2017 URSA SCHOLARS WEEK

A SYMPOSIUM DEDICATED TO CELEBRATING UNDERGRADUATE CREATIVITY

ACHIEVEMENT
RESEARCH
VISION
CREATIVITY

COMMITTED TO UNDERGRADUATE EXCELLENCE

Program & Abstracts • March 27-31, 2017
Undergraduate Researchers!

Nominate your faculty research advisor for *Undergraduate Research Mentor of the Year!*

Nomination forms are available on the URSA website (www.baylor.edu/ursa). It will only take a few minutes to complete a nomination for an exceptional research mentor, and submit it via the website.

*Say thanks to a Baylor faculty member!*
What is URSA?
The Undergraduate Research and Scholarly Achievement (URSA) initiative at Baylor welcomes all undergraduates, from freshman to senior, to maximize their education through a variety of research, creative and scholarly activities. Undergraduates take advantage of opportunities on-campus from the laboratories in the Baylor Sciences Building, to the design studios, to the library collections. They also participate in off-campus programs, including research internships at medical schools, assistantships at field stations, and apprenticeships in museums. URSA sponsors a small grant program, with funds available exclusively for undergraduate projects.

What is Scholars Week?
Each year Baylor Sponsors a series of events to celebrate undergraduate research and creativity. Every spring, Baylor dedicates an entire week to scholarly presentation. The first two days are dedicated to platform (oral) presentations where students from a cross-section of academic disciplines share their projects and results. In mid-week, individual students and research teams display posters in the Baylor Sciences Building. Academic departments and the Baylor Libraries provide judges to determine the most outstanding efforts from both the platform and poster presentations. URSA recognizes the winners, along with outstanding faculty mentors at an Awards Reception at the end of April.

Who administers Scholars Week and URSA?
The Office of the Vice Provost for Research has oversight over The URSA Steering Committee, which includes faculty and student representatives. Administrative research staff participate ex-officio. BURST, Baylor Undergraduate Research in Science and Technology, a student-run organization, assists with the event venue for Scholars Week.

The URSA Steering Committee
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Dianna Vitanza, PhD (OVPR)
Cindy Wu, PhD
Colleagues:

Once again, I have the pleasure of welcoming you to the Baylor URSA Scholars Week. Please find time within your busy schedule to examine the breadth and depth of the research of our students. It is easy to see that Baylor Research is Making a Difference in the lives of our undergraduates around the world.

The achievements of the faculty and students represented in this ninth annual Scholars Week celebration are exemplary. As such, I encourage you to sample all of the scholarship on display, not just in your own discipline. The quality of each individual presentation once again demonstrates the monumental commitment provided by every Baylor faculty mentor and the direct impact this commitment has on our students.

Please also take the time to thank your faculty colleagues and students who have worked so hard to bring URSA to where it is today. Their unwavering enthusiasm promises a bright future for the undergraduate research experience at Baylor and is worthy of our praise!

As always, please accept my thanks for all you do on a daily basis for Baylor research.

I appreciate it and you.

Best regards,

Truell W. Hyde

Truell W. Hyde, PhD
Vice Provost for Research
A special Scholars Week presentation and reception, organized as part of the speakers series sponsored by BURST with The College of Arts and Sciences.

"Discovery of a New Planet"

Michael Endl, PhD

Runner Up for Science Magazine’s 2016 Breakthrough of the Year

Thursday, March 30, 2017
5:30 pm
Foster 240

Dr. Endl is a research scientist and lecturer at the University of Texas at Austin. His research focuses on the detection and characterization of Extrasolar Planets. Dr. Endl’s current activities include observations to confirm and validate exoplanet candidates from K2 & Kepler, characterization of the stellar population in the original Kepler field, a search for Earth-mass Planets in the Alpha Centauri System, M-dwarf planet survey at the Hobby-Eberly Telescope and VLT, long-term planet search at the Harlan J. Smith 2.7 m Telescope and the Tull spectrograph, and transmission spectroscopy of transiting exoplanets. He was most recently involved in the discovery of Proxima B, the closest known exoplanet to Earth, which has characteristics that indicate it may hold the potential for life.
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Oral Presentations
Bill Daniel Student Center
March 27-28, 2017
Monday 2:00 p.m. Session One – Baines Room

A1. Plato and Pornography: Progressing Through the Regimes
Jessica Schurz; Faculty Mentor: Dr. Sam Perry
Department: Baylor Interdisciplinary Core/Philosophy

In *The Republic*, Plato crafts the timeless argument comparing the city to the soul. In this paper, Plato’s classic work is paired with contemporary neurological research on the biophysical realities of pornography addiction. Plato’s claims on the tri-part soul and the consequences of when the appetitive soul reigns correspond closely with current research on brain lateralization and functional neuroimaging technology. The most salient similarities between pornography addiction and *The Republic* lie in Plato’s description of progressing through the regimes. The succession of the oligarchic soul to the tyrannical soul align with neurological research on the over-consumption of pornography. This paper explores how one of academia’s most cited works sheds light on a modern taboo.

A2. Chaucer’s Unpardonable Pardoner
Sakina Haji; Faculty Mentor: Dr. David Whitford
Department: Religion

In *The Canterbury Tales*, Chaucer shows an extreme dislike for the character of The Pardoner. Not only does Chaucer give a revolting description of The Pardoner, but he also enumerates several examples of The Pardoner’s corrupt, money-making practices and disregard for morality in general. This paper researches the causes for Chaucer’s hatred, which stems from his disagreement with the Church on the practice of selling indulgences. I analyze how the sacrament of penance was initiated, evolved, and came to be common practice in the Church, and how this practice was corrupted into the sale of indulgences by the likes of The Pardoner.

A3. Theophany in Luminosity: The Theology of Light in Gothic and Shaker Architecture
Lydia Williamson; Faculty Mentor: Dr. David Lyle Jeffrey
Department: Great Texts, Honors

Creation begins with God’s spoken words, “Let there be light” (Gen 1:3). God speaks to Moses in a burning bush. John says in the prologue to his Gospel that Christ is the light that “shines in the darkness, and the darkness has not overcome it” (Jn 1:5). Revelation describes the Celestial City as radiant with light, filled with the glory of the Lord. Beginning with Scripture, then, and continuing through the exegetical tradition, light expresses the relationship between heaven and earth, figuring and communicating the divine. Early French Gothic and Shaker architecture, though disparate in time periods, locations, and traditions, both capture the beauty, purity, and simplicity of light. In doing so, these spaces attempt to convey a heavenly vision and guide the mind and soul to contemplation of the Uncreated Light.
Clare Ordemann; Faculty Mentor: Dr. Jann Cosart
Department: Music - Academic Studies

A number of the greatest writers and poets of the Romantic Period played a part in Robert Schumann’s musical compositions. Not least among these were Johann Wolfgang Goethe, Jean Paul Richter and E. T. A. Hoffmann, whose words appear as lyrics or themes in a multitude of Schumann’s works. Although Schumann is known primarily as a composer, he was equally skilled as a writer, and held the understanding of great literature in high regard. His music and writings often overlapped: thus, his most beloved authors were also his music teachers. Through analysis of selected musical works, reading of Schumann’s letters and other primary sources, and study of literary influences, this study investigates how Romantic Era authors shaped Schumann’s artistic development as a composer.

A5. The Women’s Oath of The Morte Darthur
Stephanie Hoffman; Faculty Mentor: Dr. D. Thomas Hanks
Department: English

The Morte Darthur is most commonly viewed as a male-centered text, focusing on the exploits of the Knights of the Round Table and the life and death of the Once and Future King, Arthur. Because the knights’ quest for worship and honor is so prevalent in the text, women, while present, often seem to fade into the background. The knights are bound to a code of courtly conduct known as the Pentecost Oath, but they are not the only gender called to obey a certain standard of chivalry and honor, and they are not the only ones who can gain or lose worship based on their actions. Although never explicitly stated in the text, the women, too, follow a code that can be discovered through careful examination of their actions throughout the text. This code explains the behavior of many of the noblewomen, from the small episode involving Lady Ettarde to the overarching affair between Guinevere and Lancelot. This paper explores the four-part Women’s Oath hidden in the Morte, delving into its stipulations after discussing prior feminist scholarship on the text. After defining the values that make up the Oath, it then examines many of the women in the Morte, including Lady Ettarde, Queen Isode, Lady Elayne (the mother of Galahad), Elayne of Ascolot, and Queen Guinevere. The adultery, trickery, and purity exhibited by the actions of these women can all be explained by their desire to gain courtly worship according to the stipulations of this Oath.

A6. Gogol and His Use of Slavic Folklore
Steven Newcomb; Faculty Mentor: Dr. Adrienne Harris
Department: Modern Languages and Cultures

Combining his interest in folklore with his desire to become a renowned author, Gogol incorporates various folk beliefs into his earlier writings that propel him into the public’s eye. The stories in Gogol’s first collection Evenings on a Farm near Dikanka in 1831 showcase his unique passion for folklore – specifically through his use of calendrical rituals and witches.
Mariano José de Larra, a Spanish romantic author of the 19th century, is best known for his “cuadros de costumbres,” articles on the customs and traditions of Spain that use humor and irony to criticize society. Larra founded two newspapers, *El duende satírico del día* (1828), where he published the essay, “El café,” and *El pobrecito hablador* (1832), where he published the essay, “El castellano viejo.” Larra illuminates the problems of the middle class throughout his works through comical anecdotes about its members. Each essay includes the thoughts of a solitary observer, Figaro, who describes characters exemplifying ridiculous characteristics that demonstrate the ignorance of the bourgeoisie. In “El café” and “El castellano viejo,” Larra uses satirical humor through his funny stories, exaggerated caricatures, clever and detailed phrases, and parallel narratives. He criticizes the middle class by commenting on its lack of education, traditional customs, and its hypocrisy. The essays reflect the liberal ideals of Larra about the importance of education and the reforms necessary for Spain to progress.

Mariano José de Larra lived during a tumultuous period of Spanish history in the first half of the nineteenth century. The Napoleonic invasion, followed by the despotic monarchy of Ferdinand VII inspired his *cuadros de costumbre* or scenes of typical Spanish life. In his narrative essays “¿Entre qué gente estamos?” (1834) and “La nochebuena de 1836” (1836) the characters consider and discuss personal as well as societal problems through Larra’s romantic style. While his earliest essays are comic and humorous, his later works adopt a somber tone that distinguished him from other essayists of the period. As a romantic author, he rebels against the rules of literature and invents characters that break the rules of society. Through the point of view of his alter ego Figaro, his use of anecdotes modeled on his interactions with the middle class, and his command of satire, Larra demonstrates a critical perspective of the hypocrisy and bad manners of his fellow Spaniards.

Benito Pérez Galdós, the most prominent Spanish realist author of the Nineteenth Century, was a staunch critic of the hypocritical society of Madrid. His novel *La de Bringas* or *That Bringas Woman*, written in 1884, takes place in Madrid in the months before the “Glorious Revolution” of 1868, in which Queen Isabel II was forced to step down from the throne and the First Republic was established. The semi-omniscient first-person narrator is himself a character in the story, which gives the work a unique perspective and bias. His narrative focuses on Rosalía, the wife of a lower-level bureaucrat who both works and lives in the Royal Palace. Throughout the novel, the narrator utilizes numerous metaphors and vocabulary relating to the theater. Such theatrical references appear in the descriptions of Rosalía’s obsession with clothing, Isabel II’s Good Friday dinner for the poor, and even casual comments about Madrid society. These references
highlight the hypocritical nature of the social, religious and political spheres of the society. The extension of this theatrical metaphor, implied by Galdós, is that the political system and the Glorious Revolution were incapable of bringing change or justice because every aspect of the contemporary society was a mere façade and nothing more than theater.

**Monday 2:00 p.m. Session Four – Beckham Room**

**A10. Syrian Refugee Resettlement and National Security**  
Megan Starkweather; Faculty Mentor: Dr. Peter Campbell  
*Department: Political Science*

Donald Trump’s controversial executive order on immigration, the fulfillment of several highly controversial campaign promises, is framed as necessary for the preservation of national security. It prescribes several actions, including suspension of the entire United States Refugee Admissions Program (USRAP) for 120 days, during which the administration will take this time to review “the USRAP application and adjudication process to determine what additional procedures should be taken to ensure that those approved for refugee admission do not pose a threat to the security and welfare of the United States.” The order also permanently halts all Syrian refugee admissions. Syrian refugees became a major issue during the election. During my internship at a refugee resettlement agency last summer, I observed the resettlement process firsthand. I realized that, due to election rhetoric, many people have developed highly inaccurate ideas about the process by which the United States admits Syrian refugees. In the wake of Trump’s executive order, the need for clarity surrounding this issue is greater than ever. This paper takes the form of an intelligence assessment that seeks to explain the refugee admissions process in detail, as well as to weigh the positive and negative consequences of alternative policy options. Based on this assessment, it argues that when the Trump administration reviews the refugee admission process, it will discover that, while the admission of Syrian refugees can never be without risk, the process is thorough enough that the risk is extremely low. Additionally, when the risks of Syrian refugee admissions are weighed against the potential consequences of this order for international relations and the global fight against terrorism, it is clear that an unqualified refusal to accept Syrian refugees could actually harm the national security interests of the United States.

**A11. The Opportunity for Insurgency in the Sudanese Civil Conflicts**  
Caroline Caywood; Faculty Mentor: Dr. Ivy Hamerly  
*Department: Political Science*

This presentation analyzes the claim asserted by James Fearon and David Laitin in their article "Ethnicity, Insurgency, and Civil War" that looking at characteristics which allow opportunity for insurgency in a state are the most essential factors in determining the likelihood of a civil conflict outbreak. The civil wars in Sudan and South Sudan are employed as case studies to which this theory can be applied. After applying the theory to the violence in Sudan and South Sudan and looking at the presence of insurgency risk factors in the case study, this paper will determine the veracity and ability of Fearon and Laitin's claim to predict civil violence outbreaks.
A12. Police Oversight for Beginners: A Comparison of Two Agencies
Aaliyah Thomas; Faculty Mentor: Elizabeth Cano, JD (Research Conducted in Washington, D.C. at American University- Baylor in Washington Program)
Department: Pre-Law/Political Science

In recent years, increased attention to negative police and community interaction has led to realization that poor relationships of the past have not improved. Community dissatisfaction stems from decades of perceived lack of police accountability. Though complaints are investigated in internal affairs, communities believe justice is improperly served. Because local governments need the cooperation of the police and the community to maintain safety, this perception creates a need for civilian oversight of the police. Although police oversight in the U.S. dates from the 1920s, there is not a consensus of what characteristics lead to an effective agency. The purpose of my research is to analyze how practices of police oversight agencies impact the police-community relationship. To study this, I conducted a case study on Washington, DC which has established two agencies in the past twenty-one years. The first, Citizen Complaint Review Board (CCRB), was abolished for ineffectiveness, and the second, Office of Police Complaints (OPC), is one the most successful agencies in the nation. To discover what contributed to the success and failure of police oversight in DC, I participated in investigating complaints, conducted interviews of OPC employees and police officers, analyzed literature, and attended local hearings. I then compared the strengths and weaknesses of both agencies, and I found the differences in structure and statutory authority were the main components that made OPC more effective than CCRB. Though my findings cannot be generalized due to Washington, DC’s uniqueness, it can assist local governments considering establishing police oversight.

Monday 2:00 p.m. Session Five – White Room

A13. A Catalogue of Rediscovered Ancient Oil Lamps
Joseph Brennan and Sara Beth Burch; Faculty Mentor: Dr. Nathan Elkins
Department: Art

In Fall 2015, eight oil lamps were discovered in the office of Dr. Jeff Fisher in Baylor University’s Department of Classics. Nothing was originally known about the lamps. We studied these eight lamps, four for each of us, for Dr. Elkins’ Roman Art class in the Fall 2016 semester. We researched the imagery, periods in which they were produced, possible centers of production, and the history of oil lamp development. We determined that these lamps were made in various regions across the Roman Empire. The earliest lamp is possibly from the late first century BC, and the latest lamp is possibly from the sixth century AD. The lamps also possibly span as far east as Alexandria, as far west as Tunisia, and as far north as Italy.
A14. Are You Standing Before the Lion, or Behind It? Lion Iconography in Iron Age II Israelite and Judahite Seal Impressions
Payton Hanby; Faculty Mentor: Dr. Deirdre Fulton
Department: Religion

The Judeo-Christian tradition is rife with references to lions and leonine qualities, both in textual and in archaeological evidence. In the Hebrew Bible, there are over 200 references to lions and leonine qualities, thus suggesting the lion as a significant cultic symbol for the ancient Israelites and Judeans. Moreover, the archaeological evidence reveals that the lion was a favorite motif on stamps and stamp seals (*bullae*). Scholars offer many different interpretations of these leonine depictions, but when looking at *bullae* depicting lions from the 8th century BCE in both Israel and Judah, the lion as the sole motif of a work is believed to suggest monarchal majesty. However, this interpretation is unlikely when one considers contemporaneous passages from Amos and Isaiah that depict YHWH as an all-powerful and fearsome lion. My paper argues that the use of lions in textual and archaeological evidence in the context of ancient Judah and Israel was meant to depict the power of the LORD (YHWH).

A15. Yahwistic Names and Economic Success of Judean Exiles in Babylon
Charlie Campbell; Faculty Mentor: Dr. Deirdre Fulton
Department: Religion

In 597 BCE, Babylon invaded the southern kingdom of Judah, exiling Jehoiachin and members of his court to Babylon. Eleven years later, the kingdom of Judah fell entirely, and more Judean exiles were taken captive to Babylon. There is significant published archaeological evidence from specific legal documents uncovered in Babylonia that note the names of the people involved in trades and business. Ran Zadok, who has studied these documents and the names therein, examines the more than 20,000 documents. Zadok forms a model that analyzes names, specifically examining the language group they are from (Akkadian, Hebrew, West Semitic, etc.) as a marker of ethnic identity, he creates a picture of foreign life in Babylon. However, his study not include the recently published documents from āl-Yāḫūdu (“Judah town”), a settlement outside of Nippur, which includes a greater percentage of Yahwistic and West Semitic names, including Ahiqam (“my brother has established”), a second-generation Judean exile. The documents shines a clearer light on the lives of the Judeans in exile and reveals that the Judeans were conducting minor business dealings with the Babylonians almost immediately upon their arrival in exile, and they were able to expand their business and amass a certain wealth within the span of a single generation. As my research on the āl-Yāḫūdu documents highlights, Hebrew, specifically Yahwistic, names were not confined to the bottom of the witness list in this corpus, as Zadok suggests, nor were they rarely present as principal actors. The presence and orthographies alone suggest a Judean population that is roughly ten times larger than Zadok’s estimation based on earlier legal documentation. The new evidence from the āl-Yāḫūdu Tablets reveals that Judean exiles were far more prevalent in Babylonian society that the previous legal documents suggest.
Monday 2:00 p.m. Session Six – Houston Room (3rd Floor)

A16. Fear, Humility and Variance in Meaning in Exemplum XV
Macy Mize; Faculty Mentor: Dr. Paul Larson
Department: Modern Languages and Cultures

In the collection of short stories known as *El conde lucanor*, each exemplum works within the narrative frame to convey a moral lesson. Although it is widely accepted that this work was written for didactic purposes, interpretations of each exemplum vary in meaning. The traditional view holds that the work was written to teach nobleman of the fourteenth century how to act with humility, while modern approaches see each exemplum more openly, placing the task of interpretation on the modern reader. Exemplum XV is a unique illustration of the complexity of *El conde lucanor*, as the moral lesson conveyed relies on the reader to interpret its hidden instruction. The lesson in the story is to maintain control and not let fear get the best of you, which can be seen as a lesson to nobleman on how to be better men, specifically counsel for acting with humility, and can also be a source of advice for modern readers today. This paper will examine the lessons of Exemplum XV, questioning the slippage between Patronio’s tale and the lessons he would impart through it.

A17. On the Question of Leisure
Rachel Sangster; Faculty Mentor: Dr. Paul Larson
Department: Modern Languages and Cultures

This paper discusses the 16th story of The Count Lucanor written in the 14th century by the Spanish noble, Don Juan Manuel. In this story, the main characters of the count and his advisor, Patronio, discuss the count’s proposition that he should relax and enjoy life’s pleasure. This paper seeks to interpret how the balance between work, leisure, and sloth is conceptualized by Patronio and the count. The paper begins by defining the significance of work, leisure, and sloth and proceeds to discuss the necessary balance that should be obtained between work and leisure so as to avoid sloth or overworking. Finally, the paper discusses the importance of the moral of the story in context of the culture of 14th century Spain as contrasted with its meaning to modern readers of the 21st century.

A18. Short Term Missions, Language Proficiency, Long Term Impacts; a Guatemalan Case Study
Megan Boyd; Faculty Mentor: Dr. Alex McNair
Department: Modern Languages and Cultures

Three years ago, I went to Guatemala with the organization Hope Renewed International (HRI) as a short term missionary with limited Spanish knowledge. This past summer, I spent a semester as an intern for HRI. I organized and led American short term mission (STM) teams roughly every 14 days. Through this, I saw how STMs fall into the “big picture” of missions: how STM teams fall into the larger operations of mission work in Guatemala, and how STM teams affect Guatemalans and their communities. I worked alongside people from all walks of life, both Guatemalan and American, and learned colossally from their insights. I witnessed the interactions and perspectives of many STM teams as well as the often unexpected impact each team left behind. I have pondered my own change in perspective, a change in perspective facilitated by my deeper grasp of the Spanish language which allowed me to truly listen to many different voices. I now would like to contribute the perspective gained through this experience to the larger discipline of missiolo-
gy. I will share both my perspective and the perspectives of the people I worked with while participating in missions. I hope this contribution will provide insight into how STM teams and their organizers can maximize their positive impact while participating in the mission. I first will emphasize the significance of language skills among missionaries of foreign language-speaking countries. I then will address psychosocial issues that should be taken into consideration before planning a short term mission trip.

Monday 2:00 p.m. Session Seven – Claypool Room (3rd Floor)

A19. Moderate and Militant Suffrage
Josie Halozan; Faculty Mentor: Dr. Coretta Pittman
Department: Professional Writing

The battle for suffrage was hard-fought over the course of many years by many different groups of women. In the latter half of the 1910s, the movement was fraught with conflict between the National Woman’s Party (NWP), a radical group which piloted the militant protest methods that are commonplace today, and the National American Woman’s Suffrage Association (NAWSA), a moderate organization which advocated for suffrage on a state-by-state basis through education and polite debate. The two organizations clashed fiercely in their methodology, but the 19th Amendment was passed thanks to the combination of both moderate and militant protest methods. Today, in a time where America’s political climate is notably contentious, there is still a place for both moderate and militant activists: militant activism allows the voices of the oppressed to be heard, while moderate activism calmly explains the activists’ positions to those willing to listen.

A20. The Glass Ceiling
Claire Crites; Faculty Mentor: Juliet Brown, MA
Department: English

Last semester I conducted a research paper that analyzes the reasons for the existence of the glass ceiling in 21st century corporate America. My thesis is broken into two parts to address two of the most significant reasons for the existence of the glass ceiling in 21st century corporate America. The first part of my research paper expresses how gender stereotypes and stigmatization affect professional networking and the availability of promotions for women. Gender stereotypes are discussed and defined, and psychological research from scholarly sources convey how these often unconscious stereotypes hinder the advancement of women in the workplace. The second part of my paper conveys how faulty maternal leave policy enables salary discrimination and the gender wage gap. An analysis of what the current American maternal leave policy is given, which is followed by the effects of this policy on women in corporate America. Maternity leave most significantly impacts the gender wage gap, and research from scholarly resources are provided to prove this. The conclusion summarizes the argument as well as expresses gender double standards in 21st century America, and hints to the solution to the glass ceiling through changing workplace attitudes and increased mentorship for women in the workplace.
A21. Hopeless Wanderer: Fashion as an Expression of Self by Music Festival Attendees
Taylor Tucker; Faculty Mentor: Dr. Lorynn Divita
Department: Family and Consumer Sciences - Apparel Design and Merchandising

“Coachella sets the trends that are likely to dominate festival fields this summer” (Berrington, 2016). Music festivals around the world such as the Coachella Valley Music and Arts Festival in Indio, CA, South by Southwest in Austin, TX, and Glastonbury in England have experienced significant popularity in recent years. One of the hallmarks of these events, aside from the headlining bands and artists, is “festival fashion”: the vast array of clothing and accessories attendees wear which have an inevitable impact that influences mainstream fashion. Festival fashion is in constant change, and due to the Zeitgeist that defines how ideas and events are absorbed into our culture, what is considered fashionable is in flux. Magazines and “street-style” photographers flock to festivals to observe cool young people and to see what the newest, upcoming trends will be, thus inspiring “style tribes” from around the globe to adopt everything from Native American headdresses to Bindis worn traditionally by Hindu and Jain women. The problem of culturally appropriating elements from differing countries or religions is the blatant disregard to the historical and symbolic importance of that culture (Schilz, 2016). This research project examines trend frequencies through a fashion count of fashion media on Coachella combined with observational research taken outside a major music festival on March 18th in Austin, TX. The implications of this research is that young people are trend setters and their influence trickles up into mainstream fashion resulting in high demand from retailers and consumers.

Monday 3:30 p.m. Session One – Baines Room

A22. The Impact of Chinese and Japanese Heads of State on the Senkaku Islands Dispute
Parker Walton; Faculty Mentor: Yoshiko F. Gaines, MA
Department: Modern Languages and Cultures

The Senkaku Islands are eight small, uninhabited rocks that lie in between China and Japan in the East China Sea. Since the end of World War II the islands have been under effective Japanese control, although China has a claim on them as well. The resulting territorial dispute surrounding the islands, once a point of quiet disagreement between the two countries, has rapidly evolved into their biggest geopolitical point of contention within the last five years. The purpose of this research was to examine what caused this volatile shift, specifically as it related to changes of government in both countries between 2009 and 2012 as well as from 2012 to present. I specifically analyzed the similarities and differences in foreign policy between Chinese President Hu Jintao and the Democratic Party of Japan and their three Prime Ministers between 2009 and 2012 as well as between President Xi Jinping and Shinzo Abe, who is a member of the currently-ruling Liberal Democratic Party and the Prime Minister of Japan since 2012. I also examined the involvement of Shintaro Ishihara, an erratic far-right nationalist and the governor of Tokyo from 1999 to 2012. What I found was cohesion in foreign policy between President Hu and the Democratic Party of Japan, and almost compete incoherence in foreign policy between President Xi and Shinzo Abe. The dispute’s primary “tipping points” were the similarly-timed elections of Xi and Abe in 2012 as well as Ishihara’s attempt to nationalize the Senkaku Islands earlier in the same year.
A23. The Effect of Parental Leave on Fertility Rates
Taylor Demons; Faculty Mentor: Dr. Ivy Hamerly
Department: Political Science

Fertility rates have been declining since the early 1960s. Consequently, many developed countries have dipped below the “very low” fertility rate of 1.5 children per woman. While most would speculate that longer maternity leave periods would help increase the average number of children a woman has, in actuality, the opposite is true. Gender equity within the work force and the home is a better indicator of modern fertility rates. In my presentation, I will address institutionalized equity within the labor force and societal norms regarding equity within the home. I define gender equity as the sense of fairness women feel towards pursuing a career and bearing children while competing with their male counterparts. I found that states that utilized the complementarianism model of gender equality had lower fertility rates than states that valued equity. I measured equity by examining institutionalized policies such as maternity, paternity, and parental leave, as well as compared the rate of male participation in household duties traditionally viewed as feminine. I found that although institutionalizing gender equity is important, it is more important that gender equity becomes a societal norm. The Cyprus case demonstrates that though parental leave can exist, if society functions on the complementarianism model, legislation will not have a significant impact on fertility rates. On the other hand, when gender equity within the home becomes a societal norm, fertility rates increase.

A24. The Longest Ride: Alexander Pushkin and "The Bronze Horseman"
Charlotte Stoltzfus; Faculty Mentor: Dr. Adrienne Harris
Department: Modern Languages and Cultures

This paper examines Alexander Pushkin’s epic poem The Bronze Horseman and how it has been utilized in a variety of cultural contexts, from propaganda in the Soviet Union in the mid to late 20th century, to romantic fiction in the United States in the 21st century. This paper explores how the Soviet government incorporated Alexander Pushkin into Soviet mythology, how his poem The Bronze Horseman became a cornerstone of the Soviet curriculum for youth, and a tool the Soviet government used to communicate its ideological messages. This paper also explores how a modern Russian-American author, Paullina Simons, used The Bronze Horseman to inspire her series of epic romance novels set in World War Two. I used two types of resources in researching this paper: 1) primary sources including The Bronze Horseman, and the trilogy of the same name written by Paullina Simons and 2) secondary sources from the scholarly communities of Russian literature and Soviet studies. This paper argues that The Bronze Horseman is a unique achievement in literature because it inspired such a broad variety of people, from politicians to authors, who in turn used it to create multiple forms of art, from propagandistic illustrations to commercial American literature.
Monday 3:30 p.m. Session Two – Beckham Room

Session conducted in French

A25. Le Rôle de la Résistance française pendant les débarquements du Jour-J
Caroline Caywood; Faculty Mentor: Dr. Richard Duran
Department: Modern Languages and Cultures

This presentation will look into the role played by the French Resistance in the D-Day landings on June 6, 1944. I will analyze who the key players were, as well as their methods and the impact that their actions had on the invasion of Normandy.

A26. La Convergence linguistique du français métropolitain et québécois
Kelsey LaFreniere: Faculty Mentor: Dr. Mike Boerm
Department: Modern Languages and Cultures

Beneath the superficial differences in pronunciation between metropolitan (or mainland) French and the French spoken in Québec (Eastern Canada), the two variants are unexpectedly similar in structure. Moreover, French spoken in Western Canada resembles mainland French not only in grammar but also in pronunciation; this finding further supports a theory of a surprising modern convergence between the linguistic situations of the two countries. The aim of this paper is thus twofold: to examine the geographic and demographic origins of Canadian French, and to offer answers as to the reason for the unexpected similarity between the two variants on separate continents.

A27. L’Ascension du Front National: une France de plus en plus divisée
Steve Kemgang; Faculty Mentor: Dr. Richard Duran
Department: Modern Languages and Cultures

The most notable political parties in contemporary France are Lutte Ouvrière, the Communist Party, the Socialist Party, the Democratic Movement, the Republicans and, last but not least, the Front National. This paper analyzes the causes of the rise of the Front National, with particular emphasis on the 2005 riots in Clichy-sous-Bois, where the killing of two young males of immigrant descent by police led to two nights of violent protests.
A28. The Role of Women in *La Comedia Nueva o el Café*
Lauren Graham; Faculty Mentor: Dr. Frieda Blackwell
*Department: Modern Languages and Cultures*

The Eighteenth century saw a shift towards more liberal ideas as a result of the Enlightenment and a focus on the education of all. The Neoclassical movement fought against the Baroque norms and emphasized greater simplicity and a more didactic role for literature. Leandro Fernández de Moratín in his dramatic comedy, *La comedia nueva o el café* (1792), presents the idea of women participating in education through the personas of doña Marquita and her sister-in-law, doña Augustina. Moratín uses these two characters to demonstrate the contrast of traditionalists’ views of women’s roles and their education and a neoclassical or Enlightenment education emphasizing utility. This contrast is apparent in the conversations between doña Mariquita, the more liberal, and doña Agustina, the more traditional, in her conversations with her fiancé, the classical scholar don Hermogenes, as well as the innovative use of a woman to express ideas about education. As readers reflects on this drama, they can see Moratín’s hope for what Spain can become but also a glimmer of hope for what a woman could become.

A29. Emilia Pardo Bazan
Marianne Sullivan; Faculty Mentor: Dr. Frieda Blackwell
*Department: Modern Languages and Cultures*

Emilia Pardo Bazán, an inspired Spanish writer of the early Nineteenth century, gaining her initial success in critical literature focused predominantly on exploring women’s transitioning roles in society. During the mid-Nineteenth century, both realism and naturalism rose to become the new dominant esthetic movements which revolved around exploring a more realistic view of the world, the importance of the middle and lower class, and a calling for social revolution. Writers like Pardo Bazán, are successful in using their female characters to personalize these changes to demonstrate to her readers the transitions occurring in society during the later Nineteenth century. In her short stories, “El encaje roto” (1897) and “Champagne” (1898) Bazán uses her female characters, who were in engaged and for a variety of reasons do not go through with their plans for marriage, to criticize social traditions, to argue subtly for female changes in gender role and stereotypes, and to impulse the need for social revolution to change women’s roles under the patriarchy.

A30. Physical and Social Ailments in “El revólver” by Emilia Pardo Bazán
Kelsey Landrum; Faculty Mentor: Dr. Frieda Blackwell
*Department: Modern Languages and Cultures*

Known as a pioneer in nineteenth century Spanish feminism, naturalism, and realism “who vigorously, yet cogently advocated the case for women” as critic Giles affirms, Emilia Pardo Bazán is regarded as one of Spain’s most famous authors and earliest advocates for women’s rights (Giles 356). Many of her works entail feminist themes that were scarce in her time and argue for greater female agency. In her short story, “El revólver” (1895), Emilia Pardo Bazán uses a realistic and natural esthetic to shed light on the state of women in Spanish society without using words that directly criticize Spanish tradition. The story is more than that of an abused, silenced and trapped woman; it is an expression of a
a Spanish society dominated by men. Bazán contrasts physical and social ailments, uses one character’s relatable daily life, and describes the physical and psychological state of an abused spouse to invite the reader to consider the significance of what it means to be a man or woman in nineteenth century Spain and to demonstrate the necessity of social change to protect women from domestic abuse.

Monday 3:30 p.m. Session Four – White Room

A31. Magnetostratigraphy of the Lower Paleocene Upper Nacimiento Formation, San Juan Basin, New Mexico
Tyler Leggett; Faculty Mentor: Wayne Hamilton, MS
Department: Geosciences

Lower Paleocene alluvial foreland basin deposits of the Upper Nacimiento Formation in the San Juan Basin, New Mexico contains an excellent record of early Cenozoic mammalian evolution. The Nacimiento Formation contains a record of early Paleocene faunal mammalian faunal dynamics, and a significant faunal turnover of therian mammals is found between Tj5-Tj6 biozones. The Tj5-Tj6 faunal turnover is best documented at three locales across the basin: Torreon West, Torreon East, and Kutz Canyon. However, to understand the possible causes of the turnover and to determine if it occurs synchronously across the basin, high resolution geochronology is needed from all of the locales. Previous magnetostratigraphic analyses at Torreon East and Torreon West indicate that the Tj5-Tj6 transition occurs near the top of the subchron C27r. However, a detailed magnetostratigraphic study of the Tj5-Tj6 interval has not been conducted at Kutz Canyon limiting our ability to correlate the section, and thus the record of faunal turnover, to the Torreon East and West locales. Kutz Canyon is located near the center of the San Juan Basin and contains one of the thickest outcrops (~65 m) of the Tj5 – Tj6 interval, and thus a key section for reconstructing the paleoenvironment and paleoclimate through the Tj5-Tj6 transition. In this study, we construct a local polarity history of the Kutz Canyon strata. This will be done by running samples collected at this site through a magnetometer to measure the direction of the poles, which will be used to develop a precise age model for the section to constrain the ages of the biozones and to correlate it to the Torreon East and West sites. About 100 samples from each site has been collected by hand, and high temperature susceptibility measurements indicate titanohematite and titanomagnetite are the dominant magnetic minerals present in the deposits and demonstrate the suitability of the sediments for magnetostratigraphic analyses. Preliminary polarity stratigraphy for the section indicates an ~35 m thick interval of normal polarity bracketed by intervals of reversed polarity, which we correlate to subchrons C27r, C27n, and C26r of the geomagnetic polarity time scale. The development of this local polarity stratigraphy for Kutz Canyon indicates that it is correlative to the Torreon East and West sections and suggests that the Tj5-Tj6 faunal turnover is synchronous across the San Juan Basin.

A32. Liquid Metal Batteries – Grid Scale Energy Storage
Jackson Liller and Jessica Cramer; Faculty Mentor: Dr. Scott C. James
Department: Geosciences

The Green Energy movement has led to calls for higher use of renewable energy sources; however, renewable energy sources are prohibitively more expensive to deploy on the scale of municipal power grids than current energy technologies such as natural gas turbines. Because renewable energies such as solar and wind power are only available intermittently it is necessary to store the excess power generated during peak times for use during slumps in generation. Several
solutions to this storage problem have been suggested and implemented with varying success, however the efficiency of these methods is generally considered low and other considerations limit the deployment capability of these solution methods. Batteries seem like the obvious solution; however, current battery technologies are limited in their long-term effectiveness for grid-scale power storage because the cells of lithium-ion batteries deteriorate with each discharge and recharge. The proposed technology of liquid metal batteries aims to overcome this limitation in traditional batteries by using self-segregating liquid salts and metals as anode and cathode components which will revitalize the cell after each discharge and recharge as opposed to deteriorating the cell. If successful, liquid metal battery technology would increase the efficiency of stored renewable energies and revive competition in the energy sector between renewable energies and non-renewable energies.

**A33. Non-Destructive Inspection Approach Using Ultrasound to Identify the Material State for Amorphous and Semi-Crystalline Materials**

Elliott Jost; Faculty Mentor: Dr. David Jack  
*Department: Mechanical Engineering*

At present, there are many methods of identifying temperature and phase of a material. However, most current methods have disadvantages such as requiring physical contact or visual line-of-sight. This work presents a method of nondestructive inspection using ultrasonic wave technology that circumvents these disadvantages to identify phase changes and infer the temperature state of a material. Through the use of ultrasonic inspection, this information can be determined without physical contact or visual sight of the material. Through an experiment of melting wax and measuring time of flight using ultrasonic inspection a method has been developed to relate a material’s speed of sound to temperature of the tested material, resulting in an ability to identify phase changes. This research has direct applications in many industries, including oil and gas, food and beverage, and polymer composites, as well as many implications for future capabilities of nondestructive inspection.

**Tuesday 2:00 p.m. Session One – Baines Room**

**A34. Marine Protected Areas: A Case Study of Hong Kong and the United States' Management of Marine Environments**

Mark McComb (Baylor University), Chiu Lok Yi, Fung Yu, Wong Tsz Chiu, Yiu Hoi Tin (Hong Kong Universities); Faculty Mentor: Dr. George Cobb  
*Department: Environmental Science*

With global climate change and human activities threatening ecosystems around the world, marine areas have become crucial environments on which to focus protection and conservation efforts. These delicate ecosystems are home to some of the world’s most biodiverse plant and animal communities providing local economies with increased development from ecotourism and other recreational activities. However, these marine environments are constantly facing threats such as ocean acidification, pollution, overfishing and by-catch, and impacts from infrastructure developments such as effluent discharges and construction. In order to mitigate these effects, governments establish protected marine areas within their respective coastal borders. Hong Kong and the United States have implemented different legislative pathways designed to protect sensitive marine areas. A critical analysis of both countries’ management practices high-
lights their respective achievements and shortcomings. Reflection on the political processes and legislation that creates their respective marine protective areas plays an important role in the management of these ecosystems.

A35. Natural Resource Management of Designated Park Areas on an International Scale: A Case Study of Hong Kong and the United States
Abbey Jones; Faculty Mentor: Dr. George Cobb
Department: Environmental Science

The Global Environmental Leaders Program hosted at HKBU in Hong Kong, offered students valuable insight of natural resource management methods at the international scale. Similar to the United States, Hong Kong has reserved a considerable amount of land, approximately 40%, for public use and conservation. Hong Kong has designated these areas as nature reserves and country parks. A country park designation is comparable to the United States’ designation of a national park. Students who participated in the program conducted research, which focused on the allotted park areas of the United States and Hong Kong, and how both authorities manage their recreation and preservation areas in terms of sustainability. The goal of the research was to demonstrate the necessity of evaluating development efforts and management strategies and the advantages of communication and constructive criticism on an international scale.

A36. Solid Waste Can be a Resource for Urban Developments
Bruce Jurss (Baylor), and Leo Chu, Ella Hui, Ida Lau, Shirley Tsui (Hong Kong Universities); Faculty Mentor: Dr. George Cobb
Department: Environmental Science

Our research finds a solution for the Municipal Solid Waste problems in the United States and Hong Kong. Throughout our research solutions show how recycled waste can be used as a resource for urban environments. Most waste consists of highly recyclable materials than can be used alternatively. Our research explores where the waste is coming from, what kind of waste is being produced, and how it can be used better. Research from international sources provided information that helped determine our solution. During the discovery process, the following breakdown of Municipal Solid Waste sources in the United States was found: 5.2% wood, 5.9% glass, 10.4% food wastes, 9.4% plastics, 7.7% metals, 13.4% yard waste, 38.1% paper/paperboard, and 9.9% other waste. The 10.4% of food waste and 13.4% of yard waste can be utilized through composting in order to produce fertile soil that can be used to grow a variety of agricultural products in and around urban environments. Landfills in Hong Kong and the United States generate a byproduct of methane in large amounts that is detrimental to the atmosphere; however, the methane may be converted into power when pushed through a special generator that can be used by cities to power developments. Additional power produced from landfills, can be further applied to recycle plastics and papers perpetually that reuses existing waste to manufacture new products for large populations. This minimizes the overall environmental impact of existing waste. These discoveries can be further explored to find a better use for food waste along with methane to power the facilities that recycle the waste and sustain urban living environments. All in all, there is still a lot of work to be done, but there is much potential for solid waste to be a resource for urban developments.
Tuesday 2:00 p.m. Session Two – White Room

A37. Modern Day Segregation: Informal Segregation and Silva’s Proposed Tri-Racial System in Baylor University Dining Halls
Tyler Rutherford and Sean Lavoie; Faculty Mentor: Dr. Kevin Dougherty
Department: Sociology

The purpose of this research is to observe the racial dynamics of campus dining halls at Baylor University. Data collected will be used to confirm or deny the Bonilla-Silva’s proposed tri-racial system within the bounds of the Baylor University campus dining halls. The hypothesis is that the data will support Bonilla-Silva’s tri-racial system. In order to accomplish this study, multiple mealtimes at each Baylor dining hall over a period of three months were recorded. Each time a dining hall was observed, the racial makeup of each table that had two or more people sitting at it was collected. In the findings we discovered that Baylor University’s dining halls are informally racially segregated, with different races sitting with people who look like them. When we take an aggregate of the data, we find that one dining hall in particular had a higher percentage of diversity than the other three.

A38. My Brother’s Keeper: Healthcare Experiences of the Poor in One Texas City
Matthew Mulloy; Faculty Mentor: Dr. Kevin Dougherty
Department: Sociology

Access to healthcare is an important issue in the United States. The purpose of this study was to explore ways in which individuals living under the federal poverty line experience negative interactions with the healthcare system. I interviewed 11 individuals in the Waco area who are currently living under the federal poverty guideline. Answers were recorded and analyzed. Common themes amongst the participants included (1) financial insecurity combined with a lack of health insurance discouraged individuals from visiting a healthcare provider, (2) inadequate transportation to a healthcare establishment, (3) feelings of disrespect when receiving treatment from healthcare professionals, and (4) difficulty following up with treatment. In conclusion, the problems that arise in the healthcare system regarding the treatment of individuals living in poverty cannot be attributed solely to lack of funds.

A39. The Efficacy of Child Life Programs: Parent’s and Sibling’s Perspectives
Sarah Pitman; Faculty Mentor: Dr. Joyce Nuner
Department: Family and Consumer Sciences – Child and Family Studies

Child Life Programs in hospitals work with patients and their families to lower stress and educate families about their healthcare experience; however, Child Life Specialists and their Programs are not offered in every medical setting. This study utilizes a case study method to explore the impact of Child Life Programming from a sibling and parent perspective, or what happens when Child Life is not offered. In-depth, semi-structured interviews with sibling and parent dyads about their hospital experiences. A theoretical framework of Family Resilience Theory and the idea of disenfranchised grief describe the processes of grief, bereavement, and the ways families cope through different types of grief. Although we will never know what could have been different with or without Child Life in specific circumstances, this study illustrates the importance for grief-informed and developmentally appropriate interventions in a hospital setting for holistic care for parents and siblings while their family system experience stress and grief during diagnoses, treatment and death.
Tuesday 2:00 p.m. Session Three – Fentress Room

A40. Don Juan & Don Gonzalo as Abettors: A Critique of Masculinity in “El Burlador de Sevilla”
Katerina Levinson; Faculty Mentor: Dr. Paul Larson
Department: Modern Languages and Cultures

This paper treats the characters of Don Gonzalo and Don Juan and the male-dominated society that they represent. Acting in a hypocritical society which pays lip-service to the virtues, and, particularly to honor, Don Gonzalo breeches society’s own standards for virtue through his patriarchal role. He perpetuates the actions of Don Juan, who rebels against the traditional conception of masculinity. Don Juan, in turn, acts as a foil to Don Gonzalo, bringing out the most authoritarian self that Don Gonzalo has to offer. Don Juan seeks to destroy the very moral order of society through his sexual exploits in order to imprint his own definition of masculinity. Both Don Juan and Don Gonzalo are guilty of wronging women in the end. Tirso de Molina critiques his own society through these characters; and if Golden Age Spain is culpable of this, what are the implications for our own society?

A41. The Social Sins of Don Juan Tenorio in “El Burlador de Seville”
McKenna Middleton; Faculty Mentor: Dr. Paul Larson
Department: Modern Languages and Cultures

The character, Don Juan Tenorio, from the Tirso de Molina’s Spanish comedia "El burlador de Seville," is often stereotyped for his seductive nature and uncanny ability to manipulate women into sleeping with him. Such a superficial reading of the Spanish Siglo de Oro play, however, dismisses the true sin of Don Juan, which is the anarchic disruption of the social order. Don Juan “seduces” several of the patriarchal authority figures present in the drama in order to carry out his nefarious activities. Throughout the play, Don Juan subverts the patriarchal constraints of society to his benefit, evidenced in his appeal to the other male characters, his use of verbal contracts, and his ultimate demise at the hands of Don Gonzalo. Molina highlights two distinct sides to Don Juan: one that allows sexual desire to disturb the social order in clear, direct ways and another that subverts the rules of the patriarchal society to his advantage. Don Juan's role as a social offender is confirmed since he is divinely punished for killing a patriarchal figure rather than for raping and deceiving multiple female characters.

A42. Don Juan as a Social Offender in Tirso de Molina’s “El burlador de Sevilla”
Samantha Thorn; Faculty Mentor: Dr. Paul Larson
Department: Modern Languages and Cultures

Passion can be highly addictive and temporarily fulfilling. Famous poet and writer, Federico Garcia Lorca, claimed “to burn with desire and keep quiet about it is the greatest punishment we can bring on ourselves”. Tirso de Molina’s character, Don Juan, is no stranger to unabashedly giving himself over to his carnal desires, especially for the beautiful young women of Spain. In fact, Don Juan’s only mission in life is to steal a woman’s honor (chastity) for his pleasure, feeding his ego and narcissism. Though warned on various occasions by his servant, Catalinón, to repent and stop his sinful behavior, his self-serving, all-consuming pursuit of pleasure ultimately brings about his destruction and death. Throughout his quest for passion, Don Juan hurts everyone he encounters, including himself, leading an empty life as a social offender and serial rapist. Tirso de Molina portrays Don Juan as a bold and brash man, self-confident; Don Juan
is defiant of authority, antagonistic towards death, and unyielding in his pursuits of desire. Molina gives his protagonist an arrogance unrivaled by any other character in Spain’s “siglo de oro,” and perhaps, by any other character in Spanish literature. This paper will detail the socially offensive behavior of Don Juan and how that behavior will lead to his destruction.

**Tuesday 2:00 p.m. Session Four – Beckham Room**

A43. The Influence of Charismatic Christianity  
Harrison Eid; Faculty Mentor: Dr. Joe Coker  
*Department: Religion*

This paper addresses the growth of the Charismatic Movement among evangelical circles. The increasing prevalence of Nondenominational churches has provided a perfect avenue for the influence of charismatic faith practices, and statistics suggest the charismatic faith will grow to be the dominant style among evangelicals. Through analyzing various case studies and surveys of churches, the Charismatic Movement is both defined and tracked through various denominations. Presented is a diagnosis of the current situation of the Church and a prediction for its future. Examining its characteristics and development is an essential task for Christians, as it allows us to prepare a response for what is ahead.

A44. The Controversies of Contemporary Christian Music  
Victoria Adams; Faculty Mentor: Dr. Joe Coker  
*Department: Religion*

Contemporary Christian Music has become more diverse and the genre has spread to several different styles of music. With this widening of artists and styles, questions and controversy start to arise. Which Contemporary Christian Music songs have a theological basis? Which Christian songs should be taken off the radio, and which ones should be added? Should the mainstream artist who mentions God once be considered in the genre of Contemporary Christian Music? These questions all lead to the widely debated topic of what makes Christian music Christian. As the overall Contemporary Christian music genre starts to be broadened, the line between sacred and secular starts to be questioned and defined. This project explores these controversies showing insight on the topic of Contemporary Christian Music and today’s society.

A45. Evangelicals vs. Hollywood  
Dan Hibbs; Faculty Mentor: Dr. Joe Coker  
*Department: Religion*

In recent years, evangelical films have done well at the box office, gaining the attention of the industry. However, these films usually lack many of the attributes of good filmmaking, and so have rightly been criticized by the Hollywood community. This paper will examine the dynamic between evangelical filmmakers and Hollywood, trying to find any tensions that may exist between them and to determine whether there is a “culture war” at the box office. To begin, the
paper will define evangelical films and examine the history of evangelical filmmaking. Next, the paper will look at the reasons, or the need, for evangelical films. Finally, the paper will cover the critical receptions of the three evangelical films—*Left Behind*, *War Room*, and *God’s Not Dead*—to assess the divide between evangelical filmmakers and Hollywood (and their respective audiences).

**Tuesday 3:30 p.m. Session One – Baines Room**

**A46. An Analysis of Hong Kong’s Agriculture**
Madie J. Simms; Faculty Mentor: Dr. George Cobb
*Department: Environmental Science*

Hong Kong is a growing metropolis that has a population of over 7 million people. With this growing population Hong Kong, with the growing population they cannot support their growing population. Therefore, they import most of their produce from mainland China. Due to the limited amounts of agricultural land, Hong Kong has not been able to produce sufficient amounts of food from local agriculture to support their local population. Agriculture in Hong Kong supplies produce as well as providing agriculture education, leisure, and to maintain biodiversity. There are some problems that are effecting agriculture such as limitations of land due to development and illegal dumping. Although agriculture in Hong Kong does not compare to the large-scale agriculture that occurs in the United States, it is still important to maintain local agricultural activities. Many solutions can be proposed including urban gardens, and land utilization, several of these will be discussed in this presentation.

**A47. Comparison of Environmental Education and Engagement Approaches in the United States and Hong Kong**
Brianna S. Jones; Faculty Mentor: Dr. George Cobb
*Department: Environmental Science*

Environmental protection and sustainability are global movements. The education and engagement of the public is imperative to successfully reach environmental goals. With no two countries or regions facing the exact same obstacles, whether it be solid waste management, marine habitat degradation, or air pollution, there is no global standard for solving these issues. Most nations have environmental regulations to maintain various air and water quality standards, but encouragement of the public to take environmental ownership is dependent on regional leaders. In the United States, community involvement is primarily facilitated by cities, private organizations, or nongovernment organizations. There are also significant efforts from larger government authorities. Places like Hong Kong greatly differ in this way. Their environmental education programs are almost completely facilitated and regulated by the government. A comparison of the United States and Hong Kong’s environmental education and engagement programs allow a better understanding on why various global governing entities of various sizes approach public engagement in environmental issues in different ways, and the effectiveness of the methods being used.
Tuesday 3:30 p.m. Session Two - White Room

A48. The Use of Video-Calls in Early Labor Care: Exploring Providers’ Views of the Potential Benefits and Challenges
Sarah Smeltzer; Faculty Mentor: Dr. Mary Ann Faucher
Department: Louise Herrington School of Nursing

Purpose: The purpose of this study is to explore the views of midwives about the potential benefits and challenges of using video calls to assess low risk women in early labor. Methodology: An IRB determination of exempt was received. A convenience sample of midwives in Texas is being recruited through email and a private Facebook page. Guided focus group discussion using open-ended questions will be used to determine perceptions of these care providers about introducing video-calls into early labor care. The focus groups will be audio-recorded. A content analysis of the audio-recorded transcripts will be conducted by 2 researchers to identify codes and themes. Results: A thematic analysis of the focus group discussion will be presented. Discussion: The common practice among many settings is women telephone the maternity unit when they feel that labor is starting, seeking midwifery advice, confirmation of whether labor has started, and information about when they should travel to the unit. Providers must build rapport and make accurate assessments over the phone, without the visual and non-verbal cues they would use in face-to-face care. Alternative means of communication where visual cues could be observed by both women and providers have the potential to improve communication, reassurance, and accuracy of assessment of a woman in early labor.

A49. Testing Prospective Memory Theories with MouseTracker Trajectories
Kiersten A. Scott; Faculty Mentor: Dr. Michael Scullin
Department: Neuroscience and Psychology

Prospective memory refers to remembering to complete a future task, such as remembering to read for a class or to return to the washer at the appropriate time. The Multiprocess Theory states that spontaneous retrieval, or automatic remembering due to environmental cues, initiates prospective memory. Existing evidence for spontaneous retrieval arises from slowed reaction times relative to control items when a prospective memory cue is presented in an unexpected context. However, reaction times only indirectly support cue driven spontaneous retrieval. In contrast, MouseTracker software can visualize cursor trajectories, velocities, and acceleration, thereby providing greater insight into mental processes during cue presentation. In the present experiment, participants learned a word or a non-word decision task by selecting boxes in the top right or left-hands of a computer screen, respectively. They were then instructed to select a third box in the bottom right hand corner if the target words “corn” or “dancer” were present (i.e., prospective memory task). Following a performance phase, participants were instructed either to suspend the prospective memory task for the next phase, or that their prospective memory task was finished. Regardless, the target words were re-presented in the following block. Based upon pilot data we hypothesize that participants will show mouse cursor trajectories toward the prospective memory response during target trials (bottom right corner) in the suspended, but not the finished, condition. Such a finding would provide strong evidence that spontaneous retrieval is the primary method of retrieval for active prospective memory tasks.
Tuesday 3:30 p.m. Session Three – Fentress Room

A50. The Duchess Isabela: The Force that Snares Don Juan
Claire Uhlman; Faculty Mentor: Dr. Paul Larson
Department: Modern Languages and Cultures

In the first moments of *El burlador de Seville* by Tirso de Molina, the Duchess Isabela relinquishes any sense of agency when she becomes a victim of Don Juan’s vicious acts. Objectified and condemned to a life chosen by the noblemen, Isabela has absolutely no control over her own fate. Yet, she is the cause for the noblemen to finally bring Don Juan to his fate. This paper will discuss the lack of women’s agency within the seventeenth century, specifically how Isabela drives the *comedia*’s action despite the noblemen’s dominance over her.

A51. Tirso de Molina’s Doña Ana: A Character Study of a Symbol of Sexist and Classist Influences in Golden Age Spain
Rebecca Voth; Faculty Mentor: Dr. Paul Larson
Department: Modern Languages and Cultures

Tirso de Molina’s medieval drama *El burlador de Sevilla* raises several questions about the role of women in society. The iconic character, Don Juan, in his conquests of women provides ample material from which to draw conclusions about the role of women in Spanish late medieval society. This paper, through a character analysis of Doña Ana, one of Don Juan’s victims, seeks to examine the social differences between Spanish men and women of noble birth, and the impact of Spanish *machismo* on male-female interactions. In Tirso’s work, the manner which the plot surrounding Ana advances without her, the rhetoric used to describe her, as well as her lack of voice in the play suggests that women of noble lineage in Spain were little more than political capital treated as objects without individual agency by men in power. Regardless of Tirso’s position on feminism, his work points out the lack of individual determination for noblewomen as well as the concentration of social and political power in the hands of elite male authority figures.

A52. Don Juan's Damnation Normalizes Misogyny
Delaney Bryant; Faculty Mentor: Dr. Paul Larson
Department: Modern Languages and Cultures

Tirso de Molina’s *El burlador de Sevilla* normalizes the misogynistic tendencies characteristic of 17th century Castilian culture. Molina makes use of weak female characters, the routine seduction of women, and the ultimate damnation of Don Juan due to his sins against the patriarchy, not women, to normalize the misogyny that pervaded Spanish society. In addition to Molina’s own words, the continued use of Don Juan as a trope in other literary works such as *Don Juan Tenorio* and *Don Giovanni* has further standardized the male superiority that Molina presented. The idea of a “Don Juan”, or womanizer, has persisted for hundreds of years and has successfully carried Molina’s ideas of misogyny into the 21st century.
Tuesday 3:30 p.m. Session Four – Beckham Room

A53. A House Divided: An Ancestral Expedition
Sarah Jones; Faculty Mentor: Carol Macaulay, MA
*Department: Anthropology*

The history of the British Isles is littered with numerous occasions of conflict among the neighboring English, Scottish, and Irish. Particularly in the 16th and 17th centuries, these Three Kingdoms’ diversities led to outbreaks of cultural discrimination and religious persecution, thus igniting hostility between the Isles’ inhabitants. Some of the conflict was even expanded to include the developing Americas as emigrants from each kingdom sought out the freedom and opportunity the New World promised. Yet amid the strife, familial ties existed that endured even through the most contentious disputes. “A House Divided” follows the movements of three migrant families and their journeys from the British Isles to the modern-day United States, thereby unveiling the unexpected unity between these divided nations.

A54. Archaeological and Archival Investigations of a Norwegian Farmstead in Bosque County, Texas
Alexandra Smith; Faculty Mentor: Carol Macaulay, MA
*Department: Anthropology*

In 1871, a Norwegian immigrant, Ole F instad, and his family settled near the Norse community in Bosque County, acquired 160 acres of land and built a rock house. For 84 years, the F instad-Bakke family farmed and raised cattle, and eventually built a larger home on the property. Today, the rock house is in ruins, but much has been learned about this family through archival research, archaeological survey and testing, and artifact analysis. This presentation presents information of the on-going investigations at the Ole F instad Farmstead (41BQ335).

A55. “Archaeology and Americanization”: An Archaeological Perspective into the Lives of Norwegian Immigrants in Texas
Johnathan Reed Cooley; Faculty Mentor: Carol Macaulay, MA
*Department: Anthropology*

In 1854, Cleng Peerson, the “Father of Norwegian Immigration to America,” was granted permission by the Texas State Legislature to settle in Bosque County, Texas only forty miles from Waco. In 1859, Peerson bequeathed half of his property to Ovee Colwick, in exchange for a place to live during his final years. The property stayed in the Colwick family until the 1960s. Throughout the fall of 2014 and winter of 2015, Archeological Stewards of the Texas Historical Commission conducted excavations at the homestead in order to find the footprint of Peerson-Colwick residence so that the property could be nominated to the National Register of Historic Places, which did occur on November 24, 2015. This presentation will explore the history of this Norwegian family; describe the artifacts recovered during excavation; and put forth contemporary questions concerning immigration and American identity.
Poster Presentations
Baylor Sciences Building
Session One
March 28-29, 2017
SESSION ONE: Tuesday, March 28<sup>th</sup> and Wednesday, March 29<sup>th</sup>

Baylor Sciences Building – 1<sup>st</sup> Floor

BIOLOGY

B1. Isolation and Purification of Arthrobacteriophages from Environmental Samples

Caroline M Addison, Nirupama T Ancha, Joshua Baker, Thomas Van Eckenrode, Haley BrooksEverroad, Christina A Gaw, Jacob F Hanna, Julia Elizabeth Hawes, Catherine Corinne C Hughes, Alec Michael Ingros, Roshni Trujillo Jaffery, Emily Angela Johnson, Pranav Kapoor, Navya Katragadda, Niharika Koka, Hugh S Mair, Alex A Munoz, Micheal C Munson, Noah Davis Patton, Madison Courtney Powell, Christian Sessa, Andrea Jane Springman, Natalie Celeste Widdows and Daniel Gregory Zeter; Mentor: Dr. Tamarah Adair

Department: Biology

Over $10^{31}$ bacteriophage exist within our biosphere yet they are hardly understood within the scientific community. This experiment was formulated with the intention of increasing the understanding of phage genomics and to help unlock future discoveries within the field of bacteriophage research. A series of isolation, purification and amplification procedures were performed with the intention of isolating a phage from an environmental sample using the host bacterium, *Arthrobacter sp. ATCC 21022*. Twenty-five positive plates were identified following isolation. A series of plaque assays were performed and plaque assays were performed with 3 passages for purification. The samples were amplified to a minimum titer of $10^7$ pfu/ml. Samples were viewed using electron microscopy and DNA was extracted and purified from 9 ml of high titer lysate. The DNA concentration was determined by nanodrop and confirmed by agarose gel analysis. Seven unique samples were archived and four DNA samples were sent to the Pittsburgh Bacteriophage Institute to be sequenced using Illumina Sequencing. These phages, Lore, Shrooms, Nubia, and Caterpillar are now part of the genomic database at phagesdb.org. Using computational programs, the genomes of these samples will be analyzed to identify genes, regulatory elements, and other genomic features.

B2. Genomic Analysis of Arthrobacteriophage Shrooms, Caterpillar, and Nubia

Caroline M Addison, Nirupama T Ancha, Joshua Baker, Thomas Van Eckenrode, Haley Brooks Everroad, Christina A Gaw, Jacob F Hanna, Julia Elizabeth Hawes, Catherine Corinne C Hughes, Alec Michael Ingros, Roshni Trujillo Jaffery, Emily Angela Johnson, Pranav Kapoor, Navya Katragadda, Niharika Koka, Hugh S Mair, Alex A Munoz, Micheal C Munson, Noah Davis Patton, Madison Courtney Powell, Christian Sessa, Andrea Jane Springman, Natalie Celeste Widdow and Daniel Gregory Zeter; Mentor: Dr. Tamarah Adair

Department: Biology

Research in bacteriophage genomics has become more widespread because researchers are realizing the benefits of studying bacteriophage genomes in terms of discovering mechanisms of gene regulation, metabolic pathways, and novel proteins. Arthrobacteriophages are a class of viruses specific to *Arthrobacter species* and include two types: temperate and virulent. During fall 2016, 24 first year Baylor University biology students isolated, purified, and characterized 21
Arthrobacteriophages from soil samples. Of these samples, 4 phage genomic DNA samples were submitted for sequencing. Here we compare one AL Arthrobacteriophage, Shrooms, one AK Arthrobacteriophage, Nubia, and one AU Arthrobacteriophage, Caterpillar. These bacteriophages were sequenced using Illumina sequencing at the Pittsburgh Bacteriophage Institute’s sequencing facility. Using the bioinformatic tools GeneMark, Glimmer, BLAST, HHPred, Phamator and Starterator, potential genes of the bacteriophages were identified and assigned possible functions. A draft of the annotated genomes with their predicted gene products was created after comparing these genomes with other sequenced Arthrobacteriophages. Further research into genomes of bacteriophages may lead to new therapeutic techniques, a useful model for studying evolution and gene regulation and new discoveries in genetics and biotechnology.

B3. UV-B Radiation Exposure and Mutation-Induced Phenotype Differences in *Brassica rapa* Plants

Tim Baumgartner, Jianna Lin, Jake Minter, and Kristin Koch; Mentor: Dr. Marty Harvill

*Department: Biology*

By acting as a mutagenic agent, UV-B radiation significantly influences plant growth, development, phenotype, and reproductive success (Tevini et al., 1989, 1991b). Previous studies have revealed a number of physiological effects of UV-B radiation on a variety of plant species such as reduced biomass, epidermal formation, changes in the ability of crop plants to compete with weeds, decreases in the percentage of pollen germination, and changes in cuticular wax composition (Tevini et al., 1981). These phenotypic alterations are thought to be due primarily to DNA damage, direct photosynthetic damage, membrane changes, protein destruction, hormone inactivation, and signal transduction via a UV-B photoreceptor (Peak et al., 1986). The present study aims to determine the effects of UV-B radiation exposure on mortality, biomass, and height in *Brassica rapa*. An experimental group of 48 *Brassica rapa* seeds were subjected to 21 days of continuous UV-B radiation and standard fluorescent light from the day they were planted. A control group of 48 *Brassica rapa* plants we subjected to 21 days of continuous fluorescent light from the day they were planted. The number of plants, leaves, and plant height were measured in 7 day intervals. Plants in both treatment groups were uprooted and heated for 3 days, starting on day 21. Plant biomass was measured on day 24 when the plants were dry. This study shows that UV-B radiation causes increases in mortality and significant decreases in shoot height along with decreases in biomass in *Brassica rapa*.

B4. The Sustainability of Wisconsin Fast Plants (*Brassica rapa*) in the Middle Bosque and North Bosque Soil Contaminated With Methane Gas

Anmoldeep Singh, Morgan Barnes and Riley Mills; Mentor: Dr. Marty Harvill

*Department: Biology*

Organisms in the Waco Wetlands are exposed to methane gas on a daily basis as their primary water sources, the three Bosque Rivers, are located adjacent to a cattle farm and the wastes from this cattle farm (high in methane concentration) are drained into the North Bosque, Middle Bosque, and South Bosque Rivers. Cattle feces contains a very high concentration of methane. Due to the wetlands being so close to the rivers, the feces end up draining into the rivers whenever it rains. In order to justify these conclusions, Dr. Marty Harvill’s laboratory raised 80 Wisconsin fast plants in soil from the North and Middle Bosque Rivers, consolidating a control group and a treatment group for each river. Analysis of height and infrared radiation displayed correlation between plant height and location as plants grown in soil from the
Middle Bosque River without methane treated water were taller than the plants grown in soil from the North Bosque River without methane treated water. However, a correlation was not found between plant height and treatment. Furthermore, infrared radiation was utilized to assess the overall health of the plant. The infrared radiation method led to the conclusion that plants in the Middle Bosque are able to sustain themselves in methane contaminated environments better as they are located further from the cow farm and yield higher NDVI values (explained in methods and materials).

B5. Effect of Differing Amounts of Nutrients in Waco Wetlands Soil on Growth Rate in Wisconsin Fast Plants (*Brassica rapa*)

Temitope Akinola, Gabriel Cantu-Hilbig, Isabella Cruz and Kristin Koch; Mentor: Dr. Marty Harvill

*Department: Biology*

The purpose of plants in the wetlands is to filter water. Thus, more plants means cleaner water. This experiment was designed to understand the relationship between nutrients in the Waco Wetlands and plant growth. By testing nutrient levels of three different soil samples – from Cells 1 and 4 of the Wetlands and potting soil – before and after Wisconsin Fast Plants (WFP) were grown in them for five weeks, it was observed that one out of five tested nutrients may have had an effect on plant growth. Throughout the experiment, plant height was also measured, and, at the end, biomass was taken. These measurements were evidence that the plants in Cell 4 had a smaller average height than those in Cell 1 and potting soil. Cell 4 also had a decrease in Calcium levels, which could be a contributing factor to its reduced height. Therefore, the soil that initially had the greater amount of nutrients resulted in less plant growth compared to the soil with the lesser amount.

B6. Effects of Macronutrients Found in Laundry Detergent Runoff on *Brassica rapa* Growth

Lenneth Li, Nicholas Brust and Anthony Badra; Mentor: Dr. Marty Harvill

*Department: Biology*

The bioaccumulation of detergents in areas of sewer runoff is inevitable in the foreseeable future; thus, developing an eco-friendly strategy for areas of runoff is important. Given that nitrogen, phosphorus and potassium are three fundamental nutrients found in detergents and are responsible for plant growth, *Brassica rapa* was treated with solutions containing 0.05 M of nitrogen, phosphorus, and potassium fertilizers that had been tested in similar environmental conditions along with a 1% concentration of Tide Ultra laundry detergent. Since nitrogen is the most essential component of the formation of amino acids, proteins and DNA in *Brassica rapa*, it had been hypothesized that the *Brassica rapa* treated with nitrogen fertilizer will promote the greatest plant growth rate in terms of mean plant heights. However, the collected data rejected the hypothesis. The results of the experiment indicated high concentrations of phosphorus promoted the growth of *Brassica rapa* the most. Our results determined that if an abundance of the macronutrient phosphorus were added to laundry detergents, it could potentially be beneficial to plants growing in the areas of sewer runoff.
B7. The Effect of Somatotropin on the Growth and Sustainability of *Brassica rapa*

George Crickard, Gillian Mathews and Alexander Lee; Mentor: Dr. Marty Harvill

*Department: Biology*

The preliminary study was conducted to observe the relationship between somatotropin and the growth and overall health of *Brassica rapa*. The influenced characteristics being measured is plant growth. In this experiment, three varying concentrations of somatotropin were introduced to the *Brassica sp.* and their ecosystems. The *Brassica sp.* were placed in 4 containers in the Baylor Science Building in lab A255. In each container a specified concentration of somatotropin was added to their initial watering to create different ecosystems. The height of each plant was measured on Mondays, Wednesdays, and Fridays over a period of two weeks. At the end of the growing period the biomass was taken to measure the overall health of the plant. The results showed that by adding the somatotropin, the height of the *Brassica sp.* increased and the biomass of all the concentrations are different from each other except for groups 200/20 and groups 2/0.

B8. The Effect of Aspirin on the Growth of the Wisconsin Fast Plant (*Brassica rapa*)

Arham Siddiqui, Stefan Caputo and Kelly O'Connor; Mentor: Dr. Marty Harvill

*Department: Biology*

The goal of this research study was to determine the height, leaf count, and seed count of the Wisconsin Fast Plant when exposed to increasing concentrations of aspirin. Aspirin is known to have salicylic acid as one of its main components, which is related to the growth of plants over time (Vicente and Plasencia 2011). Measurements of height, leaf count, and seed count were observed by comparing the data results from two trials of plant groups, each with one control, one 202.5 mg dosage of aspirin, one 405 mg dosage, and one 810 mg dosage. The control group received 0 mg of aspirin and served as a model for normal plant growth. Seeds that germinated were measured on a biweekly basis and received tap water to maintain proper growth. It was observed that the height and seed count of the control groups in the experiment were significantly different than the plants receiving dosages of aspirin. However, it was found that there was no significant difference in leaf count between the groups of plants. The increased dosage of aspirin in the Wisconsin Fast Plant decreased the height over time and seed count, refuting our hypothesis.

B9. Effects of Burned Tree Ash on the Growth and Development of *Brassica rapa*

Lauren Graham, Laura Licht, and Madeleine Cook; Mentor: Dr. Marty Harvill

*Department: Biology*

The purpose of this experiment is to determine the effects of slow burn versus fast burned tree ash on *Brassica rapa* plant health. Using a cool burn allows for organic material in the tree to be broken down into more accessible compounds for the plant to utilize in its development, such as ammonia and orthophosphate (Knicker 2007). In this experiment, tree ash was incorporated into soil and plant height, flower and bud production, and biomass were taken as data collection. Overall, the plants grown in the soil incorporated with ash had superior growth, biomass, and flower and bud production, but there was no statistical difference between the plants grown in soil with deoxygenated, slow burn, and oxygenated, quick burn, ash. These results suggest that burning does in fact aid in vegetative growth and production.
B10. Effects of Bluegrass and Mustard Seed Plant Ashes on the Health of Wisconsin Fast Plants

Victoria Jenks, Kenzie Gaul and Gregory Ugoh; Mentor: Dr. Marty Harvill

Department: Biology

Various ecosystems depend on periodic fire in order to rejuvenate growth amongst the plant species in addition to bolstering the survival of those species. The process of a controlled burn not only ensures plant diversity, but has the ability to restore nutrients into the soil which will aid the plants. In effect, this experiment employs the methodology of a controlled burn in order to test the effects of differing plant ashes on both the final height and health of successive generations of plants. Despite the initial significant differences in height, in addition to the vast differences in final health, statistical analysis has revealed that there was no significant difference of overall health during the three-week experimentation period. Had the experiment been conducted again, in addition to more samples, time, or resources, significance in overall health may have been uncovered.

B11. Effects of Juniperus Ashei Needles and Schenoplectus Californicus Ash on Brassica Rapa Growth in Potting Soil

Daniel Yoo and Jacob Harder; Mentor: Dr. Marty Harvill

Department: Biology

The periodic burning of plant life is a common practice used to return nutrients to the soil in order for new plants to grow. The objective of this experiment is to evaluate the effects of Schenoplectus californicus (bulrush) and Juniperus ashei (cedar) needle ash on Brassica rapa growth. If there is a substantial difference in plant growth with the addition of Schenoplectus californicus or Juniperus ashei ash, plant ash could be a possible alternative to fertilizers. The ashes of Schenoplectus californicus and Juniperus ashei were mixed into two different soil groups, each containing one type of ash. Brassica rapa seeds were planted in each soil group and the height of the plants was recorded over a 28 day period with biomass being recorded at the end. The ash from Juniperus ashei resulted in taller plants while the ash from Schenoplectus californicus resulted in plants shorter than those in regular potting soil. The findings of this experiment suggest that the ash of Juniperus ashei returns helpful nutrients to the soil that contributes to greater plant height.

B12. Effects of Burn Intensity on Nutrient Composition of Soil and Subsequent Effects on Growth of Brassica rapa

Leslie Allen, Brianna Carmony and Jenna White; Mentor: Dr. Marty Harvill

Department: Biology

This preliminary study was designed to observe the effects of burn intensity on the nutrient composition of potting soil and soil gathered from the Waco Wetlands, as well as the subsequent effects on growth of Wisconsin Fast Plants, Brassica rapa. High and low intensity burns were simulated by baking two samples of each soil type at 290°C and 95°C respectively in a drying oven. Two samples from each soil type remained unburned as a control group, resulting in a total of twelve soil samples, six from each type. The hypothesis was that the soil that experienced low intensity burn...
would perform the best. Nitrogen, phosphorus, and potassium tests were taken each week to observe nutrient levels of each soil. Twenty seeds of *Brassica rapa* were planted in each sample and the average height, leaf count, flower count, and biomass were recorded. As predicted, the soil that experienced low burn produced the tallest plants for both potting and wetland soil. For both soils, the samples that underwent the high intensity burn produced fewer and significantly shorter plants. Both soil types responded in similar ways to the burn intensities, but more research could be done to determine if these trends were consistent across all soil types.

**B13. The Effects of Variance in Burn Intensities on the Biomass of *Oenothera speciosa* Populations**

Valerie Simard, Cailee Adams and Emily Feese; Mentor: Dr. Marty Harvill

*Department: Biology*

This preliminary study was conducted to determine the relationship between burn intensity and growth rates of *Oenothera speciosa*, more commonly known as the primrose. Two trials were completed in this study, with .25 grams of seeds being planted. Each pan had increasing amounts of debris on top of the soil to increase burn intensities. The debris increased at a constant rate of 75 grams with the low intensity pan having 75 grams of debris, the medium intensity pan having 150 grams, and the high intensity pan having 225 grams. The effect of the increasing levels of burn intensity was determined by collecting and measuring the biomass of the foliage that grew in the pans post-burn. The results of this study show that seeds that are planted pre-burn grow best when the burn is at lower intensities. The biomass of the plants that grew post-burn was largest in the pans with the least amount of debris used, and smallest in the pan with the most debris used. This data set does prove the hypothesis, although it is also important to know that of all the trials, the largest biomass was produced by the control group.

**B14. Effects of Various Water Types from Waco on Chlorella Algae Growth**

Erika Barron, Jackie Ssenyonga and Bisma Zulifqar; Mentor: Dr. Marty Harvill

*Department: Biology*

In this experiment, the most polluted of four water environments, taken from the North Bosque River, Middle Bosque River, South Bosque River, and Lake Waco, was determined by measuring growth of Chlorella algae, an absorber of excess nutrient pollutants, such as phosphorus. To execute this experiment, equal amounts of water and soil sediment were collected from each water environment in order to act as mock environments along with a control environment that contains an equal amount of D.I. water. Fifteen trials were set up; three trials per environment. Phosphorus tests and aqua fluorescence tests were done to monitor pollutant levels and algae growth in environments. If a water sample is polluted, then algae growth will occur in that water sample.
B15. Investigation of Methane Gas on the Photosynthetic Rate of Algae

Shayda Ebrahimi and Amy Mpala; Mentor: Dr. Marty Harvill

Department: Biology

This study examines how methane affects the photosynthetic rate of algae. Methane gas was infused into algae (Ankistrodesmus sp.) every 48 hours at various concentrations. An AquaFlor Handheld Fluorometer and Turbidimeter was used to measure the algae’s chlorophyll fluorescence, or the light re-emitted by chlorophyll molecules during return from excited to non-excited states. This chlorophyll fluorescence is an indicator of photosynthesis. The rate of photosynthesis would increase with a healthy, growing population of algae. The addition of Methane was expected to cause a decrease in the photosynthetic rate of the algae. However, the results revealed that time, and not methane, was the factor of greater significance.

B16. Effect of Tetracycline on Ankistrodesmus sp.

Ashley Joos, Sofia Sonner and Latin Amlani; Mentor: Dr. Marty Harvill

Department: Biology

Antibiotics given to livestock enter bodies of water as runoff. Through the study of the effect of tetracycline, a common antibiotic found in cattle feed, the potential effects on Ankistrodesmus sp. can be seen. It is hypothesized, if Ankistrodesmus sp. is exposed to increasing levels of tetracycline, then there will be a decrease in growth. Ankistrodesmus sp. was exposed to varying levels (including a control) of tetracycline. The effect was identified through measuring fluorescence of chlorophyll cells in Relative Fluorescence Units (RFUs). There was a statistical difference between varying levels of tetracycline. Additionally, there exists a correlation between an increase in tetracycline level and an increase in fluorescence and therefore growth. However, further studies must be conducted before a definitive statement can be made on whether tetracycline causes increased growth in Ankistrodesmus sp.

B17. The Effect of Penicillin G. Procaine on Fluorescence of Ankistrodesmus sp.

Vivian Tran, Karla Bautista and Kacee Daniels; Mentor: Dr. Marty Harvill

Department: Biology

Penicillin G. Procaine, a common antibiotic used in dairy cattle, is predicted to impact the livelihood of common green algae (Ankistrodesmus sp.), potentially negatively affecting the biological life and ecosystems dependent on its conversion of carbon dioxide into oxygen. Studies have shown that antibiotics given to animals are an environmental problem because of their inability to be removed through conventional water treatment methods (Rivera-Utrilla et al., 2013). The presence of these antibiotics as runoff into lakes and streams pose a worldwide ecological threat. In this study, an investigation of the fluorescence potential (which measures photosynthetic activity) when suspended in different concentrations of penicillin is conducted in order to conclude whether or not there is any correlation between photosynthetic activity and antibiotic inhibition. This study shows that in response to an increased amount of penicillin in the algae’s respective environment that the photosynthetic activity decreases significantly.
B18. Effect of Thermal Stress on Rifampin Resistance in *Escherichia coli* B
Minwoo Kim, Kristin Koch, Amber Ludtke and Brady Walker; Mentor: Dr. Marty Harvill

*Department: Biology*

This experiment sought to find a correlation, if any, between incubation temperature and resistance to the antibiotic Rifampin, an aminoglycoside, in *Escherichia coli*. One sample of *E. coli* B strain was obtained for this experiment. Cultures, initially grown at 37°C and tested for Rifampin susceptibility, were split into groups according to incubation temperature. The bacteria were then incubated at 37°C (control), 39°C, and 42°C, with three separate trials per temperature to test for changes in Rifampin susceptibility. The cultures were grown continuously in LB broth and transferred to fresh broth frequently to maintain optimal growth conditions. Rifampin susceptibility was measured using the disk diffusion method on sterile Mueller-Hinton (MH) agar plates and the diameters of inhibition were measured in millimeters. After measuring the zones of inhibition and compiling data, statistical significance was found between the size of the diameters at 37°C and 39°C on day 14. However, on day 21, no statistically significant differences were present. Conclusiveness of these results is highly dependent on the number of data points vs time, therefore, more data will need to be collected to solidify these findings.

B19. The Comparative Analysis of Antibiotic Resistance in *Escherichia coli* of the Middle Bosque and Brazos Rivers
Sara Walden and Blake Baerwald; Mentor: Dr. Marty Harvill

*Department: Biology*

This study was conducted to determine if *Escherichia coli* (*E. coli*) present in the Middle Bosque and Brazos rivers has developed resistance to penicillin G and monensin. These antibiotics are frequently administered to treat bacterial infections in livestock and eventually enter local waterways as runoff. Samples were collected from both the Middle Bosque and Brazos rivers. *E. coli* was isolated and tested for resistance against penicillin G and monensin. Our data suggest that *E. coli* from the Middle Bosque River was most resistant to penicillin G and the controlled sample of *E. coli* was the most resistant to monensin.

B20. Study of Difference in Proficiency in Laparoscopic Training Modules Between Undergraduates and Residency Students
Victoria Jenks and Erin Reynolds; Mentor: Dr. Marty Harvill

*Department: Biology*

In recent years, laparoscopic surgery has become more prevalent due to the increased demand for minimally invasive surgery (MIS). MIS has considerably lowered recovery times compared to the previously implemented, more invasive surgical procedures. The rise in the use of laparoscopic surgery in medicine has called for the enactment of training in medical schools. In this study we have formed the type of training modules that would be seen in medical schools to view the performance of undergraduate students who are interested in medicine. Students interested in the course BIO 1V90, “Laparoscopic Study I”, were sent a survey polling their handedness and questions concerning the amount of time spent gaming on an Xbox, Wii, or iPad/iPhone. Forty students who took the survey registered for the 12-week course
that consisted of 2 hours of practice and 1 hour of lecture time weekly. Eight laparoscopic boxes modeled after medical school course criteria were made available for students to practice exercises during practice times. For the entirety of the course students trained on a pegboard exercise using Maryland dissecting forceps, and in the last 9 weeks, an exercise using the Maryland curved scissors was implemented. Student’s proficiency in each module was measured on the amount of time it took them to complete an exercise. The pegboard assessment also accounted for the amount of error made during the exercise. In this study we will evaluate the difference in the performances between undergraduate students and residency students who have been trained on the same modules.

B21. Comparisons Between Male and Female Performances in Laparoscopic Surgery Training

Jordyn Farewell and Mary Taylor Tillman; Mentor: Dr. Marty Harvill

Department: Biology

Laparoscopic surgery is quickly becoming the standard for several different surgical procedures, allowing patients to undergo a minimally invasive operation in place of a more complicated open surgery. Medical residents and physicians must undergo laparoscopic surgery training and complete certain certification requirements in order to become certified in laparoscopic surgery. The goal of this preliminary study was to determine if there is a difference in laparoscopic training performances between male and female undergraduate students at Baylor University. Forty students were enrolled in an individual topics course and participated in various training modules required for certification in laparoscopic surgery throughout the Fall 2016 semester. Data was collected for every attended practice session on an exercise called “the pegboard.” A score was given to each student’s attempt at the exercise by a formula, which took into consideration errors made and time taken to complete the activity. Comparisons of average scores were made between male and female students upon completing the pegboard exercise during their second practice time, taking into account their highest average achievements, and the average difference in scores from the second practice time to their highest average practice session. Male students had a higher average score completing the pegboard exercise during the second practice time than females. Male students also had a higher average maximal score when completing the pegboard exercise than female students. Female students exhibited greater improvements between their second practice time and their highest average scores in completing the pegboard exercise than male students.

B22. A Cost-Effective Design For A Laparoscopic Box Trainer

Austin MacDonald and Davis Payne; Mentor: Dr. Marty Harvill

Department: Biology

The development of laparoscopic surgical methods began in the early 1900s and emerged as a staple of multiple surgical fields in the 1990s. However, it was discovered that the skills associated with open surgery did not fully translate into the skills required for the successful completion of a laparoscopic case. Two common challenges associated with laparoscopic surgery are lack of coordination with the instruments and loss of depth perception due to the use of a camera for visualization. Due to these obstacles, various methods have been designed and implemented to create training programs of sufficient efficacy. Different modes of training range “box” trainers to surgical simulations carried out
through virtual reality programs. Our goal was to create a cost-effective box trainer that would allow a person to effectively improve their performance in completing laparoscopic exercises. The trainer and exercises were inspired by various designs used by training programs today. The efficacy of the trainer was tested by undergraduate students with little to no knowledge concerning the field of laparoscopic surgery.

B23. 3rd Grade Students' Perceptions and Attitudes Towards Science
Morgan Shettle, Divya Lakshminarayanan and Mehul Mistry; Mentor: Dr. Marty Harvill

*Department: Biology*

This study attempts to find the perception and attitudes towards science held by 3rd grade students at China Spring Elementary School in Waco, TX. In order to measure these qualitative traits, 182 students were given a survey prior to a fieldtrip to the Lake Waco Wetland, and at conclusion of the Lake Waco Wetlands fieldtrip. The survey aimed to measure: (a) The draw a student feels towards the sciences, (b) The understanding what it means to be a scientist (c) An assessment of the students’ knowledge of scientific topics covered either in the classroom or during modules covered during their fieldtrip to the wetlands. In effort to account for students “guessing” answers on the pre-assessment portion of the survey, half of the surveys possessed an option for “I do not know.” The data indicates that after the fieldtrip students had a better outlook and attitude towards the sciences. Also, the students who had the option for “I do not know” showed improvement in the post assessment questions regarding scientific topics covered during the module learning experiences.

B24. Isolation of Octopamine mutants in *Caenorhabditis elegans*
DeQuawn Johnson, Danielle Natividad, Jonas Kruse and Justin Davis; Mentor: Dr. Myeongwoo Lee

*Department: Biology*

*C. elegans* is a non-parasitic, transparent nematode and is one of the simplest organisms with a nervous system. *C. elegans* can survive at 20 degrees C for 2-4 weeks, produce hundreds to thousands of offspring and have a generation time of approximately 4 days, making them a great model organism. While *C. elegans* lack circulatory and respiratory systems, most are hermaphroditic, possessing both male and female reproductive organs. Octopamine is a neurotransmitter found in nematodes and other invertebrates that acts in place of norepinephrine. In mammals, norepinephrine stimulates the brain and body in preparation to mobilize in times of stress. While octopamine serves no known biological function in mammals, invertebrate octopamine acts directly on cell receptors OctαR, OctβR, and TyrR, which are structurally and functionally similar to mammalian noradrenergic alpha-2 receptors. As exogenous octopamine has been observed to depress egg laying, octopamine will be administered in Cell and Developmental Biology Lab (BIO4108) to hermaphroditic *C. elegans*, and their behavior and egg-laying patterns will be noted. In an effort to isolate a mutant strain with innate biological resistance to octopamine, individual *C. elegans* organisms that are observed to continue laying eggs in the presence of the exogenous neurotransmitter will be extracted for further observation. Research suggests that the octopamine signaling mechanisms counter the signaling mechanisms observed in the presence of food. Therefore, characterizing an octopamine-resistant mutant strain of *C. elegans* could potentially lead to the growth and study of a strain that is disposed to eat and propagate in spite of external stressors.
B25. Use of Imipramine in *Caenorhabditis elegans* to Identify Treatment Resistant Mutations
Casara Han, Jodie Nguyen, Kevin Nguyen and Holly Souimaniphanh; Mentor: Dr. Myeongwoo Lee

*Department: Biology*

Antidepressants are commonly prescribed drugs that are typically used to help target specific behavioral and neurological disorders. Specifically, imipramine is a tricyclic antidepressant that works to restore the balance of neurotransmitters, such as norepinephrine and serotonin. As a serotonin re-uptake inhibitor, imipramine blocks the respective transporters, resulting in elevated concentrations of serotonin, and therefore treating depression in patients. Imipramine has also been reported to stimulate egg-laying behavior seen in *C. elegans*. We are interested in examining mutagenesis in *C. elegans* treated with imipramine to discover a new form of mutation. Imipramine causes *C. elegans* to lay eggs at a more rapid pace due to it disrupting the hermaphrodite-specific neurons that innervate the muscles in the vulva and the uterus. As a Cell and Developmental Biology Lab (BIO4108) project, we will take a genetic approach on isolating the stimulated egg-laying mutations in the N2 wild-type. Our group will screen for approximately 250 haploid genomes and examine the mutants that do not lay eggs in the imipramine solution, indicating resistance to the imipramine drug. The data gathered from this project will serve to develop higher efficacy in antidepressants.

B26. Targeting *C. elegans* With Dopamine to Understand the Effects this Drug will have on the Worm
Connor Anderson and Nicole Wood; Mentor: Dr. Myeongwoo Lee

*Department: Biology*

*Caenorhabditis elegans* is a free-living soil nematode. *C. elegans* has two sexual forms- it can either be hermaphroditic or male. Egg-laying in *C. elegans* mostly occurs in short bursts lasting approximately 1–2 minutes, which are separated by longer periods averaging about 20 minutes in duration. Dopamine is a neurotransmitter chemical that regulates several physiological functions within the body. It is present in *C. elegans* in eight neurons in the hermaphrodite and in an additional six neurons located in the tail of the male. Varied dopamine levels can cause the animal's ability to sense or respond to changes in its environment. Egg-laying behavior has played an important phenotypic assay for the genetic dissection of neuronal signal transduction mechanisms. We are interested in characterizing the function of dopamine in egg-laying behavior. The assignment of locomotion and egg-laying behavior in *C. elegans* appears to be regulated by feedback from the HSN motor neurons to interneurons in the head of the worm that attributes to forward movement. In Dr. Myeongwoo Lee’s Cell and Developmental biology lab, our group will test 200 haploid genomes to isolate mutants resistant to dopamine treatment during egg-laying. This study will provide us with valuable information about the function of neurotransmitters on a particular behavior of the nematode.

B27. The Effects of Dopamine on Egg Laying Behaviors of *Caenorhabditis elegans*
Susana Diaz, Ialexa Plascencia, Jordan Spaude, and William Townsend; Mentor: Dr. Myeongwoo Lee

*Department: Biology*

There are four dopamine receptors in *C. elegans* and eight dopaminergic neurons in the nervous system. The dopaminergic neurons are classified dependent on their location in the body. There are four that innervate the tip of the nose,
two innervate the head cuticle and two innervate the posterior cuticle. *C. elegans* has two D1-like receptors, dop-1 and dop-4, and two D2-like receptors, dop-2 and dop-3. Dopamine has been related to locomotion and sensory perception of surroundings. Dopamine has been shown to inhibit locomotion and egg-laying as well as having modulatory purposes in crawling speed in response to food. When exposed to food, the dopamine signaling pathway, containing the DOP-3 receptor, is utilized and causes a slowing response in order to remain near the food source. Dopamine has also been associated with learning and memory in *C. elegans*, such as tap habituation. Dopamine has been shown to inhibit defecation as well. As a project for our Cell and Developmental Biology Lab, we will create various mutants for resistance to the effects of dopamine and be determining how dopamine is inhibiting the egg-laying in *C. elegans*. The new mutants will be important in understanding how the mechanism of dopamine in animal behavior.

**B28. Characterization of the Relationship between Imipramine and 5HT Receptors Affecting Egg Laying Potential**

Jayson Huynh, Yvette Dequito, Kathy Son and Sally Vo; Mentor: Dr. Myeongwoo Lee

*Department: Biology*

*C. elegans* hermaphrodites are self-fertile, and are controlled by various environmental cues. Neurotransmitters in *C. elegans* can be seen having a variety of effects on differing from thermal sensing, body movement, and so forth. Neurotransmitters often directly affect wild-type hermaphrodites typically stimulating or inhibiting egg laying. Drugs targeting the serotonergic system are typically prescribed therapeutic agents. HSNs (Hermaphrodite specific neurons) release 5HT, which then acts directly on the muscles associated with egg laying resulting in contractions. The action of imipramine at the serotonin (5HT) receptors is a separate mechanism in comparison to the already well-established serotonergic egg-laying behavior in *C. elegans*. Imipramine increases 5HT levels in the synapse thereby promoting the rates of egg laying. Imipramine is suggested to induce the rate of egg laying by the blockage of 5HT reuptake released by the HSN neurons. Furthermore, mutants lacking 5HT or 5HT reuptake transporters still are able to partially respond in the presence of imipramine. Overall, deletion of a 5HT receptor gets rid of responses associated with 5HT (serotonin), but has a minor effect on the responses to imipramine and other antidepressant drugs such as fluoxetine. We are interested in characterizing the effects of imipramine on *C. elegans* and specifically their reproductive rates. As a Cell and Developmental Biology Lab (BIO 4108) project, the group’s goal is to depict imipramine’s direct effects on *C. elegans*, specifically regarding its egg-laying habits. The group will screen for approximately 250 haploid genomes. These mutants will be utilized in other studies regarding drugs affecting the functions of reproductive properties within *C. elegans*. It is believed that imipramine will increase levels of serotonin within the 5HT system synapse furthermore provoking egg-laying.

**B29. Phenotypic Screen to Identify *C. elegans* Mutants that Display Atypical Vulval and Locomotor Responses to Serotonin**

Kaitlyn Havlik, Amanda DeVries, David Carpenter, Breanna Laughlin and Raj Nair; Mentor: Dr. Myeongwoo Lee

*Department: Biology*

Serotonin in wild type *Caenorhabditis elegans* strains helps to modulate typical biological locomotive and egg laying mechanisms. Normally, the transmission of serotonin neurotransmitter in *C. elegans* wild type constrains locomotion
and defecation, while stimulating egg laying and vulval muscle contraction. Phenotypic screening is necessary in order to identify an atypical response to serotonin in *C. elegans* mutants, likely manifesting itself most transparently in the form of a lack of a motor inhibition. Mutations in SER-1 protein-coupled receptor gene may be responsible for any atypical egg laying responses visualized in *C. elegans* mutants as implicated in such in previous studies. Furthermore, SER-4 and SER-7 receptor genes have been shown to function in the binding of serotonin in egg laying domains in *C. elegans*. In terms of locomotion, mutations in the MOD-1 gene might be responsible for any atypical motor responses, including any lack of motor inhibition in response to serotonin neurotransmitter signaling. It should be noted that *C. elegans* will exhibit long term habituation to the effects of serotonin on egg laying behaviors. For a Cell and Developmental Biology Lab (BIO 4108) project, different *C. elegans* mutants were screened in a forward genetic approach with various neurotransmitters in order to identify locomotive and/or egg laying deviations from the wild type strain. Approximately 250 haploid genomes will be screened for in order to identify such mutants. These mutants will then be used in future studies in order to identify unstudied biological mechanisms in the serotonin signaling pathway in *C. elegans*. More specifically, this analysis may provide a source of information to shed light on the mechanisms in which serotonin influences certain egg laying and locomotor behaviors in the future.

**B30. Genetic Screen to Determine Behavioral Changes Elicited by the Monoamine, Tyramine, in Different Strains of *C. elegans***

Kyle Petter, Brittany Wilder, Idowu Disu and Monica Armas; Mentor: Dr. Myeongwoo Lee

*Department: Biology*

Tyramine derived from tyrosine, is a neuropeptide that in invertebrates has the ability to imitate the biological effects of other neurotransmitters such as epinephrine and norepinephrine, but with less efficacy. Tyramine is present in low abundance in Caenorhabditis elegans in a few cells that serve as an intermediate in the synthesis of octopamine. Tyramine may be used as a neurotransmitter by two types of cells that express enzymes required to synthesize tyramine but not the enzyme for conversion to octopamine, such as RIM-1 motor neurons and uv1 neuroendocrine cells. Two receptors SER-2 and TYRA-2 have been recognized to bind tyramine with a high affinity. Tyramine has been shown to play a role in the inhibition of egg laying, modulation of response to normal and painful stimuli, and suppression of head oscillations in response to anterior touch. Mutations in those two receptors exhibit several behavioral defects such as failing to suppress head oscillations in response to touch. TDC-1, the enzyme in charge of synthesizing tyramine, is only expressed in two cell types in the organism including tyraminergic cells, which are the only ones affected by the *tdc-1* mutations. Our lab utilized an analytical approach to test for the effects of tyramine by creating mutant strains that are resistant to tyramine. M9 and the wild-type strain, N2, were used as controls to compare and validate test results. Our class will screen many haploid genomes and expect to isolate several tyramine resistant mutants.

**B31. Genetic Screen to Isolate Mutations Resistant to Serotonin***

Nicholas Simitzi, Ryan Molina, Stephan Lloyd-Brown and Derek Wu; Mentor: Dr. Myeongwoo Lee

*Department: Biology*

Serotonin is a monoamine, neurotransmitter present in many eukaryotic organisms. It functions to regulate mood, appetite and sleep. Several classes of antidepressants regulate serotonin in the central nervous system. Serotonin is synthe-
sized in the neurosecretory motor neurons which has sensory endings in the lumen of the pharynx. In *C. elegans*, Serotonin activates two classes of motor neurons that directly innervate the vulval muscles: the VC4/5 neurons and the pair of HSN hermaphrodite-specific neurons. Wild type N2 *C. elegans* exposed to serotonin have been observed to have reduced locomotion, activated pharyngeal pumping, and increased egg-laying. Four receptors have been identified that bind serotonin, including G protein coupled receptors (SER-1, SER-4 and SER-7) and a serotonin-gated chloride channel (MOD-1). Previous studies have shown that a gene such as, SER-1, a serotonin receptor, has the clearest role in the control of egg laying among the other four receptors that bind to serotonin. We are interested in isolating and characterizing a serotonin insensitive mutant. Therefore, we will implement a forward genetic method to isolate mutants losing serotonin sensitivity within *C. elegans*. Our group will screen approximately 200 haploid genomes and expect to isolate the resistant mutants. These isolated mutants will be utilized in further studies of serotonin mechanism of *C. elegans*.

**B32. Genetic Screens to Compare the Strength of Innate Resistance Versus Acquired Tolerance of Ethanol in *C. elegans***

Austin Hubbert, Sam Chun, Robert Shajari and Eric Soo; Mentor: Dr. Myeongwoo Lee

*Department: Biology*

When *Caenorhabditis elegans* are exposed to high concentrations of ethanol, they exhibit various physiological changes, including decreased mobility and egg-laying. However, ethanol-resistant populations of *C. elegans* have been discovered. One gene that was found to cause ethanol resistance is the slo-1 gene, which encodes a potassium channel protein in the *C. elegans* similar to the human BK potassium channel protein. The loss of slo-1 functionality has been shown to reduce ethanol’s effect on *C. elegans*’ movement and egg-laying. Additionally, populations of *C. elegans* without resistance can build up ethanol tolerance over time. The CB4856 strain can build up ethanol tolerance faster than the standard N2 strain due to a mutation on the npr-1 gene. N2 worms generally have a fully-functional npr-1 allele. N2 worms may bear a mutated allele, leading to an increased tolerance-acquisition capability. As a BIO 4108 lab project, we plan to discover new genes of resistance and tolerance acquisition. Our group will try to isolate a new gene that will create a strain of *C. elegans* that is resistant to ethanol. N2 worms will be mutagenized, given doses of ethanol, and then tested for their locomotion and egg-laying capabilities. Afterwards, the worms that seem unaffected by the ethanol in the N2 control will be removed for continued testing with higher doses of ethanol, resulting in a pure mutant strain of ethanol-resistant *C. elegans*. The results may shed light on the effects of ethanol on humans and can lead to a discovery in how ethanol tolerance is developed.

**B33. Combating Influenza Through the Educational Awareness of Vaccination***

Meagan Bean*, Lilly Carter*, Ebosetale Ogbebor*, Nicholle Igbinyemi*, Alexia Lopez*, Tomi Fadeyi*, Angelica Anzures*, Austin White* and Zachary Pranske* (*Authors contributed to this work equally); Mentor: Dr. Jason Chacon

*Department: Biology*

The 1918 Spanish Flu was responsible for 20-50 million deaths worldwide. Since 1918, three pandemics have emerged with the most recent being the H1N1 (swine flu) pandemic in 2009, prompting a global effort to conduct further research into anti-viral therapies. With the first of many authorized for public use in 1940, vaccines are our first line of
defense against influenza. However, due to the virus’ ability to undergo antigenic shift and genetic drift, vaccinations must be administered annually in order to ‘update’ our immune system to respond to newly circulating strains. In the 2015-2016 influenza season, the CDC reported that ~74 pediatric deaths were attributed to the virus. The mortality rate for adults infected with influenza was highest during week 12 of this season. The disparity in the number of deaths caused by influenza in 1918, compared to the 2015-2016 flu season is suggested to be correlated to the general population’s increased education and awareness of the importance of vaccines, in addition to vaccination decreasing the likelihood of flu illness by ~55%. In this study, students were presented with the immunological mechanism and statistics of vaccine efficacy related to influenza and awarded an extra-credit incentive to receive the influenza vaccine. We then polled the students as to the main reason they chose to receive their vaccination. Here, we present data that further supports the hypothesis that increased education and awareness of the vaccination, particularly influenza vaccines, increases the likelihood of individuals to voluntarily receive a vaccination, despite incentives.

B34. Searching for Antibiotics in Soil Microbes
Ryan Blas, Olivia Perez and Bisrat Berhanu; Mentor: Dr. Diane Hartman

Department: Biology

In order to search for antibiotics from the natural environment, we collected soil from MLK Park in Downtown Waco, TX, a public and popular area near the Brazos river. After collecting our soil sample, we diluted the soil in order to observe the diverse soil microbial colonies and select colonies we felt were unique or recurring. We then streaked several plates with the ESKAPE pathogens and inoculated the plates with our soil microbes. After two days, we observed the growth of the colonies and the size of the zone of inhibition, if one was present. Upon realizing the ratio of colonies that produced antibiotics to a pathogen was vastly different, we decided to select an additional set of colonies that we felt could produce antibiotics. From the additional ten trials, we found one antibiotic-producing organism, which in retrospect was not able to be identified in our database. This experience further showed us how difficult research is for antibiotics.

B35. Inhibitory Receptor Ligands on Alveolar Epithelial Cells as Potential Therapeutic Targets for Pulmonary Inflammation and Lung Injury in Pneumocystis Pneumonia (PCP)
Ariane Kubena (Baylor), Jing Wang, Samir P. Bhagwat, Jane Malone and Francis Gigliotti (University of Rochester); Mentors: Dr. Terry W. Wright (University of Rochester) and Dr. Diane Hartman (Baylor)

Department: Biology/ University of Rochester School of Medicine and Dentistry, Department of Pediatrics

Pneumocystis (PC) is an opportunistic fungus that causes a limited asymptomatic infection in immunocompetent individuals but results in Pneumocystis Pneumonia (PCP) in subjects with impaired CD4⁺ T cell immunity. While detectable anti-PC antibody is commonly found in most humans by 2 years of age, approximately 400,000 cases of PCP occur yearly worldwide. PCP is the most frequent HIV-associated opportunistic infection, showing a 10-20% mortality rate for those with HIV/AIDS and a 30-50% mortality rate for those with cancer or other immune deficiencies. The mortality rate for those placed on a ventilator due to the side effects of PCP is 50% or even higher. The absence of CD4⁺ T cells during PCP is accompanied by the recruitment of CD8⁺ T cells to the lung, which are ineffective for host defense against Pneumocystis and cause inflammatory lung injury. Our laboratory recently determined that a high proportion of
CD8+ T cells in the lungs during PCP express the inhibitory receptors PD-1 (programmed cell death protein 1) and Lag-3 (lymphocyte-activation gene 3). These receptors suppress CD8+ T cell effector function and may impair CD8 antifungal activity and/or limit immunopathogenesis during PCP. Because the tight attachment of *Pneumocystis* to alveolar epithelial cells has been shown to activate the NF-κB pathway, we hypothesized that alveolar epithelial cells produce inhibitory ligands that contribute to the suppression of CD8+ T cells during PCP. To test our hypothesis, type II alveolar epithelial cell lines were stimulated in vitro with *Pneumocystis*, and PD-L1, PD-L2, and galectin-3 production was measured at the mRNA and protein level. Our study suggests that alveolar epithelial cells secrete PD-L1, PD-L2, and Gal-3, suggesting that alveolar epithelial cells may contribute to CD8+ T cell suppression during PCP by stimulating the inhibitory receptors PD-1 and Lag-3. Modulating inhibitory receptor pathways may represent a potential adjunctive therapy to reduce lung injury and enhance fungal clearance in PCP patients.

**B36. Microbial Inhibition of E.S.K.A.P.E. Pathogens**

Gillian Mathews and Connor Kelley; Mentor: Dr. Diane Hartman

*Department: Biology*

E.S.K.A.P.E. pathogens are six different nosocomial bacteria that are antibiotic resistant and virulent in humans. As a group, they are referred to as E.S.K.A.P.E. pathogens because each letter refers to the first letter of their genus and species names, *Enterobacter cloacae, Staphylococcus aureus, Klebsiella pneumoniae, Pseudomonas aeruginosa,* and *Enterococcus faecalis*. The goal of this study was to find microbes in soil that would display inhibitory characteristics against these E.S.K.A.P.E. pathogens. The soil sample was chosen from a local dog park. (Coordinates: 31.5541, -97.1235). This location was selected because it seemed to be an ideal environment for a diverse community of microbes. Using this soil sample, we conducted serial dilutions and grew the bacteria from the soil on trypticase soy agar (TSA) plates. From these plates, 12 isolated bacterial colonies were selected and grown. These colonies were then tested for inhibitory characteristics against any of the E.S.K.A.P.E. pathogens. Seven of the bacteria species displayed inhibitory characteristics to either *S. aureus* or *K. pneumoniae*. We ran biochemical tests on the bacteria to facilitate their identification. The overall goal of this study is to identify microbes that could be used by physicians to make antibiotics or other treatments to target these E.S.K.A.P.E. pathogens.

**B37. Investigating Potential Sources of Antibiotics Against E.S.K.A.P.E. Pathogens Within the Soil Bacterial Flora**

Aarón Murillo-Ruiz and Beatriz Castillo-Rodriguez; Mentor: Dr. Diane Hartman

*Department: Biology*

The proliferation of bacteria that are resistant to antibiotics has resulted in severely diminished treatment options effective against certain bacterial infections; indeed, some bacteria are now resistant to all known antibiotics. This research is aimed at finding new antibiotics that are effective against six bacteria *Enterobacter cloacae, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa,* and *Enterococcus faecalis* (collectively known as E.S.K.A.P.E. pathogens). Soil bacterial isolates (S.B.I.) from Cameron Park Waco, Texas were grown alongside the E.S.K.A.P.E. pathogens to create an environment that may induce the S.B.I. to produce an antimicrobial agent capable of inhibiting the growth of the pathogens. Fifteen bacterial colonies present within the soil were grown in the same medium as the E.S.K.A.P.E. pathogens of which eight exhibited antimicrobial activity against one or more of the
E.S.K.A.P.E. pathogens as denoted by a zone of inhibition wherein no pathogen growth was observed. Diagnostic tests related to the S.B.I.’s metabolism, including sequencing of the 16s-ribosomal subunit, were conducted to obtain a genome-specific identification of these eight isolates. Of the eight identified, sample F16.G1.2 is suspected to be Bacillus thuringiensis, and F16.G2.4 is suspected to be of the Pseudomonas genome. The results of this research shed light on the treatment of antibiotic-resistant bacteria; namely, sources of new antibiotics.

**B38. MRSA-ful or MRSA-less?**

Danielle Natividad; Mentor: Dr. Diane Hartman

*Department: Biology*

Staphylococcus aureus is a major cause of both nosocomial infections and community-acquired infections. It ranges anywhere from life threatening disease such as, bacteremia to something as manageable as food poisoning. It may be harmless when dormant in the nasal cavity, but may cause damage when an impairment of the skin occurs. Asymptomatic carriers exist without anyone’s knowledge, possibly including the carrier themselves. Although asymptomatic, the organisms can still spread to susceptible hosts. CDC reports about a quarter of the population carries S. aureus in their nasal passages, and of those, 2% are a carrier of Methicillin Resistant Staphylococcus aureus (MRSA). This is a result of bacterium having developed a resistance to antibiotics, MRSA specifically being resistant to oxacillin. MRSA infections are most often skin and soft tissue infections, but have also been associated with pneumonia, osteomyelitis, and bacteremia. A survey and a collection of cultures were executed from students for two classes: Biology 4401 and Biology 1402 over the course of three semesters. The survey included whether certain factors affected the carrier rate such as team sports, animals, and traveling. Out of the 510 students that participated from all semesters, 121 fermented mannitol. After the samples were tested for fermentation of mannitol, fermenters were then transferred to tryptic soy agar plates for further testing. Testing included coagulase tests, catalase tests, and gram staining. Cultures that were coagulase positive, catalase positive, gram stain positive staphylococci, and mannitol fermenting were presumed S. aureus. Of the original 121 fermenters, 84 inferred to be S. aureus. Staphylococcus aureus organisms were then tested for resistance against six antibiotics using the Kirby-Bauer disk method: oxacillin, penicillin, erythromycin/azithromycin, trimethoprim sulfa, doxycycline, and ciprofloxacin. Zones of inhibition were measured in millimeters and compared to the standard zone diameter interpretive standards for S. aureus. Of the fermenters, three exhibited resistance towards oxacillin, thus making them MRSA-ful.

**B39. Toll-Like Receptor Activation by Outer Membrane Vesicles**

Daniel E. Goyco, Kevin Chung, Timothy Tateossian and Leigh Greathouse; Mentor: Dr. Joseph Taube

*Department: Biology*

Because bacteria and human cells coexist in an equal ratio it is imperative that human cells have a means to respond appropriately to commensal an infectious microorganism. Disruptions in the microbiome are known to contribute to multiple diseases, including inflammatory bowel disease and cancer. There are two immune responses called the innate and the adaptive system. The portion of the immune system that responds to organisms in a non-specific manner is called the innate immune system. An essential component of the innate immune system are the toll-like receptors (TLRs), which are transmembrane proteins of the innate system that recognize foreign antigens, including lipopolysaccharides, flagellum and nucleic acids. There are eleven known TLRs in humans that function by initiating signaling
pathways, in which NF-kappaB initiates the cytokine response. We tested the hypothesis that outer membrane vesicles (OMVs), which are shed by bacteria and contain multiple proteins, RNA and DNA, activate toll-like receptor signaling. As nucleic acid sensing TLRs were found to be activated, we next used quantitative real time PCR to detect several small RNA species in the OMVs. These preliminary studies support further investigation into the roles of specific bacterial species and distinct cell types to uncover novel interactions relevant to human disease.

**B40. Role of Long Non-coding RNA on Epithelial-mesenchymal Transition of Breast Cancer**

Sizhe (Tom) Niu; Mentor: Dr. Joseph Taube

*Department: Biology*

Breast cancer (BC) is cancer in breast tissue and can be classified into four stages, each with increasing severity and progression. Stage IV BC has the lowest 5-year survival rate and its defining feature is that the cancer has metastasized to a secondary site. Epithelial-mesenchymal transition (EMT) is a key process contributing to cancer metastasis in which epithelial tumor cells gain the ability to split off from the primary tumor and enter the bloodstream. This canonical transformation is responsible for initiating metastasis which results in the formation of a secondary tumor. Previously, long non-coding RNAs (lncRNAs) were thought to have little or no effect on the phenotype of the organism due to their non-protein coding nature. However, lncRNAs have been found to either activate or inhibit expression of associated genes, either in cis (close to the target site) or in trans (far from the target site). We chose to evaluate the effects that these lncRNAs have on EMT and how it can modify gene expression typically associated with EMT. Using qRT-PCR, we measured the expression levels of lncRNAs studied in other contexts (H19, HOTAIR, NORAD) to observe if there was a gene expression difference in vitro between multiple cancer cell lines (HCT 116, HMLE Twist, MDA-MB-231) and epithelial cell lines (HMLE, MFC10A). Based on those findings, we plan to use siRNAs to inhibit the effects of those lncRNAs to observe if EMT can be reversed through that pathway.

**B41. Antibiotic Resistant Bacteria in an Urban Freshwater Ecosystem in Central Texas**

Annie Kwok and Michael Davis; Mentor: Dr. Sanghoon Kang

*Department: Biology*

Antibiotic resistance is a growing concern for the human population, due to an increasing occurrence of antibiotic resistance genes in aquatic ecosystems and the risk of pathogens acquiring those resistance genes. It is desired to more closely examine the relationship between antibiotic resistant bacteria (ARB) and antibiotic residues in an urban freshwater environment. Thus, the main objective of this study is to investigate the presence of antibiotic resistance in wastewater treatment plant (WWTP) effluent leading into the Brazos River. The study further explores the possible mechanisms of resistance emergence among different antibiotics using classical techniques such as replica plating. Three samples of influent wastewater and treated effluent were collected from the WWTP, and cultured on TSA and EMB media to enumerate resistant bacteria in the community. Luria-Delbrück’s Fluctuation Test and the Newcombe Test were performed on antibiotic-susceptible bacteria from samples to investigate whether mutations causing re-
istance in ARBs are induced or spontaneous. Penicillin had the highest rate of resistance from both influent and effluent samples. Most antibiotics had a higher rate of resistance from influent samples on TSA and EMB media. According to Luria-Delbruck’s Fluctuation Test and the Newcombe Test, different antibiotics appear to be associated with different tendencies of resistance emergence – raising questions about the roles of random mutation and induction. This study provides a baseline understanding of the urban freshwater ecosystem status in central Texas and quantitatively examines the degree of resistance emergences.

**B42. The Impact on Copper Homeostasis When the COX19 Gene is deleted in *S. cerevisiae* with a Functional and Nonfunctional Nonsense-mediated mRNA Decay Pathway**

Roxanne Martino; Mentor: Dr. Bessie Kebaara

*Department: Biology*

The Nonsense-mediated mRNA decay (NMD) pathways exist in all eukaryotic cells. This pathway regulates and degrades both mRNAs with premature termination codons as well as some naturally occurring mRNAs that encode fully functional proteins. The regulation of these mRNAs by this pathway has been observed in *Saccharomyces cerevisiae*, *Drosophila melanogaster* and humans. In these organisms, approximately 10% of the mRNAs are affected when NMD is inactivated. However, the regulation of natural mRNAs by NMD has been most extensively studied in *S. cerevisiae* and has been shown to have physiological consequences. In *S. cerevisiae*, one physiological consequence of the NMD pathways is seen in tolerance to high copper environments. When the NMD pathway is non-functional *S. cerevisiae* cells can withstand high levels of copper. We have found that the pathway targets certain mRNAs that are involved in copper homeostasis. These mRNAs include *CTR2, COX19, COX23, FRE2, CRS5, PCA1* and *MAC1*. Here we would like to figure out physiological consequences result from deleting the *COX19* gene in yeast cells with a functional and non-functional NMD pathway. We can then test the copper tolerance through growth on different levels of copper. We will also determine the effect environmental copper levels have on the expression of *COX19* mRNA in yeast cells with a functional and non-functional NMD pathway. By looking at the outcomes, we can figure out how the *COX19* gene and the NMD pathway influence the cells ability to metabolize copper.

**Baylor Sciences Building – 2nd Floor**

**EDUCATIONAL PSYCHOLOGY**

**B43. Functional Communication Training and Demand Fading Using Choice Making**

Kristen Williams, Regan Weston, Abby Hodges, Lauren Uptegrove; Mentor: Tonya Davis, PhD

*Department: Educational Psychology*

Demand fading, a schedule thinning procedure for escape-maintained behaviors, typically includes an escape extinction component. The purpose of this study was to examine the effectiveness of demand fading with choice making, rather than extinction. During demand fading, aggression and requests emitted prior to meeting the task completion criterion were reinforced with short, low-quality breaks, but requests emitted following task completion criterion were rein-
forced with long, high-quality breaks. Results suggest that choice making may be an effective alternative to extinction as a component of demand fading.

PSYCHOLOGY AND NEUROSCIENCE

B44. Understanding the Mechanisms of Susceptibility Genes Implicated in Autism Spectrum Disorders
Kayla Murphy (Baylor), Kara Barber and Keegan Bush (Neurology Department at University of Texas Medical Branch, Galveston); Faculty Mentors: Dr. Yogesh Wairkar (Neurology Department at UTMB, Galveston) and Dr. Bob Kane

Department: Psychology and Neuroscience

Autism Spectrum Disorders (ASD) affect 1 in 68 children worldwide. Previous research has indicated a strong genetic component through the identification of many susceptibility genes, many of which affect synapse growth and development. MARK1 is one gene that was found to be upregulated in the prefrontal cortex of ASD patients. Previous research from our laboratory has shown that neuronal overexpression of Par-1, its Drosophila homolog, leads to a specific accumulation of Bruchpilot (BRP) within axons. Since alteration in gene dosage is highly implicated in ASD, we aimed to test the hypothesis that the correct gene dosage of Par-1 is critical for effective BRP and/or active zone protein transport. We looked at the reduction of Par-1 by using RNAi of Par-1(RNAi) and mutations in fat facets (faf). Mutations in faf, a deubiquitinating enzyme, prevent the deubiquitination of Par-1 leading to a reduction of Par-1 levels in vivo. Through Drosophila larval dissection and immunohistochemical staining of the exposed neuromuscular junctions, we found that Par-1 RNAi and faf lead to a specific accumulation of active zone proteins in axons. However, other synaptic cargoes did not accumulate in axons. This data confirms our hypothesis that gene dosage of Par-1 specifically affects active zone protein transport.

B45. A Mouse Model of Fragile X Syndrome Exhibits Qualitative Deficits in Vocalization Behavior
Kaylin Ackerman, Samantha Hodges, Suzanne Nolan, and Conner Reynolds; Faculty Mentor: Dr. Joaquin Lugo

Department: Psychology and Neuroscience

The Fmr1 knockout (KO) mouse has commonly been used to investigate communication impairments, one of the key diagnostic symptoms, observed in Fragile X syndrome (FXS) and Autism spectrum disorder (ASD). Many studies have found alterations in ultrasonic vocalizations (USVs) in neonatal Fmr1 KO mice, however, there is limited research investigating whether these deficits continue into adulthood. In the present study, we examine differences in female urine-induced ultrasonic vocalizations, scent marking behavior, odor discrimination, and open field activity in adult male Fmr1 KO and WT mice. Overall, we found extensive alterations between genotypes in both spectral and temporal properties of vocalizations. There was no difference in the average number of calls emitted by both genotypes, however, Fmr1 KO mice emitted calls of a higher frequency, decreased amplitude, and shorter duration than WT mice. Spectrographic analyses revealed significant differences between genotypes in the types of calls emitted. Contrastingly, we
found no differences in scent marking behavior, a form of social communication, or in odor discrimination and activity levels of the mice. The results corroborate previous studies emphasizing the importance of qualitative differences observed in vocalization behavior of Fmr1 KO mice, rather than quantitative measurements such as number of calls emitted. Overall, the study confirms the presence of significant abnormalities in vocalization behavior in adult Fmr1 KO mice that we believe are consistent with communication deficits seen in the syndrome.

**B46. A Single Seizure Induces Anterograde Amnesia in Mice**

James T. Okoh, Andrew J. Holley and Matthew S. Binder; Faculty Mentor: Dr. Joaquin N. Lugo

*Department: Psychology and Neuroscience*

**Introduction.** Reports indicate a single short seizure can impair the retention of learning in delay fear conditioning at 24 h. The current study seeks to extend previous findings and assess hippocampal-dependent memory at 24 h and 1 week following a seizure in mice. **Methods.** We placed 6 week old male C57BL/6 mice into an inhalation chamber and infused flurothyl until a generalized seizure occurred. We placed sham control animals concurrently in another inhalation chamber. An hour later mice were trained in trace fear conditioning. The mice were then tested 24 h and 1 week later for cued recall. We used the open field and elevated plus maze tests to assess locomotor activity and anxiety in additional cohorts of mice 24 h and 1 week after a single seizure. **Results.** Memory tests revealed no differences between seizure and control groups at 24 h, but did show significant differences between groups at 1 wk. Results from the open field test indicated suppression of activity at 24 h, but not 1 week following a seizure. Similarly, the elevated plus maze test revealed no changes to anxiety at 24 h or 1 week. **Conclusion.** This data suggests that there may be a period after a seizure in which new learning can be retained; however, hippocampal-dependent memory may be impaired as time passes following a seizure. Notably, the decay of memory we observed resembles a pattern of memory impairment known as accelerated long-term forgetting found in individuals with epilepsy.

**B47. The Individual Network Analysis of a Movie Paradigm Compared to Resting State Functional Connectivity**

Joel Reid and Zach Sloan; Faculty Mentor: Dr. Steven Nelson

*Department: Psychology and Neuroscience*

Recent publications have shown the network structure of the human brain by examining correlations in fMRI activity between brain regions (Power et al., 2011). While this analysis is most commonly performed during the task-free “resting state”, brain networks are known to alter size and connectivity during task performance (Krienen et al., 2014); as a result, it is unclear whether resting brain network estimates are representative of how brain networks function in everyday life. Movie-watching may represent a more naturalistic situation for brain network estimation (Vanderwal et al., 2015). However, no previous study has collected sufficient within-subject data to estimate movie-driven brain network function at the level of the individual. Here, we used a high-data approach for deriving brain network function in individuals. We used fMRI to scan six healthy young adult subjects during ninety minutes of task free rest as well as ninety minutes of movie viewing (*Finding Nemo*). Each individual's brain networks were analyzed in a movie condition and in a resting state condition in order to determine if networks in one condition were robust enough to be present in the other condition. Functional connectivity patterns were directly compared between conditions to identify regions of
altered network function. Finally, a permutation bootstrapping procedure was employed to calculate the statistical significance of the identified connectivity differences. An evaluation of this individual focus, greater amount of scan time, and how engaging in naturalistic viewing procedures drive functional connectivity will be discussed.

B48. Resting State fMRI Changes as a Result of EEG Neurofeedback Treatment Observed in Participants with Traumatic Brain Injury

Robert Athey Dr. Laura Zambrano-Vazquez, Dr. Richard Seim, Dr. Geoff May, Dr. Evan Gordon, Bradley Gary, Ramy Sweidan, Dr. Steven Nelson; Faculty Mentor: Dr. Sara Dolan

Department: Psychology and Neuroscience

Traumatic brain injury (TBI) is an increasingly prevalent health issue marked by difficulty with memory, concentration, confusion, as well as other cognitive deficits. Thousands of returning Veterans (OIF/OEF/OND) have TBIs which have resulted from combat events and has contributed to the growing health concerns of this population. Prior research has indicated that electroencephalogram (EEG) neurofeedback shows potential to be used as a treatment to help with symptoms of TBI and other cognitive dysfunction. During this study, we recruited both male and female Veterans between the ages of 18 and 60 who were screened for positive TBI diagnosis. Using a double blind method, the participants were administered 20 sessions of either true neurofeedback or non-responsive feedback (Sham) treatment. This treatment study was supplemented with 4 hours of fMRI - pre and post treatment - resting state data as well as cognitive evaluations in order to observe physiological changes related to EEG neurofeedback treatment. Preliminary analysis has demonstrated strengthened and more segregated resting state networks in fMRI indicating positive physiological change. Preliminary data shows promise that EEG neurofeedback can be used to supplement treatment for TBI.

B49. Resting-state EEG Data and TBI Correlations in Veteran Populations

Krupa George, Dr. Laura Zambrano-Vazquez, Dr. Richard Seim, Dr. Steven Nelson, Dr. Geoffrey May; Faculty Mentor: Dr. Sara Dolan

Department: Psychology and Neuroscience

Traumatic Brain Injury (TBI) is common in the general population, affecting over 1.7 million each year. It is especially prevalent in the Veteran population as results of blast-related injuries but its long-term effects are still poorly understood. Electroencephalography (EEG) may yield additional information that can quantify the severity of TBIs that have occurred in the distant past. Methods: Data was collected from a sample of Veterans who underwent resting-state EEG testing to assess correlations between various assessments, including type of injury, and EEG readings. Pearson correlation was used to search for EEG analytics that correlate with the number of blast injuries sustained. Results: Alpha 2 (10-12 Hz) power differences between the left temporal lobe and right-sided sites in the frontal, central, and parietal areas were sensitive markers for blast injuries regardless of how long ago the injuries occurred. Discussion: These findings suggest that the impact of blast-related TBIs can be retained for a long time, and that EEG may be a useful tool in understanding the extent of injury.
B50. Normalized EEG Coherence Correlates with Neurofeedback Success in TBI Subjects

Janani Srikanth, Steven Nelson, Laura Zambrano-Vazquez, Richard Seim, Geoffrey May; Faculty Mentor: Dr. Sara Dolan

Department: Psychology and Neuroscience

Research has shown that EEG (electroencephalogram) neurofeedback is a potentially beneficial treatment for traumatic brain injury (TBI) patients. In this setup, TBI patients received operant conditioning to normalize the abnormal power distributions at individual electrodes and the covariations between electrode pairs’ EEGs. The purpose of the study was to investigate possible predictors of improvement in a patient’s EEG, and determine whether one predictor was more accurate than another. The results indicate that the change in covariance/coherence between electrodes is a better predictor of improvement in a patient’s EEG (from pre-treatment to post-treatment) than the individual electrodes’ spectral power distributions. This experiment demonstrates that brains that have undergone widespread damage are capable of conducting complex tasks through neurofeedback, indicated by the role of covariance/coherence in patients who improved, further suggesting that this method of EEG neurofeedback could be instrumental in the treatment of traumatic brain injury.

B51. Prevention of Death by Suicide in OEF/OIF Veterans

Kensi Boenker, Dr. Laura Zambrano-Vazquez, Dr. Richard Seim, and Dr. Eric Meyer; Faculty Mentor: Dr. Sara Dolan

Department: Psychology and Neuroscience

Rates of death by suicide have steadily risen among veterans returning from Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF). It has been estimated that an average of 20 veterans die by suicide every day. Current estimates greatly contrast from previous historical trends that have shown a decrease in suicide during times of war, which highlights the unique differences between OEF/OIF veterans and aging veterans from past wars. The Interpersonal Theory of Suicide (IPTS) has shown to be an important tool in the assessment of potential risk of suicide, which considers the role of three major components (“perceived burdensomeness,” “thwarted belongingness,” and “acquired capability” (Joiner, 2005)). In addition to using the IPTS as a source for assessing suicide risk, prevention should be emphasized throughout the veterans’ most vulnerable times at the beginning of deployment and through the transition process by implementing programs that provide social support for the veteran. This poster reviews recent research concerning suicidal ideation and suicide risk with the purpose of analyzing modern military culture, testing the effectiveness of assessing potential risk of suicide through measures derived from the IPTS, and utilizing effective programs of social support to decrease the likelihood of death by suicide.
B52. Reasons for Non-suicidal Self-Injury in Veterans Diagnosed with PTSD: The Role of Emotion Regulation

Lauren Longcor, Nathan Kimbrel, Ph.D., Eric Meyer, Ph.D., Sandra Morissette, Ph.D., & Bryann B. DeBeer, Ph.D.; Faculty Mentor: Dr. Sara Dolan

Department: Psychology and Neuroscience

Introduction: An accumulating literature indicates that non-social self-injury (NSSI) is common in veterans diagnosed with post-traumatic stress disorder (PTSD; Kimbrel et al., 2015). However, little is known about the reasons for engaging in NSSI in this population. The initiation of NSSI is associated with both interpersonal factors, such as communicating with others (Muehlenkamp et al., 2012) and emotion regulation difficulties (Turner et al., 2012). This study examines the association between reasons for engagement and NSSI behaviors. It was predicted that reasons associated with interpersonal factors (e.g., communication with others, or to get out of doing something) and emotion regulation (e.g., escaping bad feelings, or to feel something) would be associated with NSSI behavior. Method: Veterans (n = 100) diagnosed with PTSD completed the clinician administered Self-Injurious Thoughts and Behaviors Questionnaire (Nock et al., 2007). Results: Results indicated that 15% of veterans (n = 15) diagnosed with PTSD engaged in lifetime NSSI behavior. NSSI behavior was associated with emotion regulation, β = .50, p = .002, R²Δ = .26, but not with communicating with others. The final model explained 30% of the variance in NSSI behaviors. Discussion: Difficulties in emotion regulation was associated with NSSI behaviors. Study limitations include the cross-sectional design, and that only veterans who were enrolled in VA care were included. These findings suggest the need for the development and validation of treatments for NSSI that incorporate emotion regulation skills for veterans diagnosed with PTSD.

B53. Predictors of Resilience Following Traumatic Exposure

Jeff Rossiter, Laura Zambrano-Vazquez Ph.D., Richard Seim Ph.D. and Eric Meyer Ph. D.; Faculty Mentor: Dr. Sara Dolan

Department: Psychology and Neuroscience

Returning Veterans face many potential difficulties upon readjusting to civilian life including Posttraumatic Stress Disorder (PTSD). One of the more striking features of PTSD is the extreme variability seen in individuals’ susceptibility to its development following traumatic exposure. Even though many Veterans will experience similar traumatic experiences during war, only a certain percentage will develop PTSD while the others are said to be resilient. Understanding the differences between the resilient and susceptible populations could be the key to developing more effective treatments for PTSD. This poster reviews recent research regarding some predictors of resilience to the development of PTSD following traumatic exposure; including various biological markers, genetic markers, and various psychosocial factors.
B54. An Examination of Alcohol, Depression, and Quality of Marriage as Predictors of Family Functioning in a Sample of U.S. Veterans

Mollie Shin and Suzannah K. Creech; Faculty Mentor: Sara Dolan

Department: Psychology and Neuroscience

Since the return of veterans serving in Iraq and Afghanistan the integration back into civilian life has been a concern of health care providers in the military community. Notable aspects of this integration include healthy marital and family functioning. The topics of many recent studies have focused on the adverse effects that PTSD has on marital and family functioning. However, few studies have addressed the effects that alcohol and depression have on the same variables. This study is of importance because past research has indicated that PTSD rarely occurs without the company of alcohol abuse and depression. Using a hierarchical linear regression of the responses from a web-based survey done by 75 veterans with children between the ages of zero and eighteen the current study examined the comorbid effects of alcohol and depression as well as the presence of marriage quality on family functioning. After examining demographic predictors, the results of this study revealed that a model that included alcohol and depression uniquely explained variance in family functioning. A third model, which included the Quality of Marriage Index better explained variance in family functioning relative to the model of comorbid alcohol and depression alone. In the final model, depression and quality of marriage were significant factors in predicting family functioning. Considering that family functioning is a powerful influence on overall health, findings from the present study indicate treatment of depression as well as an emphasis on a healthy relationship between intimate partners postdeployment may be advantageous for improving family functioning.

B55. What Is on Your To-Do List?: A Computerized Linguistics Analysis of Daily Intentions in Young and Older Adults

Alexandra M. Villagran, Mary V. High, Brittany M. Ripperger and Michelle N. Dasse; Faculty Mentor: Dr. Michael Scullin

Department: Psychology and Neuroscience

People rely on prospective memory (PM), remembering to perform a future action, every day. Kliegel and Martin (2003) suggest that PM forgetting composes at least 50% of all memory errors. However, there is little to no work on which PM tasks individuals perceive as most common. We previously assessed the frequency with which young adults (age 18-29 years) perceived that they must perform daily PM tasks such as taking out the trash or meeting friends. Here, we assessed the frequency with which older adults (age 60-87 years) perceived that they must perform these same tasks. We hypothesized that young and older adults would show stark differences in their perceptions of everyday PM tasks, particularly in the health domain. Using Amazon Mechanical Turk, 63 young adults and 65 older adults ranked the personal frequency of needing to perform PM tasks in four categories: house/organizational, health, work/school, and social/leisure. Surprisingly, only two tasks showed age differences: taking prescribed medication (more frequent in older adults) and working out (more frequent in younger adults). Additionally, participants were allowed to name other PM tasks they perceived as most frequent. We used Linguistic Inquiry and Word Count (LIWC) software to analyze the data for variables related to task category. Older adults were more likely to use words related to health (e.g. flu, pill) or ingestion (e.g. dish, eat), whereas young adults were more likely to use body-related words (e.g. teeth, face). Thus, health appears to be the category most sensitive to age differences in task frequency.
B56. Take a Lunch Break: Time of Day is Associated with Educational Learning Performance
Taylor Terlizzese, Rachel West, Zachary Pranske, and Chenlu Gao; Faculty Mentor: Dr. Michael Scullin

Department: Psychology and Neuroscience

Students seldom consider whether time of day affects their learning, as many classes are scheduled from early morning to late evening. Wile and Shouppe (2011) suggested that student achievement was higher before noon and in the afternoon. In the current study, we examined whether the time of day correlated with performance on laboratory measures of STEM learning material. Forty-one Baylor undergraduate students completed two experimental sessions. During session 1, participants completed a virtual microeconomics course along with a fluid intelligence test, the Raven’s Advanced Progressive Matrices Test. Participants returned seven days later at the same time for session 2, and completed an intelligence test and a microeconomics test that included problems they were originally trained to perform as well as problems that required integration of learned principles. We categorized participants based on time of participation [Morning (n=15): before 12pm; early afternoon (n=6): 12-2pm; late afternoon (n=20): after 2pm]. A one-way ANOVA showed that students’ fluid intelligence scores did not differ across time groups, F(2,38)=0.74, p=.484. However, students in different time groups scored significantly differently on the microeconomics test, F(2,38)=3.34, p=.046, [morning=10.93(6.04), noon=3.33(3.67), afternoon=8.75(6.61)]. Those who participated around noon also tended to perform the poorest on microeconomics integration items, F(2,38)=2.52, p=.094, [morning=1.80(2.24), noon=0.17(0.41), afternoon=0.7(1.56)]. The results of the pilot study suggested a significant decrease in performance on educational learning tests when administered in the early afternoon. To avoid a post-lunch dip in educational performance, college students can benefit from scheduling courses and study sessions in the morning and late afternoon.

B57. Age Effects on REM Sleep and Prospective Memory Consolidation
Hannah Ballard, Kiersten Scott, Stacy Nguyen, Ali Villagran, and Cole Rowley; Faculty Mentor: Dr. Michael Scullin

Department: Psychology and Neuroscience

Prospective memory refers to remembering to execute delayed intentions, or remembering to remember (e.g., remembering to reply to a text after class or take medication with dinner). Before they can be executed, prospective memories must be consolidated into long-term memory. Consolidation occurs during slow-wave sleep (SWS) and rapid eye movement (REM) sleep, and interestingly, SWS and REM sleep change in quantity and quality with increasing age. Therefore, we hypothesized that prospective memory consolidation would decline with advancing age to the extent that SWS and REM sleep decline. Participants (N=61) ages 18-85 spent three nights in a light, temperature, and sound-controlled sleep laboratory where we continuously monitored their sleep using 21-channel electroencephalography (EEG), electrooculography (eye movements), mentalis electromyography (muscle tone), and respiratory effort and airflow. Following a baseline night, participants completed computerized tasks for either a control task or an experimental prospective memory task: Remember to press the “Q” key when seeing the word “table” during any computerized task. We measured the number of times participants pressed the Q key in response to the word “table” during any computerized task. We found that young adults showed significantly greater consolidation of prospective memory (M = 63% correct responses) compared to older adults (M = 41% correct responses), p = .03. Prospective memory was specifically associated with the duration of REM sleep, r = .42, p < .001, but not SWS, r = .05, even after controlling for age. This finding indicates that changes in sleep physiology with advancing age contribute to age-related declines in prospective memory functioning.
B58. The Relationship between Activation Synthesis and the Positivity Effect
Cole Rowley, Stacy Nguyen and Ali Villagran; Faculty Mentor: Dr. Michael Scullin

*Department: Psychology and Neuroscience*

Sleep is an important aspect of human health. However, the function of one aspect of sleep remains particularly elusive due primarily to its subjective nature: dreaming. Dreaming most commonly occurs in the rapid eye movement (REM) stage of sleep, which has been implicated in many important cognitive processes. Although dreaming has not yet been shown to contribute to these beneficial components of sleep, theories for its purpose include memory consolidation, cognitive justification of randomly synchronized neuronal firing (activation synthesis), and emotional processing. Additionally, we found that dream content is also related to one’s personal affect. As part of a larger study including wake-daydream and nap-dream conditions, young adults \(n = 86\) and older adults \(n = 77\) randomly assigned to the nap-dream condition slept for approximately one hour. Upon awakening, participants recorded their memory of any dreams, which were analyzed using the Linguistic Inquiry Word Count (LIWC) program. The LIWC data demonstrated that older adults remembered generally more positive moments within their dreams compared to younger adults. This comparison aligns with the established phenomenon known as the positivity effect, which states that as an individual’s age increases, so too does their focus on the positive aspects of their memories. Because this effect persisted during participants’ dreams and not while awake, we infer that dreams must play a role in the development of the positivity effect. We hypothesize that the improved emotional processing through dreaming that comes with age may play an integral part in leading to these higher levels of positivity.

B59. Terms of Endearment and Perceptions of Attorney Competence
Gabrielle Fowler and Tierra Carter; Faculty Mentor: Dr. Charles Weaver

*Department: Psychology and Neuroscience*

In August 2016, the American Bar Association (ABA) approved a resolution to bar discriminatory and harassing language when its members were engaged in any way with the practice of law (Laird, 2016). While this measure prohibits the use of such language with threat of penalty, its actual effectiveness remains to be seen. For instance, the resolution includes language that states that the ban applies only when lawyers should reasonably know that their language is harassing or discriminatory (Olson, 2016), increasing the burden of proof for the target of discriminatory speech. We investigated the perception of terms of endearment when used towards men and women targets. Specifically, we explored the impact of judge use of terms of endearment on perceptions of an attorney’s effectiveness. We expected that benevolent sexism beliefs and regional background play a role in whether or not an observer perceives gender bias.
B60. Does Eyewitness Race Bias Mock Jurors’ Evaluations of Evidence?

Andrew Hughes, Bethany Gray and Brittany Nesbitt; Faculty Mentor: Dr. Charles Weaver

*Department: Psychology and Neuroscience*

Mock jury research to date has studied the effects of race on mock jurors’ decision-making by manipulating the race of many different characters in the courtroom, including character witnesses (Maeder & Hunt, 2011), victims (Mazella & Feingold, 1994), and defendants (Mitchell, Haw, Pfeifer, & Meissner, 2005). However, no research to date has studied the effects of the race of an eyewitness to the crime on mock jurors’ evaluations of the crime and of the credibility of the witness. We investigated the effects of both defendant and eyewitness race on mock juror verdict confidence and witness credibility ratings, as well as differences in these effects based on the same-race or other-race status of the mock juror as compared to the defendant and eyewitness. Participants read about a fictitious court case regarding an armed robbery in which the race of the defendant and of the eyewitness (Black or White) were manipulated, to create four separate combinations of defendant and eyewitness race: two same-race conditions and two cross-race conditions. Participants then rendered a verdict in the case, reported their confidence in the verdict, and rated their perceived credibility of the eyewitness account. We expected that mock jurors would be more confident in a conviction and would rate the eyewitness as less credible when the defendant and eyewitness are of the same race, and that this effect will be stronger when both the defendant and eyewitness are members of the mock juror’s racial outgroup.

B61. Do Violations of Justice Prime Convictions in Jurors?

Elysse Reyes, Erika Arvidson, Bethany Gray, Andrew Hughes, Rachel Sangster, Ann Iftikhar, Courtney Kurinec and Brittany Nesbitt; Faculty Mentor: Dr. Charles Weaver

*Department: Psychology and Neuroscience*

In 2014 and 2015, several high-profile cases involving police officers killing unarmed black males (e.g. Michael Brown, Eric Garner, Tamir Rice) failed to go to trial (Casselman, 2014; Goodman & Baker, 2014; Williams & Smith, 2015). Grand juries, which determine whether criminal charges should be brought to trial, failed to indict these officers, sparking public outrage (Goodman & Baker, 2014). We investigated if failures of the justice system such as these will prime jurors to correct this failure by convicting more easily. We utilized a 3 (Just/Unjust/Neutral Article) x 2 (Similar/Dissimilar Case) factorial design to present mock jurors with one of three news-style articles involving either a grand jury’s just or unjust failure to indict in an officer-related shooting or an unrelated article. Jurors then reviewed evidence and rendered a verdict on either a related or unrelated criminal case. Previous research in our lab found that reading about a guilty verdict or a perceived unjust acquittal increased likelihood of conviction on an unrelated case. Further, general pretrial publicity has been shown to have a stronger influence on juror decision-making when jurors decide on a similar case (Greene & Wade, 1988). Thus, we expected that juror verdict decisions would be primed by a complex perceived violation of justice, particularly when the cases are similar.
Poster Presentations
Baylor Sciences Building
Session Two
March 30-31, 2017
SESSION TWO: Thursday, March 30th and Friday, March 31st
Baylor Sciences Building – 1st Floor

PHYSICS

C1. Combining Methods for Large Nearly Singular and Singular Matrices
Christopher Chamness; Faculty Mentor: Dr. Walter Wilcox

*Department: Physics*

Noise subtraction techniques can help reduce the statistical uncertainty in certain Lattice QCD calculations. Some of the noise suppression techniques include polynomial quark matrix methods, eigenspectrum deflation methods, and combination methods. This looks to investigate a method combining two techniques to invert large nearly singular matrices. The two methods used are Rank Reduced Krylov Subspace and Tikhonov Regularization. By using the Rank Reduced method zero eigenvalues do not contribute and are effectively ignored and while also reducing the effective rank of the matrix to save on calculation time. While the Tikhonov Regularization scales small singular values so the solution doesn’t blow up. This combination method focuses on minimizing \( |b - Ax|^2 + \|x\|^2 \), instead of just the norm of residual \( |b - Ax|^2 \) to keep solutions in a physically interpretable scale. This method was found to be a very effective on the test matrices used and should translate to other similar matrices.

C2. New Method for Prosthetic Foot Strain Analysis
Christlynn Henderson; Faculty Mentor: Dr. J. S. Olafsen

*Department: Physics*

A flexible prosthetic foot design was proposed in a balance and mobility study in 2014. Our goal in this project is to develop an image analysis method that provides more spatial information than traditional techniques on the stress-strain response of this proposed foot design. Through this new optical technique we can more precisely compare stress-strain curves on prosthetic feet. At the same time, we will examine the use of different materials to construct the prosthesis. The materials chosen to be tested through this study are Delrin, Nylon, PVC, and Polypropylene. A large and small prototype was made from each of these materials to give 8 testable feet in total. The focus of this project is to obtain location-dependent strain values along the entire foot, rather than at a single point, in order to more carefully compare the mechanical response of the prototype design.
C3. Metal and Organic Thin Film Growth
Nick Larson, Zachary Liege, Blake Birmingham, and Weigang Lu; Faculty Mentors: Dr. Zhenrong Zhang and Dr. Kenneth Park

*Department: Physics*

The study of the interaction of organic molecules with various metal and semiconductor substrates is important for applications in sensing, light emission, and transistors. Therefore, it is important to control thickness, topographical roughness, and other such surface characteristics of both organic molecules and substrates so that the proper study of the substrate-molecule interaction can be performed. The primary goal to my project has been to grow thin films with precise control of thickness and roughness for these various substrates and deposited organic molecule layers. Thus far the procedure of depositing exact thickness and molecular distribution of the organic molecule Copper Phthalocyanine (CuPc) has been determined. Samples using this process have been characterized by Scanning Tunneling Microscopy and Tip Enhanced Raman Spectroscopy. These samples serve to improve these microscopy techniques, and the field of sensing in general. Additional work with silver as the evaporating material has also been done, and future efforts will focus on more surface materials.

Bryonna Neff, Blake Birmingham and Intra M. Ghimire; Faculty Mentor: Dr. Zhenrong Zhang and Dr. Howard Lee

*Department: Physics*

Tip-enhanced Raman spectroscopy (TERS) is a useful technique for studying the chemical composition of a sample. In TERS, a metallic tip is approached to the sample while light is focused on the same area. The tip enhances the electromagnetic field, which excites vibrational modes in the sample. The resulting signal contains peaks which are characteristic of the specific molecules in the sample. One of the main advantages of TERS in comparison to other methods of Raman Spectroscopy is the possibility of confining the signal excitation location to less than 1nm. In addition, TERS can be used in scanning tunneling microscopes to image individual molecules. We aim to improve the results obtained in this process by placing the tip at the end of an optical fiber. In this setup, instead of having an external light source focused on the sample, the electromagnetic signal is carried to and from the tip along the fiber, leading to better results. Sending the electromagnetic signal along the fiber reduces background signal, producing more sensitive results. It also increases light confinement so that a smaller portion of the sample is excited, which leads to images with a better spatial resolution. This research project focused on producing and testing these tips through a chemical etching process in hydrofluoric acid.

C5. Gold Tip Etching in 1:1 HCl: EtOH at Varying Ring Diameters
Joel Rigor, Blake Birmingham and Zack Liege; Faculty Mentors: Dr. Ken Park and Dr. Zhenrong Zhang

*Department: Physics*

The goal of this project is to find a method in which we can produce gold tips that are usable for STM through the means of chemical etching by using different parameters. Changing the ring diameter, one of many parameters that we changed, provided us with results that we typically do not expect and lead us to take a closer look into the characteristics of the tips. With this research, a gold wire of a very small radius is partially submerged within a solution containing
1:1 HCl: EtOH. Also, a gold ring is used in order to control where the wire is etched and a voltage is placed upon our system in order for the etching process to occur. During the tip etching process, four different rings were used each with varying diameters. As the tips are etched, the maximum amount of current being drawn to the system is recorded along with the time it takes for the tips to etch. We observed that the currents being drawn into each separate system were closely related. We also observed that some tips took longer than what we expected. Further investigation of the characteristic of the tips etched through the use of SEM will provide us a better look at whether or not these tips are suitable for STM.

C6. Effects of Heat Transfer in Dust Aggregates on the Photophoretic Force
Dustin Sanford: Faculty Mentor: Dr. Lorin Matthews

Department: Physics

The behavior of dust aggregates under the influence of the photophoretic force may play a role in the formation of planetary embryos in protoplanetary disks. Photophoresis has been proposed as a mechanism for aiding in the creation of high density dust regions, which are required by many theories for planetary embryo growth. High luminosities caused by rapid embryo formation can generate a temperature gradient in the dust materials that subjects dust to the photophoretic force. This numerical simulation evaluates the effects of heat transfer processes on the photophoretic force in irregular aggregate grains built from spherical monomers. Results show that the linearity of the temperature gradient within a dust aggregate depends on the size of the contact area between monomers. Large contact areas yield linear temperature gradients, while small contact areas cause non-linear temperature gradients with hot spots often located in the center of the aggregate. As a result, aggregates with small contact areas have a larger variance in drift velocity direction than aggregates with large contact areas. Both populations produced negative photophoresis, and the distribution of the drift velocity direction is representative of observations in experimental studies. Results also show that while small contact areas produce a greater variance in the magnitude of the photophoretic force and drift velocity, the average drift velocity is the same for both large and small contact areas and is weakly correlated with the number of monomers in an aggregate.

C7. Commissioning the Front-End Electronics for the CMS Endcap Hadron Calorimeter Upgrade
Adryanna Smith, Jordan Potarf, John Lawrence and Andrew Baas; Faculty Mentor: Dr. Jay Dittmann

Department: Physics

In the spring of 2015, the Large Hadron Collider (LHC) at CERN outside Geneva, Switzerland, began a new era of operation at a proton-proton collision energy of 13 TeV. To optimize the data gathered from collisions at higher beam energies and intensities, the Compact Muon Solenoid (CMS) detector is scheduled to be upgraded beginning in December 2017. We worked to characterize and calibrate the new front-end electronics, which include charge integrator and encoder (QIE) cards, for the CMS Hadron Calorimeter (HCAL). These electronics are necessary to extract more precise timing data and to combat the signal degradation observed over time due to radiation exposure. We tested over 700 QIE cards for direct shipment to CERN, where they have been assembled into readout modules and await installation. Results from the test suite show reliable performance in the QIEs and promising improvements over current detector technology.
C8. Orbit Determination of 2004 Lexell: Applying Gauss’s Method

Thayer Walmsley; Faculty Mentor: Dr. Dwight Russell

Department: Physics

Orbits are uniquely defined by six orbital elements. The goal of this research project was to determine the viability of using Gauss’s Method to determine these elements for 2004 Lexell. The asteroid was chosen based on its size and ability to be observed from the Paul and Jane Meyer observatory during the research period. Gauss’s method requires three position measurements of right ascension and declination as well as the time intervals between them. A key determinant in the viability of this method is these time intervals. The research assessed what range of time intervals produced reasonable orbits for the asteroid. Observations were conducted using a 24 inch Ritchey-Chretien reflective telescope. Supplementary data was obtained from the IAU minor planet data center.

C9. Exoplanet Observations Using Transit Photometry

Rocky Katch; Faculty Mentor: Dr. Dwight Russell

Department: Physics

Exoplanet research seeks to find an extrasolar planet that is potentially habitable for humans. In this project, stars which were thought to have unverified exoplanets orbiting them were observed using the 24” telescope at the Paul and Jane Meyer Observatory. Utilizing the transit photometry method of exoplanet discovery, three stars were observed, one with a known exoplanet, and two with potential unverified planets. By plotting the light curve of the target stars, we looked for the dip in brightness indicative of an exoplanet transit. Of the two candidate stars, one gave no indication of a transiting exoplanet, but the second presented a very clear planetary egress. Using this egress, the potential radius of the planet was calculated; the radius, mass and density of the known exoplanet were also computed. The full transit of the potential exoplanet was not able to be observed, but the research plans to continue in the summer.

C10. Stellar Pulsations of White Dwarf PN A66 43

Matthew Zakrzewski and Willie Strickland; Faculty Mentors: Dr. Dwight Russell, Mr. Campbell, Dr. Michael Endl

Department: Physics

White dwarfs are the final step in the life cycle of most stars. So by studying white dwarfs, we are able to learn more about a star’s stellar evolution. I will summarize my research as part of the Whole Earth Telescope (WET) observation of white dwarf PN A66 43 in order to learn the chemical composition of the star. My part was to observe the pulsations from the star, and calculate the peak frequency of the star’s pulsation period, and confirm it with previous results. I will go through the observation steps, and analysis, using a discrete Fourier transform and discuss my results.
MATHEMATICS

C11. Necessary Conditions on Electrical Potential for the Formation of Dirac Cones
Reese Martin; Faculty Mentor: Dr. Tracy Weyand

Department: Mathematics

This work focuses on the electrical potential conditions necessary to produce Dirac cones in the spectrum of the infinite periodic graph representative of graphene. To study these electrical potentials, I needed to calculate the spectrum that results from the Schrodinger operator acting on the infinite periodic graph. By Floquet-Bloch theory we can find the spectrum of the Schrodinger operator acting on the infinite periodic graph by calculating the spectrum of the magnetic Schrodinger operator on the fundamental domain of the infinite graph over all possible alphas. The variables, alpha1 and alpha2, used in Floquet-Bloch theory are related to the linearly independent vectors used to generate the infinite graph from the fundamental domain in the $Z^2$-periodic case, of which graphene is a part. The study of Dirac cones is helpful due to the many qualities they impart to materials such as massless fermion flow through the material and incredible tensile strength.

CHEMISTRY AND BIOCHEMISTRY

C12. Thiosemicarbazone Compounds as Inhibitors of Cruzain for the Potential Treatment of Chagas' Disease
Tuate Dambo; Faculty Mentors: Dr. Mary Lynn Trawick, Samuel O. Odutola, Dr. Erica N. Parker, and Dr. Kevin G. Pinney

Department: Chemistry and Biochemistry

*Trypanosoma cruzi* (*T. cruzi*) is the parasite that causes Chagas' disease. Charles Darwin was said to have died from the symptoms of Chagas' disease. *T. cruzi* is in the same phylum (phylum Kinetoplastea) as the parasite that causes sleeping sickness (*T. brucei*). Cruzipain is the major cysteine protease of *T. cruzi*. It is a sulfated glycoprotein that plays a major role in the metabolism and life cycle of the parasite—which makes the inhibition of cruzipain an effective criterion for drug design. A recombinant form of cruzipain known as cruzain—which a member of the papain family and a cathepsin-L like enzyme was used in this study. Thiosemicarbazone compounds are efficient in the inhibition of cathepsin-L. In a collaborative project between the Trawick and Pinney research groups at Baylor University, the reactions between different thiosemicarbazone compounds (less than 10 $\mu$M) and cruzain substrate Z-Phe-Arg-AMC in the presence of an enzyme were monitored using a fluorogenic enzyme assay. The enzyme assay measured the cleavage of 7-amino-4-methylcoumarin (AMC, a fluorescent compound) from Z-FR-AMC (a non-fluorescent compound). IC$_{50}$ was used to measure the concentration of the compound required to reduce cruzain activity by 50%.
C13. Cruzain Inhibition by Thiosemicarbazone Compounds for Potential Therapeutic Use Against Chagas Disease

Isaac Lill; Faculty Mentor: Dr. Mary Lynn Trawick, Samuel O. Odutola, Dr. Erica N. Parker and Dr. Kevin G. Pinney

Department: Chemistry and Biochemistry

Chagas disease, the result of infection by the parasite *Trypanosoma Cruzi*, is responsible for about 12,000 deaths per year worldwide and causes severe chronic illness for many more people. Treatment during the acute phase when the parasite is found in the blood is effective, but this phase may only last a few weeks and is often asymptomatic. There are currently no approved treatments that are effective in eliminating the parasite during the chronic phase after it has migrated into the tissues. One promising avenue of research into treatment of the chronic phase is the inhibition of cruzipain, a cysteine protease that is necessary for the parasite’s survival and reproduction. This study, a collaborative work between the Trawick and Pinney groups, used cruzain, which is a recombinant form of cruzipain and is a cathepsin L like enzyme. Thiosemicarbazone compounds that had previously been shown to be effective inhibitors of cathepsin L were tested against cruzain. Enzymatic activity of these thiosemicarbazone compounds was determined by using a fluorogenic enzyme assay to assess the cleavage of 7-amino-4-methylcoumarin (AMC) from the cruzain substrate Z-FR-AMC. Effective inhibitors with a low IC\textsubscript{50} were further tested to determine other kinetic parameters. Progress curves indicate that these compounds are time-dependent inhibitors of cruzain and merit further investigation into their potential for treating Chagas' disease.

C14. Computational Studies on Vaccine Antigens Against Lymphatic Filariasis

David Le; Faculty Mentor: Dr. Kevin Shuford

Department: Chemistry and Biochemistry

A significant public health concern is the control of parasitic nematodes in order to minimize the burden of lymphatic filariasis (LF) in endemic regions. Using genetic engineering technology and protein expression systems, vaccine antigens have been cloned and expressed as recombinant proteins in yeast and bacterial expression platforms in order to accelerate the development of vaccine against LF. With this preliminary evidence, it is believed these proteins are expressible for pilot-scale biomanufacturing for preclinical trials, but further evaluation of the vaccine antigens will prove useful for accelerating and prioritizing them down through the development pipeline. Herein, we propose a computational approach towards studying these vaccine antigens based on primary sequence analysis via algorithmic epitope analysis and structure-homology modeling of tertiary structures for classical molecular dynamics (MD) simulations. MD simulations will yield possible topographical regions on the antigens wherein possible binding capacity could be identified. This computation-based structural vaccinology approach will validate basic methodology for future experimental endeavors for the development of a vaccine against LF.
C15. Ongoing investigation of Hetero-substituted Maltol Metal Complexes

Amanda Hoogerbrugge, Michael Spiegel and Shamus Truksa; Faculty Mentor: Dr. Patrick Farmer

Department: Chemistry and Biochemistry

The Farmer group has synthesized a number of hetero-substituted maltol derivative that show unusual photochemistry when chelated to metal ions. In this URSA funded work, microwave irradiation was implemented to improve on the synthesis of 3-hydroxy-2-methyl-4H-thiopyran-4-thione (Httma or dithiomaltol) and explore the synthesis of other novel ligands. During this study a new method for making 3-hydroxy-2-methyl-4-selenopyrone (Hsma or selenomaltol) was developed which proved to be a vast improvement to previous syntheses. This allowed a variety of transition metal complexes to be generated, which include the first reports of selenomaltol metal complexes. The metal complexes were characterized by crystallography, absorption spectroscopy, mass spectrometry and NMR. In collaboration with the Shuford group, the hetero-substituted maltol were found to undergo a large increase of aromaticity when bound to a metal ions. A brief study on the fluorescence of zinc dithiomaltol and zinc selenomaltol was also conducted.

GEOSCIENCES

C16. Soil Black Carbon Erosion and Sediment Black Carbon Accumulation in a Central Texas Woodland

Eugenie Schieve; Faculty Mentors: Dr. William Hockaday and Dr. Joseph White (Biology)

Department: Geosciences

The Balcones Canyonlands National Wildlife Refuge is located along the eastern edge of the Edwards Plateau in Texas, and was established in 1992 for the purpose of conserving habitat for two endangered bird species. The landscape is composed of hilly, mesa-valley terrain, which is mostly covered by grasslands and woodlands dominated by juniper with intermingling of various oak species. Based on historical photo analysis and tree fire scar dendrochronology, the area has experienced major land use changes over the last century due to wildfire, logging, and drought affecting soil stability and woodland species composition. A previous study on soil black carbon showed that site-specific soil erosion potential and time since last fire may act as controls on soil black carbon concentrations. However, the black carbon transport flux, depositional fate, or the magnitude of soil erosion effects upon the black carbon budget are unconstrained at the watershed scale. To address this, we sampled the sediments accumulating in small ponds constructed during the 1950s for livestock watering. We are quantifying black carbon in sediments using solid-state $^{13}$C nuclear magnetic resonance spectroscopy. Preliminary data suggest that the pond sediments are a black carbon sink. Black carbon comprises 15% – 25%, of the sedimentary organic carbon, as substantial enrichment relative to soils within the watershed. We will present an early assessment of the black carbon erosion and sediment accumulation rates in first- and second-order watersheds.
C17. Algae Strain Identification for Wastewater Treatment: Phase 2 Experiment Report
Katherine White and Ryan Parker; Faculty Mentor: Dr. Scott James

Department: Geosciences

Algae are prime candidates for an environmentally friendly solution to wastewater treatment as they effectively consume phosphorous, nitrogen, and CO2 nutrients readily available in wastewater. Five strains (Aphanocapsa sp., Chlamydomonas globosa, Chlorella vulgaris, Pediastrum sp., Scenedesmus bijuga) were studied based on their ability to grow in wastewater and for their potential value when harvested. Three additional strains (Botryococcus braunii, Haematococcus pluvialis, and Neochloris oleoabundans) were selected for their high growth rates, established track record for wastewater treatment, prevalence in freshwater lakes, and ability to generate valuable bio-products. Following this first round of experiments testing eight algae species for abilities to produce biomass and treat wastewater, the three most successful species, Aphanocapsa sp., Botryococcus braunii, and Chlorella vulgaris were selected for further study. Over the course of three weeks, these species were grown in two sets of experiments run in triplicate. One set grew algae in recommended media and another in wastewater. Prior to and after experimentation, turbidity, dissolved oxygen, nitrogen, and phosphorous data were taken to assess changes in water quality. In addition, daily pH measurements and fluorometry data (a surrogate for chlorophyll-a) were taken as a measure of carbon consumption and growth rate, respectively. Data from each set were used to quantify how well algae grown in wastewater compared to algae growth in the recommended growth medium, which served as the baseline set of experiments. Of the three selected for extended study, Botryococcus braunii, and Chlorella vulgaris were most successful as they significantly outcompeted the baseline set, reached exponential growth rates soonest, and showed higher biomass and fluorometer readings overall. Moving forward, these two species will be used for a larger scale outdoor implementation in the future.

C18. Modeling Colloid Flow in Variable Aperture Fractures
Ryan Compton; Faculty Mentor: Dr. Scott James

Department: Geosciences

The goal of this research is to examine the impact of spatial variation in attachment strength on mono- and polydisperse colloid transport relative to the case of no spatial variation. The research also aims to examine the impacts of cross-correlation between two spatially varying fields: aperture and attachment strength, as well as the impact of well-connected high- and low-aperture pathways on mono- and polydisperse colloid transport.

C19. An Integrated Model for EOR Using Downhole Steam Generation
Payne Winter and Jiajun (Dylan) Jiang; Faculty Mentor: Dr. Scott James

Department: Geosciences

Alberta, Canada has the world’s largest bitumen reserves. However, because of the potential for energy losses and environmental impacts, traditional thermally enhanced oil recovery (TEOR) methods such as steam-assisted gravity drainage need to be optimized before bitumen can be economically produced. The Solvent Thermal Resource Innovation Process (STRIP), a downhole steam-generation technology, has the capacity to improve traditional methods by
C20. A Surface Water Quality Study with Field Instruments to Assess Agricultural Impacts on a Rural Property in McLennan County, Texas

Chance Britton; Faculty Mentor: Wayne Hamilton, MS

Department: Geosciences

The purpose of this research is to assess current land use practices on surface water quality. Onsite and adjacent land use can potentially degrade water quality below Texas Commission on Environmental Quality (TCEQ). Growth of aquaculture is becoming a major polluting activity in many countries, and irrigation return flows carry salts, nutrients and pesticides. Tile drainage rapidly carries leachates such as nitrogen to surface waters. These factors will potentially dissolve the oxygen any animals in the water need to survive. The environmental assessment will consist of three man made tanks (ponds) and a tributary of Little Tehuacana Creek in Elm Mott, Texas just north of Baylor off of Leroy parkway. One water quality sample will be taken at three man made ponds, and one stream of the 400 acre rural property. These samples, from each source of water, will be taken to perform tests, using various instruments provided by the Baylor Geosciences Department, to measure the pH balance (for acidity), levels of nitrate, the conductivity (salts present), Dissolved oxygen, etc. Given the TCEQ standard maximums and minimums of each of these tests show any normality or irregularity of the results, leading to see what may, or may not, be affecting the surface water on the property. Data will be provided in tables and graphically analyzed to show comparison of the water samples to their standard measured parameters. The Assessment will also include an understanding of surface geology and soils present on the land. The results of the water samples will be compared to state and scientific standards to assess property impacts.

C21. Comparison of Water Features on Mars and Earth

Kaitlyn Hoffman; Faculty Mentor: Wayne Hamilton, MS

Department: Geosciences

Mars was not always a dry dusty world like it is today, at one point in time it had lakes, rivers, and even oceans similar to Earth’s. With the exploration of the Red Planet by NASA orbitals and rovers many different water features have been discovered that resembles those on earth. The NASA exploration craft images will be the main source of information for this research. This research will compare Mars and Earth water features that include: 1) deltas, 2) meanders, 3) gullies, 4)
evaporites, 5) ice, and 6) gullies. By examining the NASA images taken of these water features and comparing them to those found on Earth we will learn about the environment in which they were formed. In recent years many new and unexpected things have been discovered on the Red Planet that paints a more detailed picture of water systems on Mars both in the past and present. Structures such as ancient deltas and rivers hold records of a once dynamic river systems or evaporate deposits that should be unstable at the Martian surface has strongly hinted the existence of groundwater beneath the dust. There are even ice layers near the Martian poles much like the ones we study in the Arctic. By comparing these two planets scientist can learn as much as they can about a planet which can only be seen through mechanical eyes. It would seem that Mars has much more in common with Earth than scientist had imagined.

22. A Case Study of a Horizontal Well Completion Project and Measured Production Changes in A Re-Entered Well, Fayette County, Texas

Reed Rightmer, Faculty Mentor: Wayne Hamilton, MS

Department: Geosciences

The Austin Chalk is an upper Cretaceous geologic formation located in south-central Texas and extends into parts of Louisiana. This area is explored for hydrocarbons due to its abundant oil and gas production. A significant rise in well drilling recently occurred due to new technology of horizontal well drilling which yielded excellent results in increased hydrocarbon production. The researched property consists of 1000 acres that is in Fayette County, near Muldoon, Texas. Geologic maps, scientific articles referencing the Austin Chalk were examined to understand field petroleum geology and well completion practices. A geographic information system DrillingInfo.com was instrumental in providing the production volumes and understanding the spatial relationship between the three wells. The purpose of this research was to investigate changes in the production of oil, gas, and water, associated with a horizontally completed Austin Chalk well drilled in 2010 and two nearby vertical wells. The 2010 to 2016 production records of the three wells were reviewed before and after horizontal well completion to understand if significant hydrocarbons were produced. In addition, adjacent property wells were reviewed to determine if offsite well projects might have impacted the three studied wells. The hydrocarbon volume increased after horizontal well completion indicated that the nearby vertical wells had additional oil and gas production.

C23. Using Raman Spectrometry to Determine Subsurface Nucleation Pressure and Temperature Conditions of the Colorado Plateau, Four Corners, USA

Hayden Johnson and Kenneth Befus: Faculty Mentor: Wayne Hamilton, MS

Department: Geosciences

A Raman Spectrometer was used to measure changes in igneous mineral structure to determine the formation pressure and temperature for rocks in the Four Corners region of Colorado, Utah, Arizona, and New Mexico. In the laboratory, ten garnet crystals with rutile inclusions from a diatreme at Garnet Ridge in the Colorado Plateau were examined. The crystals were selected based on number and density of intact inclusions and were ground and polished until select inclusions were ~150 μm from the surface. The Raman measured the crystal lattice deformation caused by pressure of the encapsulated rutile crystals not equilibrated to surface temperature and pressure. The conditions of the inclusion crystals can then be calculated and applied to rocks in which that crystal and others like it were found. By using the spectrometer measurements, the calculated inclusion crystals at surface and at mineral nucleation pressure and temperature can be de-
terminated. To find the inclusion pressure, a calculation is made that utilizes the host shear modulus and the host and inclusion volumes at surface pressure. Understanding the pressure and temperature of the crystals matches the pressure and temperature of nucleation, the formation pressure and temperature can be calculated for the Four Corner region.

**C24. Development of GPS Tracking for Seabed Sensor Arrays to Ensure Recovery of Empirical Data of Subsea Currents**

Micah Gonzales, John Will and Joe Kuehl; Faculty Mentor: Wayne Hamilton, MS

*Department: Geosciences*

Currently, there is little empirical data of real-time seabed current conditions. To fill this gap in knowledge, researchers have been placing bottom sensor arrays in areas of concern. However, these areas also happen to be heavily used by the fishing industry (which is why they are important). This has caused a high rate of sensor loss, and thereby a loss of crucial data. The sensor arrays provide for forecasting of seabed conditions, allowing for engineering to prevent failure of infrastructure placed on the seabed and fisheries management. Real-time monitoring of seabed conditions can improve forecasts of environmental hazards like pipeline failures, erosion events and harmful alga blooms. The purpose of this project is to provide a cost-effective way of recovering data collected by seabed sensor arrays in high risk areas. The location of the test sites will be the Keweenaw Peninsula and Lake Superior. The device will be low cost and attached to the base of the sensor array. The sensor array is then anchored to the seabed. When the sensor array concludes data collection, it is released to the surface. The pressure sensor in the device will notify the microcontroller when it reaches the surface and then the device will transmit GPS coordinates via a satellite network. By adding a pressure sensor to the sensor array, we will also collect information about the fluidization of the sediments using a pressure time series. The tilt sensor will provide velocity, therefore shear force. When coupled with the turbulence given by pressure, one can then produce an accurate model, and thereby forecast, of erosion. In addition, this technology can be placed in surface buoys, such that if there were an oil pipeline rupture we can quickly disperse device into the water to serve as tracers of potential oil spread.

**C25. On and Off Site Subsurface Assessment of Potential Environmental Impacts of Trichloroethylene and -Dichloroethane at Former Canada Dry Bottling Facility in Endicott, New York**

Dominic Rizzo; Faculty Mentor: Wayne Hamilton, MS

*Department: Geosciences*

This research presents the subsurface environmental assessment data from a Canada Dry bottling facility in Endicott, New York. The site contaminants probably originated from dry wells and floor drains and are primarily Trichloroethylene (TCE) and Dichloroethylene (DCE). The purpose of this research is to assess onsite and offsite TCE/DCE groundwater impacts compared to the standards set by the Department of Environmental Conservation. In the early 1990’s a regional assessment was done to understand contaminants in the neighborhoods near the bottling facility. Then 2011 ten borings that were completed as monitor wells were installed on the Canada Dry facility. The TCE and DCE data was collected from the wells into the first encounter of groundwater at approximately fourteen feet beneath the ground surface. The analytical results indicated that the TCE concentrations were ranging from 9.1 ug/L to 520 ug/L with the unrestricted land use regulatory criteria being set at 5 ug/L. The DCE concentrations were ranging from 9.1 ug/L to 33 ug/L with the regulatory standard being 5 ug/L. Vinyl Chloride was found in trace amounts of less than 5 ug/L and probably
associated with degradation products of TCE. The groundwater contamination is close to regulatory unrestricted land use standards; however, it is widespread over the bottling facility and surrounding neighborhood. The groundwater flow direction is offsite which indicates possible TCE impacts to adjacent properties surrounding the Canada Dry facility. Recommendations are made for additional assessment on and off the Canada Dry facility.

ENVIRONMENTAL SCIENCE

C26. A Multi-Use Geodatabase for Environmental Applications
Abbey Jones, Anna Hodges, Farzaneh Manouri, and Kaylee Conner; Faculty Mentor: Bruce Byars

*Department: Environmental Science*

This project was established in order to develop a free, online, natural resource database available to the public. This database was developed for multi-use, and for the public to access information on current environmental conditions in the Central Texas region. This project is unique in that there are not comprehensive, easily accessible, developed geodatabases available that include extensive information on environmental factors for multiple regions. The area of study focused on four counties in Central Texas: Bosque, Hill, Limestone, and McLennan Counties. The research team utilized a Geographic Information System, in the form of ArcMap, in order to create and upload the informative layers included in the database. Users can access maps that provide thorough data for the study area. Examples of accessible information include data on urban areas, political boundaries, transportation networks, soil types, geology, floodplains, and waste and water management for the region. The research team gathered data from different state databases and agencies, such as the Texas Natural Resources Information System, the Texas Commission on Environmental Quality, and the Texas Water Development Board.

C27. Environmental Fate and Bioavailability of Engineered Nanomaterials (ENMs) in Outdoor Wetland Mesocosms
Kori Adair, Erin Reynolds, Ben Castellon, Elizabeth Nicholson; Faculty Mentor: Dr. Cole Matson

*Department: Environmental Science*

Across many types of industry, the use of engineered nanomaterials (ENMs) is becoming increasingly common. While numerous laboratory toxicity studies have been conducted on ENMs, the implications of their potential release into the environment are not fully understood. A need exists for informative research on their potential ecotoxicological impacts. The use of environmentally relevant complex environmental exposures in artificial wetland mesocosms provides a valuable research platform to investigate nano-ecotoxicology. Colloidal copper in the form of Kocide 3000 is an emerging fungicide and bactericide used in agricultural settings, while gold and cerium nanoparticles are found in industrial waste. Gold nanoparticles have also risen as the basis of many new medical therapies. In this study we examined the chronic ecotoxicity of engineered nanoparticles (NPs) and a nano-enabled product in replicated outdoor wetland mesocosms (3.66 m long, 1.22 m wide, 0.8 m deep) over 9 months. Specifically these mesocosms were treated in weekly pulses with cerium dioxide NPs of two different sizes, gold NPs, and Kocide 3000, a nano-enabled fungicide and bactericide. Our aim was to determine the long-term fate, transport, and bioavailability of these ENMs in aquatic model species, including mosquitofish (*Gambusia holbrooki*) and two snail species (*Physella* sp. and *Lymnea* sp.). This presentation includes biomass and preliminary fish and snail bioavailability data.
C28. The Influence of Copper Oxide Nanoparticles on the Arsenic Uptake in Rice Seedlings
Madie J. Simms, Madison Stewart, and Jing Liu; Faculty Mentor: Dr. George P. Cobb
Department: Environmental Science

Arsenic naturally occurs in the environment and has been known to cause adverse health effects at environmentally relevant concentrations. Arsenic, once widely used in pesticides and by other industries, can be absorbed by rice plants from aquatic systems and accumulated. Therefore, arsenic concentrations in rice from some areas now exceed health standards. Nano copper oxide (nCuO) is becoming more widely used as a fungicide in agriculture. To test the effects of nCuO on the uptake of arsenic by rice seedlings, arsenic was added to the growth media (sand) before rice was planted, and nCuO was added during watering. Soil and seedlings were collected, dried, and digested. Plant tissues were processed in a manner that allowed analytical quantification in low mg quantities of each sample. Arsenic and copper concentrations in digests were quantified using ICP-MS. Correlation analysis was performed to assess relationships between concentrations of the two metals in seedlings, soil, and water. Results will be discussed as they relate to the role of nCuO in the uptake of arsenic by rice.

C29. Coral Reef Conservation: United States and Hong Kong
Rachael Oury (Baylor), James Wong, Minerva Tung; and Quanwen Sun (Hong Kong Universities); Faculty Mentor: Dr. George P. Cobb
Department: Environmental Science

Coral ecosystems shelter twenty-five percent of marine species; protect shorelines; and has become imperative to the fishing industry. Consequently, coral holds the upmost value, and conserving today’s coral reefs should be a primary initiative within the field of environmental science. To emphasize this, a comparison and contrast between coral conservation measures was drawn between Hong Kong and the United States to analyze the most beneficial and efficient methods, as well as what can be improved or changed. The objective of this research is not only to analyze beneficial and impractical conservation measures, but also to discuss the implications that humans have had on coral and predict future challenges to be overcome, and strategies on how to overcome them.

C30. Long Term Trends in Atmospheric Particulate Matter in Central Texas
Jessica Su; Faculty Mentor: Dr. Rebecca Sheesley
Department: Environmental Science

Atmospheric particulate matter (PM) is comprised of different sized airborne particles that can be harmful to not only the environment but also human health when inhaled. The Environmental Protection Agency (EPA) has set National Ambient Air Quality Standards (NAAQS) for particles 2.5 and 10 micrometers or smaller because these particles cause the most damage to human health (PM$_{2.5}$ and PM$_{10}$, respectively). Because a large portion of particulate matter is carbonaceous, the composition of PM can be further separated into organic carbon and elemental carbon (or soot carbon). Long term monitoring of organic carbon (OC) and elemental carbon (EC) has been conducted in Riesel, Texas, a
rural town of 1,000 people 12 miles away from Waco, Texas. Between the years of 2011 and 2016, 202 PM$_{2.5}$ samples have been collected at the United States Department of Agriculture-Agricultural Research Service site (USDA-ARS). These samples, collected every six days (EPA schedule), were analyzed by the NIOSH 5040 method using a thermal optic transmission carbon analyzer from Sunset Laboratories to determine ambient OC and EC concentrations. This five year dataset was then used to characterize long term seasonal and monthly trends at this background site. To better understand the interaction between gas and particle phase pollutants, correlation analysis’ were completed using ozone data from a local Texas Commission on Environmental Quality (TCEQ). This site represents the only regional background site for carbonaceous PM in central Texas and is of interest to understand potential impacts of PM on regional climate and human health.

C31. Characterized Source Sample Profiles Using GCMS: Oak Wood vs. Bovine Tissue
Scott Biebas, Morgan Cody, Kaylee Conner, Katie Cross-Powers, Kaitlyn Kelly, Maggie Leinen, Derek Lentz, Gabrielle Marye, Mark McComb, Kayle Schmidt, Savannah Tarpey, Peyton Thomas, and Katherine White; Faculty Mentors: Dr. Sascha Usenko and Subin Yoon

*Department: Environmental Science*

Source samples were collected as a field blank, background sample, wood burning, and meat cooking sample. Analysis of the samples were done on a gas chromatography mass spectrometry. The purpose of this study is to identify different tracers from burning wood and animal products. Field blanks and a background sample were also collected. In the field blank there is Benzophenone and N-Hexadecanoic. The Post Sampling Field sample had traces of Levoglucosan, Benzophenone, Benzaldehyde and N-Hexadecanoic Acid. The Meat Cooking sample has 9-Octadecenoic acid, Digitoxin, Octadecenoic Acid, Benzophenone, cholesterol and N-Hexadecanoic. Benzophenone is often used in sunscreen and is an estorgenic compound. N-hexadecenoic acid is used to produce soaps and cosmetics. Hexadonic acid is the most common fatty acid found in animals and plants and benzaldehyde is the simple staromatic aldehyde, occurs in plants and is always released when wood is burned. Ricinoleic acid is castor oil and could have potentially been present because it was part of the cooking spray used to coat the grill. Digitoxin can be used in chemotherapy and is extracted from the foxglove plant, which his not native to Texas. The retention times for each of these compounds means that they resulted from the searing of the meat hung around longer than those that occurred when the wood was burned did. Digitoxin presence is still unexplained.

C32. San Antonio Ozone and PM$_{2.5}$ Levels 2007-2016
Scott Biebas, Morgan Cody, Kaylee Conner, Katie Cross-Powers, Kaitlyn Kelly, Maggie Leinen, Derek Lentz, Gabrielle Marye, Mark McComb, Kayle Schmidt, Savannah Tarpey, Peyton Thomas, and Katherine White; Faculty Mentors: Dr. Sascha Usenko and Subin Yoon

*Department: Environmental Science*

Ozone and PM$_{2.5}$ data were taken from the TCEQ air monitoring database for three of the following sites in San Antonio: Calaveras Lake, Heritage Middle School, and San Antonio Northwest. A relationship between PM$_{2.5}$ and ozone has been seen in Houston, and our goal was to determine if there is a similar relationship seen in San Antonio. Data was
taken from the years 2007 to 2016, inclusive, for the month of September. In 2008, fracking operations near San Antonio began, but there is a question of whether the fracking has impacted the urban air quality. Examining the relationship between ozone and PM$_{2.5}$ using R$^2$ values for each site showed a significant relationship between ozone and PM$_{2.5}$, but did not show a strong relationship to the fracking operations. Therefore, future research must be done in order to understand the effects of fracking on air quality and the interactions between multiple pollutants.

C33. Mitigation of Hypoxic Ecosystems Using Hemolymph Analysis of *Callinectes sapidus* and *Procambarus clarkii* in Relation to *Spartina* Grasses

Natalie Bush, Edward Bush, Christopher Green, Julie Anderson, Pamela Blanchard, Nathan Bush, Jennifer Conover; Faculty Mentors: Dr. Rich Sanker

*Department: Environmental Science*

In the past 80 years, Louisiana has lost over one million acres in land, affecting plants and crustaceans that live in these environments. The first objective of this research was to determine the relationship between diffused oxygen in water and time with the behavioral and physiological health of *Callinectes sapidus* (blue crab) and *Procambarus clarkii* (crawfish). After 24 hours, manual dexterity, or the amount of time it takes for a crustacean to flip itself over increased under hypoxic conditions. Hemolymph was extracted and tested for lactate, glucose, and protein. Crawfish were also exposed to this same procedure. An additional crayfish study comparing *Spartina* plants to assimilate oxygen for aeration compared to mechanical aeration was conducted. The hypoxic groups for all three studies at the 0.05 level had a significantly greater manual dexterity time and greater amounts of lactate and glucose. The protein was significantly higher in hypoxia-exposed crawfish. Time and aeration affect the health of crustaceans, and plants were shown to effectively provide normoxic oxygen levels at a similar level as mechanical aeration. These studies support the importance of marsh grasses for the coast and crustacean viability.

C34. The Development of a Universal Standardized Microplastic Color Classification Protocol

Graham Bates and Colleen Peters; Faculty Mentor: Dr. Susan Bratton

*Department: Environmental Science*

Microplastics polymer-based particles ranging in size from 50 to 5000 µm, are found throughout freshwater, marine, and estuarine environments. Field studies examining the interaction of microplastics and fauna have discovered microplastic ingestion by invertebrate, mammal, bird and fish species. Current research classifies microplastics via color into broad categories, such as red, blue, gray, green, and yellow. However, this system is prone to human error and subsequently prevents an in-depth classification of color. The purpose of this study was to develop a universal standardized microplastic color classification protocol based on the Munsell Color System. This protocol was used to classify the color of microplastics collected from the stomach content of 1,381 marine fish from the Texas Gulf Coast. The utilization of this protocol reduces potential human error while simultaneously allowing for an advanced classification of color into Hue, Value, and Chroma categories.
LOUISE HERRINGTON SCHOOL OF NURSING

C35. Navajo (Diné) and Chinese Traditional Medicine: Reconsidering Nursing Care in the U.S.
Hannah Debosskey; Faculty Mentor: Marie Hastings-Tolsma, Kathryn Vories, MSN, Dr. Shelly Conroy
Department: Louise Herrington School of Nursing

Many cultures hold complex beliefs about health and healing. Two such metatheoretical perspectives are the Diné (Navajo) philosophy and Traditional Chinese Medicine (TCM), both comprised of principles that serve to guide the thoughts, actions, and behaviors of the larger culture. In these ancient cultures, the challenge is in how more technologic approaches to nursing and healthcare can be aligned with these rich, holistic traditions. Examination of key principles in each of these traditions offers the potential to apply important perspectives that when implemented, could transform healthcare and nursing in the U.S. The purpose of this qualitative research was to describe both Diné (Navajo) and TCM perspectives, compare key features, and suggest how key characteristics might be applied to strengthen healthcare and caring within nursing. Individual, semi-structured interviews were conducted with a convenience sample of TCM (n=5) and Diné (Navajo) (n=5) healers. Individual taped interviews were conducted and lasted 60 minutes or less. Recordings were transcribed verbatim and analyzed using open source coding. Analysis is now underway. Findings should provide rich data which can serve to suggest how key features from traditional health practices might inform nursing and health care in the U.S.

MECHANICAL ENGINEERING

C36. Standing is a Valid Position for Maximal Isokinetic Hip Strength Measurements
Zach Hostetler and Carley Fuller; Mentor: Dr. Jonathan Rylander
Department: Mechanical Engineering

INTRODUCTION: Hip strength asymmetries are commonly found in patients following surgeries such as total hip arthroplasty. Therefore, monitoring hip strength is essential to ensure patients achieve a full functional recovery. Isokinetic hip strength testing using a dynamometer is commonly used to screen for hip strength deficits. However, these tests are done with the patient in a supine (lying down) position that places the hip at risk for a dislocation, especially for patients who have received a total hip replacement. The purpose of this study is to establish protocol methods by determining the between-day repeatability of hip flexion and adduction measurements for three different positions (lying down, standing, and fixed standing). METHODS: 10 healthy test subjects (3 F, 7 M) aged between 20 and 23 participated in this study. Each participant completed 3 test sessions that were 3 to 5 days apart in which they performed maximal isokinetic hip movements while in the three different positions. RESULTS: For hip flexion, the repeatability was high for all three positions: Inter Class Correlation (ICC) 0.96 for supine, 0.96 for standing, and 0.96 for fixed standing. The repeatability was also high for hip abduction measurements: ICC 0.89 for supine, 0.95 for standing, and 0.95 for fixed standing. SIGNIFICANCE: This study determined that a standing position can be used to obtain repeatable isokinetic hip strength measurements with a Biodex machine. Standing or a fixed standing position is likely a good option for patient groups who should be monitored for hip strength asymmetries.
C37. Light-intensity Activity and Metabolic Risk Factors: Are there Relationships for Women?
Matthew McCullough, Megan McClendon, Thomas Andre, Cindy Wu, Shana M. Walsh, and Rodney G. Bowden; Faculty Mentor: Dr. Renée Umstattd Meyer

Department: Health, Human Performance, and Recreation

Metabolic syndrome (MetSy) has been defined as a collection of metabolic irregularities that increase the risk of cardiovascular disease, type 2 diabetes, and all-cause mortality. Women are at greater risk for developing MetSy compared to men, with prevalence increasing with age. Moderate-to-vigorous physical activity (MVPA) is consistently associated with decreased MetSy risk; however, light physical activity (LPA) is less studied. Our aim was to examine relationships between accelerometer-determined LPA and MetSy risk factors (waist circumference (WC), glucose, high density lipoprotein (HDL), triglycerides, systolic blood pressure (SBP), and diastolic blood pressure (DPB)) among women of different age groups.

METHODS: A cross-sectional study design was used to examine 68 women, ages 20-65, employed in sedentary careers. Eight-hour fasting venous blood samples were collected and LPA was measured using hip-worn accelerometers. Regression models were conducted using SPSS 20.0. Between-subject analysis was conducted across four age groups (group1=20-35; group2=36-45; group3=46-55; group4=55 and older) using LPA, WC, glucose, HDL, triglycerides, SBP, and DPB. RESULTS: Between-subject regression analysis showed HDL as a significant MetSy risk factor in a full model (p=0.02), and a model with age groups as the only independent variable (p=0.00). The model based on LPA was not significant and post-hoc Tukey tests revealed non-significant (α>0.05) associations between LPA levels (high, medium, low) and all MetSy factors. CONCLUSION: In this sample, LPA was not related with MetSy risk factors. However, given study limitations future researchers should continue to examine these relationships among both women and men, in larger samples, and in different settings.

Flor De La Garza, Amy Kumar, Christina Bridges, Megan McClendon and Cindy Wu; Faculty Mentor: Dr. Renée Umstattd Meyer

Department: Health, Human Performance, and Recreation

Long periods spent being sedentary pose a danger to individuals regardless of physical fitness and activity levels. Sedentary behavior increases risk for obesity, heart disease, cancer, and all-cause mortality. Reducing sitting time in the workplace, by incorporating standing, can help lower these potential risks. To assist participants with incorporating the use of a standing desk, researchers provided a behavioral intervention. This consisted on an orientation packet with information on how to set up a sit-stand desk, ergonomic tips, videos, possible assistance apps, and a first week goal. Short, weekly emails where sent for the first two months, then longer newsletters where sent at the beginning of months 3 and 4. This continued to provide tips on incorporating standing and progressive goals for increasing standing bouts. Process evaluation is used to help learn about the development and implementation of program materials and is used to improve future programs. A process evaluation was conducted to determine if intervention materials were implemented as designed and how they were perceived by participants. Questions in the process evaluation were designed to address the following
areas: fidelity, dose delivered, dose received exposure, dose received satisfaction, reach, recruitment, and context. Example questions included “How beneficial were the materials?”, “How many of the newsletters did you read?”, “Was there any tip you wanted to try but could not and why?”, “How satisfied were you?”, and “Did you share any materials?”. Process evaluation findings and recommendations for future interventions will be presented.

C39. Rectus Femoris Strain with Avulsion in a Collegiate Defensive Linemen
Deyonta Tolliver; Faculty Mentor: Dr. Andrew Gallucci
Department: Health, Human Performance, and Recreation

Background A 21-year-old defensive linemen suffered a quadriceps strain. Specifically, the rectus femoris was the injured muscle. This injury was paired with an avulsion of the distal end. The athlete was beginning a sprint with his foot planted in the ground when the injury occurred. He underwent surgery to repair the injury. After three months, an MRI showed another sprain. His injury is going to require a second surgery. Differential Diagnosis Patellar dislocation, Patellar Fracture, Patellar Tendon Rupture, Patellofemoral syndrome. Treatment The patient underwent a surgery to re-connect his tendon to the patella. This surgery involves suturing the quadriceps tendon to the distal pole of the patella. The rehab focuses early on with the goal to regain motion and to aid in weight bearing. The patient was placed in a brace limiting flexion past 30 degrees. He also was placed on crutches. This is an injury that may either be treated surgically and non-surgically. Uniqueness This situation is unique due to the fact that the strain occurred with an avulsion, and also because the patient reinjured himself and may face another surgery. Mainly though the avulsion that comes along with a quadricep strain is on the proximal end at the AIIS. Conclusion This is a fairly common injury, but it doesn’t have many studies on the treatment for the injury. The patient in this case may have been too aggressive in rehab for his injury. He also may not have been completely compliant with his guidelines.

C40. Effects of Hypohydration on Muscular Performance in Females: An Ongoing Study
Brooke Roemer, Joshua Gann and Thomas Andre; Faculty Mentor: Dr. Darryn Willoughby
Department: Health, Human Performance, and Recreation

Introduction: Dehydration (~3%) has been shown to negatively affect anaerobic performance. A majority of this research has been conducted using male participants. Like males, females have been shown to underestimate sweat loss, which could lead to insufficient rehydration and thus hypohydration. Additionally, due to differences in thermoregulation, it is possible that females respond to hypohydration differently than males. To date, no research has examined the effects of previous night dehydration on muscular performance in females. Purpose: The purpose of this ongoing study was to determine the effects of previous night dehydration on muscular strength, muscular endurance, lower body power, and perceptual measures in resistance trained females. Methods: Healthy, resistance trained females (n = 7) completed two bouts of resistance exercise, either dehydrated (~3% body weight) (DT) or heat exposed with fluid replacement (HT). Each exercise bout consisted of one rep maximum (1RM) for bench press followed by 5 sets to failure of 75% of 1RM, 1RM for leg press followed by 5 sets to failure of 75% of 1RM, and vertical jump assessment.
Participants estimated ratings of perceived exertion (RPE) after each exercise. Session RPE (SRPE) was estimated 5 minutes following completion of the protocol and estimations for feelings of recovery (PRS), perceived readiness to exercise (PR), thirst, and sleep quality were estimated prior to workouts. **Results:** Analysis revealed a bench press 1RM (p = 0.05) and leg press 1RM (p = 0.03) were significantly lower for DT (bench: 95.0 ± 34.0; leg press: 461.4 ± 141.7) compared to HT (bench: 97.9 ± 34.3; leg press: 500.0 ± 141.0). There was no difference in total reps completed for bench press (p = 0.32) or leg press (p = 0.37) for DT (bench press: 31.0 ± 6.7; leg press: 47.9 ± 21.6) compared to HT (bench press: 31.7 ± 5.0; leg press: 49.6 ± 22.8). There was no significant difference (p = 0.15) for vertical jump height (DT: 17.6 ± 2.2, HT: 18.1 ± 2.6). RPE was not significantly different following bench press (p = 0.5) (DT: 7.1 ± 1.1, HT: 7.1 ± 0.9) or leg press (p = 0.41) (DT: 6.7 ± 0.5, HT: 6.9 ± 1.7). SRPE was significantly higher (p = 0.05) for DT (6.6 ± 0.5) vs HT (5.9 ± 0.7). Significant differences for PRS (p = 0.03) (DT: 5.4 ± 2.2, HT: 7.05 ± 1.3) and PR (p = 0.01) (DT: 3.9 ± 0.9, HT: 2.6 ± 0.5) indicate participants expected impaired performance during DT. Feelings of thirst were significantly higher (p = 0.001) for DT (6.5 ± 2.5) vs HT (2.1 ± 2.3). Estimations of sleep quality were significantly lower (p = 0.05) for DT (4.3 ± 3.3) vs HT (7.2 ± 2.1). **Conclusion:** Even though only preliminary data from a presently ongoing study, the current results suggest that previous night dehydration has a negative influence on both performance and perceptual measures in resistance trained females.

**C41. Restrictive Breathing Mask Reduces Total Repetitions in Resistance-Trained Males: An Ongoing Study**

Emily Ziperman, Thomas L. Andre, Joshua J. Gann, Paul Hwang, Matthew O. Mccullough, Ashley Bascom, Brooke Roemer; Mentor: Dr. Darryn S. Willoughby

*Department: Health, Human Performance, and Recreation*

Recently a popular exercise training device has been developed, which has been promoted by companies as a training aid, known as a restrictive breathing mask (RBM). The RBM is designed to simulate training at higher altitudes and has become commonplace for individuals to utilize during resistance-training sessions. The purpose of this study was to examine the impact of a RBM on muscle performance and perceptual measures in resistance-trained males. A cross-over study design was utilized in 9 males with performance trials separated by 7 days. A baseline strength testing session was completed for 12RM for squat, leg press, and leg extension. Participants completed the lower body workout with no RBM. After the initial warm up, participants completed 4 sets of reps to failure of squats, leg press, and leg extension with 2 minutes rest between sets and 3 minutes between exercises. Heart rate was collected immediately post set. Participants completed a 10cm visual stress scale immediately post resistance training session and Session RPE (SRPE) was collected 10 minutes post. Using paired T-tests we found a significant reduction in total session reps, and a significant increase/elevation in SRPE, average post set session heart rate, and session stress scale. Based on the performance variables, it appears that a RBM reduces the total repetitions that an individual can complete during an acute bout of resistance training, while also increasing the perceived difficulty and stressfulness of the bout. Subsequently, a reduction in mechanical stimuli could result in a diminished hypertrophic response over time.
ANTHROPOLOGY

C42. Inter/Intra Observer Reliability in Human Craniometric Measurements
Kristen Anderson, Molly Jaskinia, and Kelly Schaeffer; Mentor: Dr. Katie Binetti
Department: Anthropology

Craniometric measurements of human skeletal remains are used in a variety of analyses in forensic, bioarchaeological, and paleontological research. They are taken and used by researchers at all levels of experience and expertise, but few studies demonstrate how reliable these measurements are within and between analysts. The current study assesses how well the observer can understand and implement the descriptions of cranial measurements, and how reliable inter/intra-observer measurements are. To accomplish this, analysts of different experience levels in Physical Anthropology collected cranial measurements, descriptions for which are found in the Data Collection for Forensic Skeletal Material manual. Participants fell into 3 categories: 1) “experienced professionals” who typically have PhDs and are instructors of skeletal anatomy courses, 2) intermediate skeletal anatomy undergraduate students who have taken advanced coursework in skeletal analysis, and 3) undergraduate students who have completed only a basic course in human osteology. A practicing Forensic Anthropologist took the same measurements on the same specimens and those served as baseline by which to compare the measurements taken by the other study participants. 15 standard craniometric measurements were chosen for their relevance in determining the ancestry of unknown individuals of both sexes. The data collected was subjected to statistical analysis in order to determine how reliable each analyst’s measurements were. The results of our study have implications for whether or not analysts can reliably use measurements collected by observers of different experience levels in determining the ancestry of skeletal remains.

C43. The Effects of Alkaline and Acidic Solutions in Modifying Saw Mark Morphology in Bone
Alexandra Chapman, Kelsea Francis, Rolando Hinojosa, and Skye Miles; Mentor: Dr. Katie Binetti
Department: Anthropology

Taphonomic processes include everything that happens to an organism from death through recovery and identification. This includes the decay and decomposition of soft tissue, the weathering of skeletal and/or hard parts, and the geochemical processes involved in the eventual petrifaction or destruction of the remaining tissues. Understanding these processes has implications in both forensic and geological sciences. It is common for decomposing remains to be submerged in water or other fluids during some part of their taphonomic journey. The current study focuses on the effects of various alkaline and acidic solutions on bone. More specifically, this study assesses how fluids of varying pH levels differentially affect saw marks on bone, which may make them difficult for investigators to accurately identify and analyze. For each of the seven solutions—Coca Cola, acetic acid, acetone, deionized water, alkaline water, sodium borate, and sodium hydroxide—two bovine tibiae were submerged in fourteen separate containers. Each bone had five nearly identical saw marks. In order to evaluate whether the solution was affecting the visibility and analytical integrity of the saw marks, the bones were removed from the solution weekly and assessed. Visual descriptions were made, the bones were
weighed, and silicone mold impressions were taken on the saw marks. We report here on which solutions had greater or lesser obliteratorive effects on the saw marks. The results of our study have implications for both forensic interpretation of skeletal remains, as well as the analysis of skeletal parts from archaeological, zooarchaeological, and paleontological contexts.

C44. Coffee Temperatures and Scalding in Medicolegal Context
Lukas Patterson, Kendall Pratt, and Avalon Stutzman; Mentor: Dr. Katie Binetti

Department: Anthropology

Scalding burns caused by accidental spilling of overly hot coffee have been, and continue to be, problematic nationwide. Several high profile cases where consumers were grievously injured by hot beverages have landed in the courts recently. However, because there is no nationally recognized food-safety authority that regulates the service temperatures of hot beverages, it is challenging for the courts to assign culpability and award damages in these cases. Instead, service temperatures are largely left to the discretion of individual businesses posing a risk to customers if beverages are served too hot. The purpose of this study is to determine which, if any, food service establishments on Baylor University’s campus regularly serve coffee at unsafe temperatures. A search of the medicolegal literature provided a range of temperatures that can cause significant damage to skin and underlying tissues. We used this information to determine what “safe” serving temperatures are. We then tested the service temperatures of coffee across campus. We focused our study on 16 ounce, medium roast, black coffee, as this was commonly available at all 12 of the target food service establishments at Baylor. Each establishment’s data was logged in order to calculate average coffee service temperature over the 5 week period of the study. Using these data, we determined which establishments are consistently serving safe coffee to the Baylor community.

C45. Frequencies of Bone Surface Modification Vary According to Specimen Size
Kristen Anderson; Mentor: Dr. Joseph Ferraro

Department: Anthropology

Cut marks and percussion damage on bone in archaeological assemblages are associated with human modification and the preparation of meat for consumption. When evaluating an assemblage and comparing human activity from different sites, it is important to understand how the frequencies of damage will vary according to the specimen size and portion. To address this issue, fragments from butchered goat bones were analyzed to determine the presence of percussion marks, percussion notches, and cut marks. Each specimen was identified according to the portion of the bone and to one of seven different size classes. The frequencies of damage were determined within each size class. Fragments from the larger size classes, and with more surface area, generally exhibited a greater frequency of damage while the fragments belonging in the smaller size classes had a lower frequency of damage or no perceptible damage at all. These results indicate that specimen size and portion influence the frequencies of damage present on the bone surface and should be taken into account when analyses and comparisons are performed between assemblages.
C46. Morphology of Preparator Airscribe Marks: Implications for Taphonomic Research
Leah Walsh; Mentor: Dr. Joseph Ferraro

Department: Anthropology

Bones recovered from archaeological and paleontological contexts are often marred by scratches, pits, and gouges. Such bone surface modifications can potentially tell us something about the taphonomic context of the finds, including important aspects of their demise, burial, and recovery. To date, however, relatively little attention has been paid to the potential of museum preparatory airscribes (handheld pneumatic jackhammers that are used to remove adhering sediments from specimens) to possibly damage bone surfaces. In this study, we purposefully damaged otherwise non-diagnostic 2 million-year-old fossil bone surfaces with preparatory airscribes at the National Museums of Kenya. Our aim was to describe and explain the morphology of the resulting bone surface modifications, with the secondary goal of identifying unique aspects of the damage that could be used to differentiate these post-recovery modifications from pre-recovery damage (e.g., stone tool cut marks, carnivore tooth marks). We report that airscribes can easily damage bone surfaces, imparting scratches and gouges that superficially resemble carnivore tooth marks. Furthermore, we report that the ‘floor of the airscribe scratches/ gouges invariably possesses a unique ‘stepped’ or ‘scalloped’ morphology that can be used to differentiate these marks from all other reported pre-, peri-, and post-mortem bone surface modifications. Implications for taphonomic studies are discussed.

C47. Intra- and Inter-observer Variation When Identifying Saw Kerf Morphologies: Implications for Forensic Studies Involving Human Disarticulation
Kelsea Francis; Mentor: Dr. Joseph Ferraro

Department: Anthropology

Criminals commonly use hand-powered saws (e.g., hacksaws, carpenter saws, pruning saws) to disarticulate human remains. This generally results in severed arm and leg bones, with individual pieces of these bones often bearing characteristic saw mark damage (i.e., kerf marks). Morphologically, kerf marks are known to vary according to saw blade ‘type’, but to date relatively little work has been done to explore intra- and inter-observer variation in analysts’ attribution of kerf mark damage to these specific types. In this study, 10 ‘novice analyst’ undergraduates and 3 ‘expert analyst’ faculty members conducted blind studies of 50 kerf marks made on cow bones created by 8 different saws. The saws represented a total of 4 blade types: alternating-set teeth, single-set teeth, keyhole-set teeth, and a carbide-grit abrasion blade. Each analyst studied the kerf marks and individually-attributed each mark to saw and blade type. Each analyst completed the entire task on three separate occasions, with each occasion separated by at least a week. This allowed us to explore both intra- and inter-observer variation in damage attributions. Our results suggest a low degree of both intra- and inter-observer variation in kerf mark damage attributions to blade type (e.g., single-set, alternating-set). We do note, however, a relatively high-degree of variation in both intra- and inter-observer variation in kerf mark damage attributions to specific saw classes (e.g., hacksaws, carpenter saws, etc.). Implications for forensic casework involving human disarticulation are discussed.
C48. Bison Procurement and Processing Strategies at Barnhill Rockshelter #3 (41CV1646)
Alexandra Chapman; Mentor: Carol Macaulay-Jameson, MA

Department: Anthropology

Eighty complete and fragmentary elements of bison were recovered from excavations within and on a terrace outside of Barnhill Rockshelter #3 (41CV1646), a large rockshelter located in northeastern Coryell County. This poster addresses two questions: What anatomical parts of the bison were brought to the rockshelter? And, which anatomical parts of the bison were processed for meat, fat, marrow and bone grease? Minimum number of animal units (MAU) was determined and was converted to a percentage using the greatest MAU (mandible). The %MAU was then compared to the bison food utility index (FUI) developed by Emerson (1993) in order to interpret subsistence-related decision-making behavior.

C49. ‘Education Can Make a Difference!’ Local Understanding of Climate Change and Associated Risks to the Tourism Industry

Hannah Fischer and Greta Gokey; Mentor: Dr. Sara Alexander

Department: Anthropology

A growing body of evidence makes clear that climate variability and change are strongly implicated in the increasingly frequent and intense patterns of natural disasters and other climate-related events in the Caribbean region and in Central America. While these effects play out in particular locales in perhaps very different ways, and around a myriad of social, cultural, political, and economic factors, none of these phenomena should be ignored, as components of the interrelationships between and among them may influence our longer-term adaptive capacity. For rural communities in developing countries, whose residents have livelihoods that are directly dependent on natural resources, climate change brings both potential impacts as well as opportunities. Yet to date, our knowledge about how rural residents in these areas conceptualize weather and climate change, and the associations they make regarding risks to their livelihoods, is limited. This research takes a critical first step in the process of addressing issues around fostering resilience and longer-term adaptation to climate change. The project is designed to explore how local residents in the western interior region of Belize – a region largely dependent on (eco)tourism (which requires an ecologically healthy resource base and an ideal climate) – conceptualize climate change and perceive associated risks to their livelihoods. Our research explores relationships between educational background and awareness and understanding of climate change. We give specific attention to whether perceptions of risk stemming from climate change understanding is influencing behaviors on the part of the tourism industry in the interior region of western Belize.

C50. Bracing The Storm: Social and Economic Factors that Influence Climate Shock Resilience

Andrew Vasquez and Daniel Alvarado; Mentor: Dr. Sara Alexander

Department: Anthropology

Scientific evidence has continued to show a greater link between global climate change and the frequency and intensity of climate related events. Of the regions affected, the Caribbean and surrounding area have become prone to more
frequent and intense hurricanes, impacting millions of natives to the region. The effects of these climate shocks have forced individuals to adapt their lifestyles in an attempt to increase their resilience, which is the ability of individuals or groups to respond practically to shocks as well as their ability to avoid potential economic losses following a disaster. Rural communities, such as those commonly found in Belize, are heavily dependent on the (eco)tourism industry, as well as the natural resources in the region to sustain their livelihoods. However, both the (eco)tourism industry and the resources needed to maintain it are highly susceptible to environmental shocks. Because of this, it has become vitally important for local communities to adapt their economic and social behaviors in attempts to better respond to disaster. This research investigates the level of economic and social resilience to environmental shocks among citizens of San Pedro, Belize, a coastal community highly reliant on tourism. It will assess the relationship between levels of social connection and economic security to an individual’s resilience towards climate shock.

C51. A Probable Oasis in the Food Desert of North Waco

Anna Hodges; Mentor: Dr. Sara Alexander

Department: Anthropology

Waco, Texas is among the top five poorest cities in Texas, with a Federal Poverty Rate of 28.7%. Nearly 40% of households earn less than $25,000; approximately thirty percent live below the poverty level for Texas. Furthermore, the north Waco neighborhood has a median income of $18,409. This research is part of a larger Mission Waco project targeting the food desert region as it has developed in the north Waco area over the last ten years. The USDA qualifies food deserts as a low-income community, “at least 500 people and [where] at least 33 percent of the population … resides more than one-half mile from the nearest supermarket, supercenter, or large grocery store for an urban area or greater than 10 miles for a rural area.” Jeremy L. Sage maintains the traditional perception of food deserts as one associated with high poverty rates in an area that is limited to no food availability or access. My research was conducted in coordination with Mission Waco to ultimately provide baseline information of the neighborhood targeted for the new Jubilee Market (grocery store). My specific objectives include to: (1) identify the basic socio-demographic characteristics of the population living in the food desert and within a one-mile radius of the store; (2) determine current food getting strategies (i.e., pre-store) including those challenges reported by community residents, and (3) explore relationships between how local residents think about “food” relative to the food and related goods to which they may or may not have access.

MODERN LANGUAGES AND CULTURES

C52. First India, then The United States; is France next? An Exploration into the Possibilities of the Future

Steve Kemgang; Faculty Mentor: Dr. Richard Duran

Department: Modern Languages and Cultures

In the last couple years, there has been a massive shift in which more and more nations have been turning away from both the ideals and the values of globalism towards those of nationalism. This trend has had many worldwide leaders
panicking and questioning exactly what direction our world is headed towards. One of the most notable events that solid-
ified a turn towards nationalism was the appointment of Narendra Modi—who is known for both his anti-Muslim policies
and rhetoric—as the Prime Minister of India in 2014. Next, and more recently, has been the appointment of Donald
Trump, who much like Modi, is also known for both his anti-immigration and anti-Muslim policies. Now in France, the
National Front party, a right wing populist and national political party led by Marie Le Pen, has been making very signif-
icant advancements as election season has gotten closer. Are we going to see a similar turn of events? Looking ahead,
what could this mean for immigrants?

SOCIOLOGY

C53. A Quantitative Analysis of Attitudes Towards Exotic Dance
Angelica Phillips; Faculty Mentor: Dr. Lindsay Wilkinson
Department: Sociology

Research on exotic dance has increased over the past four decades, although it still remains an understudied area of re-
search. Current studies on exotic dance tend to focus on dancers mitigating the negative stigma associated with their oc-
cupations; however, little to no data exists on the stigma itself towards exotic dance. This study seeks to fill this gap in
the literature by examining the stigma towards exotic dance within the scope of current college students. This study is a
quantitative comparative analysis on perceptions of exotic dance and its relation to religiosity utilizing data from two
central Texas university populations. The samples for both schools were collected through convenience sampling meth-
ods.

DIANA GARLAND SCHOOL OF SOCIAL WORK

C54. The Formation of Fictive Kinship, What to Call Them, and the Role of Faith
Hannah Crawford; Faculty Mentor: Becky Scott, MSW
Department: Diana Garland School of Social Work

While the occurrence of fictive kinship is not a foreign concept to families within the United States, its terminology and
the process of family formation is not often recognized. The term “fictive kinship” refers to “family-type relationships”
of individuals unrelated by blood or marriage, but related rather through “religious rituals” or tightly knit friendships
(Ebaugh & Curry, 2000, 189). An example of this would be relationships where a member is recognized as being “like-a
-sister/mother/father, etc.”. The purpose of this grounded theory qualitative study was not only to explore the support and
barriers involved in the formation of fictive families, but also to examine the role of faith in contributing to the growth
and support of fictive kinships. The study included interviews with more than 60 people and was designed to provide
better understanding of non-normative family formation to provide recommendations for congregations and communities
on how to participate in supporting the healthy development of these families.
C55. Process Evaluation of Family Support Centers in the Dominican Republic (Evaluación de los centros del apoyo para la familia en la republica dominicana)

Alexandra Holland; Faculty Mentor: Samantha Vo, PhD

Department: Diana Garland School of Social Work

During the summer of 2015 I, along with my professor and a group of colleagues, went to the Dominican Republic to conduct an evaluation of community sources of support for families that exist in the more underdeveloped areas of the country. The goal was to determine the strengths that these centers use to serve their families, as well as areas of growth that the centers could develop to better serve these families. This was a qualitative study that primarily used the research method of grounding. The strengths that these family support centers offered included educational resources for children, job skills training, and community-level engagement. Areas of growth found that could potentially increase family support included increasing parent involvement, more clearly defining the role of the support programs in helping the families, and addressing the tensions that exist between Dominican citizens and Haitian immigrants. Additional research for this particular study would include a longitudinal study comparing factors that impact the families before and after the introduction of the family support centers. Such factors could include annual income, employment, infrastructure of the community, and perceived needs of the family by the staff and the family itself.

Spanish: Durante el verano del año 2015, mis colegas, mi profesor y yo fuimos a la republica dominicana para hacer una evaluación de los recursos de la comunidad para las familias que existen en las áreas menos desarrolladas. El objetivo del estudio fue que determinar las fuerzas que estos centros utilizan para servir a sus familias, y también para identificar las áreas del crecimiento que los centros deben mejorar. El estudio fue cualitativo y utilizó el método de investigación que se llama grounding. Las fuerzas de los centros de la comunidad son los recursos educativos para los niños, la formación de las habilidades laborales y el contrato con toda la comunidad. Las áreas del crecimiento incluyen más enredo de los padres, papeles más claros entre las familias y los centros de la comunidad y que mejorar las relaciones entre las dominicanas y los inmigrantes de Haiti que viven allá. Investigación adicional debe ser un estudio más largo que compararía los factores que podría afectar a las familias antes y después de la introducción de los centros familiares apoyados. Algunos factores podrían incluir los ingresos anuales, el empleo, la infraestructura de la comunidad y las necesidades observadas por el personal y por la familia.

FAMILY AND CONSUMER SCIENCES

C56. The Trips that Shaped My Life

Grace Lee and Jess McGrew; Mentor: Dr. Karen Melton

Department: Family and Consumer Sciences – Child and Family Studies

The purpose of this study was to examine human values that adolescents reflect on after traveling. Adolescent travel allows opportunities for personal growth that broadens their perspective in life. When adolescents experience and reflect varying cultures, their egocentrism decreases as travelling takes attention away from the self (Galanki, 2012). Values are motivational construct of beliefs that transcend specific actions such as traveling. Values guide the evaluation
of events and are ordered by the importance relative to one another. Thus, how the adolescents reflect on their travel can state the type of values they hold. Schwartz (1994) identifies 10 types of human values—self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, benevolence and universalism. According to Erik Erikson (1959), adolescents enter the fifth stage: identity vs. role confusion of psychosocial development. Identity is an internal structure of drives, abilities, beliefs and individual history (Marcia, 1980). The better developed the internal structure; the more aware the individuals are of their own uniqueness and similarities as well as their strengths and weaknesses. Values contribute to identity formation and are influenced by experiences. Adolescent travel can play an important role in influencing the development of the values. It is also an opportunity to reflect on the current values they hold.

C57. Don’t Make Me Turn This Car Around: Reflections from Adolescent Family Travel Experiences
Jess McGrew and Grace Lee; Mentor: Dr. Karen Melton

*Department: Family and Consumer Sciences – Child and Family Studies*

The purpose of this study is to examine the impact of family travel on adolescent development. Family travels provide opportunities for primary and secondary socialization of adolescents; this suggests that family travels can provide adolescents with informal experiential learning opportunities. Experiential leaning in this context relates to the meaning-making process of the adolescent’s travel experience that is gained through personal reflection. In this study, content-analysis was used to examine adolescent reflections (n=79) of a memorable family travel experience. A total of 402 reflections were coded across 12 subthemes of family travel. Our findings advance the scholarship on adolescent development and family leisure. Family life educators can use this information to help families make decisions regarding family vacations. Adolescent’s reflections suggest that adolescents do gain valuable life lessons and skills from their experiences that advance their development. In this sample, adolescents reflect greatly on the meaning and memory of their family travels; more so, than reliving the anticipation, planning, or consumption of their travels. This is not surprising as the experiences themselves may only last a few days, but the impact can last a life time. While adolescents were most likely to reflect on the final stage, there is sufficient data to conclude most adolescents participated in each phase. Failure to realize the potential value of each phase of family travel, may lead to missed opportunities for development and socialization. One major implication from this study may be the utilization of family vacations as unique opportunities for adolescent developmental growth.

**Baylor University Student Posters Presented at Texas Undergraduate Research Day at the Capitol—March 28, 2017**

**The Excavations of the Late Roman Synagogue at Huqoq, Israel**
Nathaniel Eberlein; Mentor: Dr. Nathan Elkins

*Department: Art*

The excavations at Huqoq, Israel have yielded remains of a late fourth/early fifth-century synagogue and its monumental mosaic floor. The discovery of the monumental Galilean Synagogue and its scientific dating to the later fourth/early fifth century has ramifications for the debate regarding the date of other monumental basilica-style synagogues such as these, which are typically assigned to the second and third century according to arbitrary stylistic arguments. While one might
expect to find certain scenes on a mosaic pavement in an ancient synagogue, such as scenes of Noah’s Ark or the Parting of the Red Sea, others are unprecedented. One example is what appears to be the legendary meeting between the High Priest and Alexander the Great, which would be the first non-Biblical scene depicted in an ancient synagogue.

Patterns of Micro-plastic Ingestion by Pinfish (*Lagodon rhomboides*) Collected Between Galveston Bay and Freeport on the Texas Gulf Coast

Peyton Thomas, Maddy Doyle, and Graham Bates; Mentors: Dr. Susan P. Bratton and Colleen Peters, PhD Candidate

*Department: Environmental Science*

This study utilized stomach content analysis to determine the level of microplastic ingestion, for 449 pinfish (*Lagodon rhomboides*) collected from 6 locales from the inshore waters of the Texas coast from Galveston to Freeport, TX. Microplastics, including artificial polymers, are defined as 50 µm to 5 mm in length. The pinfish averaged 14.45 cm in length, and the mean frequencies of stomachs containing anthropogenic particles was 46.5%, and averaged 0.94 particles per fish. Maximum percentages for pinfish with microplastics present per sample were 77% and 76%, and the maximum particles for fish in a sample was 2.68. Sample sites in the center of urbanized zones, including Galveston, TX, had the greatest frequencies of ingestion. Using data from individual fish, width of the mouth displayed positive correlation to the presence of manufactured particles (cc=.116, p=.014). For the means per sample (n=15), stomach weight was strongly correlated to both microplastic frequency (cc=.592, p=.05) and the mean number of particles per fish (cc=.611, p=.05). The number of microplastics ingested increased with the amount of natural food consumed, and larger fish were not more likely to consume plastics than smaller one. We improved particle classification by using Munsell color charts and florescent microscopy.
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