test compared to 76% who correctly answered "no" on the post-test. The symptoms of the virus most commonly mimic symptoms of the flu, which 82% of participants selected on the pre-test compared to 100% of participants who answered correctly on the post-test. One of the largest disparities we discovered related to what type of bodily fluid retains this virus the longest. On the pretest, 60% answered "blood" while 19% answered "semen." After the education intervention, 98% correctly chose "semen." This was a crucial finding since sexual relations are a major mode of transmitting the virus. During phase two of the study, an educational video we created will be distributed to approximately 150 college students who are planning on attending mission trips to areas where the virus is prevalent. They will complete the same pre and post-test. This data will be collected in January 2017 and will be added to and reported with the existing data.

Self-Efficacy and Moral Distress in Bachelor of Science Nursing Students

James Bolt, Melanie Collazos, & Kimberly Burt

Mentor: Anita Broxson

Nursing in the 21st century exposes its professionals to a variety of unique challenges. Upon entering the work force nurses are often forced to set aside what they have been taught is best for their patients in order to conform to institutionalized standard procedure; this is moral distress and it happens to nurses regularly. It is imperative to recognize and address moral distress as soon as possible, because dealing with these distressing situations on a regular basis leaves nurses feeling dissatisfied with their quality of care; ultimately, moral distress threatens nurses' commitment to their patients and their profession. The purpose of this pilot study explored the level of moral distress among nursing students at the junior and senior level. Additionally, we asked students to rate their self-efficacy and any possible relationship to moral distress. Upon approval of the IRB at Abilene Christian University the Moral Distress and Self-Efficacy Survey was sent to Abilene Christian University's School of Nursing junior and senior cohorts. Descriptive statistics were used to determine the results of this anonymous survey, which was administered using a secure Survey Monkey account. The sample included 55 participants (28 juniors, 27 seniors). Juniors ranked themselves slightly higher in self-efficacy (30.7) versus seniors (30.0) on a scale of 10 to 40. Surprisingly, the juniors also reported higher levels of moral distress, which contradicted what we expected. Future research should focus on recruiting larger samples and further exploration into the relationship between self-efficacy and moral distress among nursing students. It is important to identify potential interventions in managing moral distress as such interventions will be needed to decrease the number of nurses leaving the nursing profession.

Client Perception of the Efficacy of Herbalife Supplements

Monica Leos

Mentor: Sheila Jones

Background: Obesity has increased dramatically in the United States and it is linked to alarming chronic health conditions. Weight loss diets, exercise, and weight loss supplements are ways individuals have attempted to lose weight. Herbalife is a company whose mission is to address the obesity epidemic with weight loss supplements.
Purpose: To determine clients' perception of how much Herbalife facilitated weight loss and to compare results to clients who changed their lifestyle in addition to taking Herbalife.
Methods: A survey published through Survey Monkey was sent to Herbalife providers through e-mail and was posted through Facebook. Data was gathered from participants (n=15) who completed the survey, were 21 years of age, and lost weight while taking supplements.
Results: Sixty percent (n=9) perceived weight loss was or mainly due to taking Herbalife supplements. All who lost weight made at least 1 dietary change, and 80% exercised at least 30 minutes each day.
Discussion: Although all participants made lifestyle changes that can induce weight loss, most perceived it was mainly or solely due to taking supplements.
Conclusion: Because lifestyle changes were made, data is not conclusive that Herbalife supplements induced weight loss, yet that was the perception.

An Analysis of Locations from which Students Access Course Content Using Mobile Devices

Preston Werner

Mentor: Brent Reeves

This research examines location data associated with device access to a course learning management system, Blackboard. By associating campus wireless access points with longitudinal and latitudinal data, we will map the locations from which students accessed course resources. The location data will be examined from multiple perspectives, e.g. student demographics, and offer insight as to where students most frequently spend their time throughout the day. Our hypothesis is that the traffic for various locations on campus is dependent upon the time of day. We will use data analytics to discover other associations and correlations that may be found in the data.

Session C3: Issues in Social Sciences - AT&T Theater

A Qualitative assessment of Black and Hispanic Community Collaboration

Taylor Crumpton

Mentor: Stephanie Hamm

In a conservative, evangelical community in West Texas with a population of 121,000, the breakdown in racial/ethnic populations are 62% non-Hispanic White, 25% Hispanic, and 10% Black. In the Hispanic and Black communities around the city are many people who live below the poverty line and struggle with issues such as unemployment and inadequate health care. Leaders from the Hispanic and Black communities work for the same types of outcomes for their communities, however, the two groups have yet to make sustainable moves for collaboration in any area.
To that end, researchers conducted focus groups in order to gather data that will give voice to the two communities. Researchers (one Hispanic and one Black) recorded insights from each group's own focus group, and then conducted a focus group of representatives of both groups. Data was then analyzed with a content analysis approach seeking emergent and priori themes, such as communication style, salience of faith/religion, history, and competition. Findings suggested the two groups have interest in collaborating, however differences in negotiation styles becomes as barrier. Additionally, groups identified relationship with the dominant power as being salient. Implications include finding ways of overcoming barriers to collaboration within a community, which may include relationship building and joint projects.

Attractiveness in Female Voices

Vanessa Gonzalez

Mentor: Scott Self

The purpose of this study is to understand human relationships as a function of voice characteristics. This study is in the context of a larger scholarly discussion of the effects of voice-characteristics on human interactions. This study focuses on the relationship between attractiveness and gender in female voices (as measured by fundamental frequency) and the relationship between attractiveness and specific voice pitch in female voices (as measured by fundamental frequency). A snowball sample study was distributed through various social media outlets asking for their rating of attractiveness in four different female voices. The findings in this study showed a significant difference among gender of participants rating female voices. The

results showed a relationship between low female voice and attractiveness and a relationship between high female voice and unattractiveness. These findings support the conclusion that there is a relationship between voice characteristics and human perception.

Hot or Not: the Reality of Body Image Perceptions in the 21st Century for Female College Students

Raychel Duncan

Mentor: Amy Kalb

Everyone looks in the mirror at some point in their lives and they do not feel fully satisfied with what they see. Maybe it is their weight or their hair color or perhaps their height--there is always something that "needs" to be changed. College-age women seem especially impacted by negative body image perceptions. Research show that this desire to look like and be something different is often brought on from societal pressures, social media and familial opinions and comments. The existing research often looks at why women are dissatisfied with their looks, but not routinely at what impacts this dissatisfaction has on their daily lives. This study looked at the body image perceptions of 65 female college students from a private, southwestern university to see how they felt their body image has impacted various areas of their lives. A survey that utilized open-ended questions sought to gain a better and more descriptive understanding of how college woman truly feel about their body image. The resulting qualitative data was analyzed and results showed that negative body image impacted the respondents' self-esteem and self-perception. Results also showed that these negative body perceptions had a major impact on how the participants function in their social and daily lives. A full review of this study's findings in relation to the existing literature will be discussed.

Chipotle Mexican Grill Public Relations Case Study

Laura Corral

Mentor: Cheryl Bacon

In 2015, the beloved food chain, Chipotle Mexican Grill, experienced a nationwide food-safety scare. The outbreak of E.coli and norovirus harmed the restaurant's healthy reputation and affected stock prices. The events created a public relations nightmare for the company. This research examines the company's first responses to the outbreak and the public relations strategies Chipotle is exercising to gain back consumer trust. Material was gathered through various reviews and content Chipotle has produced. The paper analyzes Chipotle's actions by comparing them to standard public relations crisis management strategies. Possible future steps are suggested to aid the chain in its efforts.