Welcome to Angelo State University’s
Undergraduate and Graduate Student Research Symposium
Friday, November 17, 2023
CJ Davidson Conference Room, Houston Harte University Center

Schedule of Events

Poster Session .............................................................................. noon – 1:30 pm

The Undergraduate and Graduate Student Research Symposium is coordinated by the Office of Research and Sponsored Projects.

Dr. David Bixler, Dean, College of Graduate Studies and Research
Elizabeth Randell, Director of Student Research
Jan Heinen, Assistant Coordinator
# Table of Contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile Pay and Financial Literacy-Cooper Sims</td>
<td>3</td>
</tr>
<tr>
<td>How knowledge of the tax code affects perceptions of tax policy-Stephanie Cardenas</td>
<td>3</td>
</tr>
<tr>
<td>Falling in Love with the Law-Brooke Bullard</td>
<td>4</td>
</tr>
<tr>
<td>Glyphosate resistant Johnsongrass found in Texas-Ryan Matschek</td>
<td>5</td>
</tr>
<tr>
<td>The Effects of GnRH Administration Prior to Timed Artificial Insemination in Virgin Heifers-Jennifer Harrison</td>
<td>5</td>
</tr>
<tr>
<td>Tracing Color Patterns in Spanish x Boer Goats by Generation-Lily Smola</td>
<td>6</td>
</tr>
<tr>
<td>Effect of seed mass on germination latency in Callirhoe scabriuscula-Clara Dorman</td>
<td>6</td>
</tr>
<tr>
<td>Columella Morphology in Ictinia mississippiensis-Adina Hernandez</td>
<td>7</td>
</tr>
<tr>
<td>Quantifying autophagic flux with Halo-Tag LC3 in HeLa cells expressing CinF-Rian Hernandez</td>
<td>8</td>
</tr>
<tr>
<td>Human Pathogen Coxiella burnetii’s Host Protein Interaction-Katie Storrie</td>
<td>8</td>
</tr>
<tr>
<td>Natural Language Processing Models for Technical Support-Jorge LeonFrausto</td>
<td>9</td>
</tr>
<tr>
<td>Constructing a Cybersecurity Knowledge Graph Using the Unified Cybersecurity Ontology-Adam Boyer, Jordan Wade, Alexander Ametu</td>
<td>9</td>
</tr>
<tr>
<td>Continuing Support: First-Generation Graduate Student Support Initiatives-Rachel Brandon-Hopper</td>
<td>10</td>
</tr>
<tr>
<td>AISC Steel Structure-Steven Guebara</td>
<td>11</td>
</tr>
<tr>
<td>Construction of Multifunctional Robotic Assistant using Raspberry Pi and Python-Edmundo Garcia, Jose Beltran</td>
<td>12</td>
</tr>
<tr>
<td>Design and Control of Active Rear Wing System-Adrian Campos, Sarah Odale</td>
<td>12</td>
</tr>
<tr>
<td>Using MOD16A2 Evapotranspiration Images to Assess the Irrigation Efficiency of Pecan Orchards Irrigated with Flooding versus Sprinkler Systems-Rylee Slate</td>
<td>13</td>
</tr>
<tr>
<td>The Relationship Between Environmental Mercury Exposure and the Incidence of Chronic Disease-Jose Jiminez</td>
<td>14</td>
</tr>
<tr>
<td>Welcome to Jurassic Park! Or...not? Do films really promote tourism?-Mary Benes</td>
<td>15</td>
</tr>
<tr>
<td>The Difference in Fashion Marketing Between Genders Throughout Generations and Its Effects-Emily Lee</td>
<td>16</td>
</tr>
<tr>
<td>Dual Language Immersion Program Lesson Planning-Sadie Sims</td>
<td>17</td>
</tr>
<tr>
<td>Accessibility Errors at Angelo.edu and Their Effects on Students with Disabilities-Jeff Caldwell</td>
<td>17</td>
</tr>
<tr>
<td>Demonstratable Jet Engine and Thrust Difference Based on Fuel and Fan Shape-SeungJun Ryu</td>
<td>18</td>
</tr>
<tr>
<td>Use of InSAR for Hazard Analysis and Prediction-Antawan Patterson</td>
<td>19</td>
</tr>
<tr>
<td>Why does anger increase punitiveness in mock juror judgments?-Seth Caldwell</td>
<td>20</td>
</tr>
<tr>
<td>Allegation severity and evidence strength affect perceptions of conflict resolution strategies-Alexandra Robison</td>
<td>21</td>
</tr>
<tr>
<td>Social power enhances health outcomes-Seongjeong Yim</td>
<td>22</td>
</tr>
<tr>
<td>Taking the Gray Out of Black and White: A Look at the Impact of Race on Perceptions of Sexual Harrassment in the Workplace-Xena DesJardins</td>
<td>23</td>
</tr>
<tr>
<td>How Come Some Can Overcome?-Samantha Roman, Xena DesJardins</td>
<td>24</td>
</tr>
</tbody>
</table>
Mobile Pay and Financial Literacy-Cooper Sims

Faculty Mentor: Dr. Song Wang
Department: Accounting, Economics and Finance

In 2021, the FINRA Foundation conducted the National Financial Capability Study. This study asked survey questions to over 500 random individuals per state. The survey included a variety of aspects, including: demographics, mobile pay usage, financial situation, and financial literacy. This research will focus specifically on the relationship between financial literacy and the usage of mobile pay. I find that with higher financial literacy, comes a trend of less mobile pay usage. This conclusion was developed through intensive data analysis and is consistent with the theory of pain of loss in payment. Through statistical evaluation and the NFCS a United States map was created, graphing the usage of mobile pay by state. This research shows that financially literate individuals choose to use mobile pay less, or not at all.

How knowledge of the tax code affects perceptions of tax policy-Stephanie Cardenas

Faculty Mentor: Dr. Michael Conklin
Department: Accounting, Economics and Finance
Sponsorship: Undergraduate Research Faculty-Mentored Grant

This is a survey-based research project that aims to measure the relationship between knowledge of the tax code and perceptions on tax policy. This survey methodology will provide quantitative evidence for what has previously only been considered theoretically. This project will also include consideration as to how the findings will shape future research, such as how education may play a role in shaping public opinion on tax policy.
Falling in Love with the Law-Brooke Bullard

Faculty Mentor: Dr. Michael Conklin
Department: Accounting, Economics and Finance
Sponsorship: Undergraduate Research Faculty-Mentored Grant

This is a teaching note for business law professors on how to conduct a special Valentine’s Day themed class activity illustrating various legal principles. The teaching note also contains a literature review on the pedagogical benefits of using themed class activities and pop culture to enhance student engagement. Examples of topics covered include real-life litigation involving:

- Legality of a ‘Ladies’ Night’ promotion at bars and antidiscrimination laws
- Suing a prom date who stood you up for breach of contract
- Legal implications of corporate mergers
- Similarities between corporate mergers and marriage
- Various intellectual property lawsuits regarding popular love songs
- FTC lawsuits against online dating websites for false advertising
- Property rights law and who is entitled to possession of a wedding ring after divorce
Glyphosate resistant Johnsongrass found in Texas-Ryan Matschek

Faculty Mentor: Dr. Cody Scott; Dr. Reagan Noland of Texas A&M AgriLife Extension
Department: Agriculture
Sponsorship: Texas A&M AgriLife Extension, Cotton Incorporated, Texas State Support Committee for Cotton

Johnsongrass (*Sorghum halepense*) is among the most problematic weeds in Texas croplands. A population of Johnsongrass with potential glyphosate resistance has been identified in the Rolling Plains of Texas. Indoor dose-response trials were coordinated to verify whether glyphosate resistance is present. The experiment was a randomized complete block design with 10 replications and 7 or 8 treatments, between 0.0625× and 50× the labeled rate, applied to susceptible and suspected resistant biotypes, respectively. Findings indicate reduced sensitivity and mortality due to glyphosate in the resistant biotype with both rhizome and seedling propagated Johnsongrass plants. Further research is being conducted to determine geographical distribution of resistant biotypes as well as efficacy of alternative herbicides for the control of glyphosate resistant Johnsongrass.

The Effects of GnRH Administration Prior to Timed Artificial Insemination in Virgin Heifers-Jennifer Harrison

Faculty Mentor: Ms. Audrey Meyer
Department: Agriculture
Sponsorship: Undergraduate Research Faculty-Mentored Grant

The purpose of this project is to identify the effects of GnRH administration prior to timed artificial insemination in virgin heifers. Before breeding, all females will be synchronized in their estrous cycle using the 7-day co-synch protocol. This is to ensure that all heifers that will be used in this project can be bred around the same time. All females will be evaluated at 52 hours post CIDR® removal (Day 0) for their patch score and estrus status. On Day 2, all females that are expressing heat will be AId, and the “silver patched” or non-expressive females will be split into two groups at that time. The early group will be given a GnRH shot prior to insemination and the late group will be given a GnRH shot at the time of AI. All silver-patched females will be bred 8 hours later at approximately 60 hours post CIDR® removal. On Day 10, a cover bull will be turned out with the females to breed any females that did not successfully breed artificially. On Day 60 all females will be checked for pregnancy via a rectal ultrasound.
Tracing Color Patterns in Spanish x Boer Goats by Generation-Lily Smola

Faculty Mentor: Ms. Audrey Meyer
Department: Agriculture
Sponsorship: Undergraduate Research Faculty-Mentored Grant

Boer goats are powerhouses for meat production. However, their maternal abilities, hardiness, and flashy coloring are cause for concern amongst commercial ranchers. All Spanish × Boer females and 2023 kids at the ASU MIR Center were analyzed for basic coat colors and color patterns. This flock originated from Purebred Boer females and has been using Spanish sires for the last 6 years to create a crossbred flock. Solid black or Swiss sires have been used to try and diminish the Boer color pattern and create more solid coats. Color patterns impact survivability and marketability of kid crops. With as many as four maternal generations to document, maternal lineages have been identified with dominant and recessive traits.

Effect of seed mass on germination latency in Callirhoe scabriuscula-Clara Dorman

Faculty Mentor: Dr. Ben Skipper
Department: Biology

Callirhoe scabriuscula, the Texas poppy-mallow, is an endangered plant native to 4 counties north of San Angelo, TX. Texas poppy-mallows produce many seeds encased in a hard outer mericarp which prevents damage to the seed until conditions are right for germination and establishment of seedlings. Visually, mericarp size is generally invariant, but the size of live seeds within may vary considerably, with small seeds being unviable. To better understand how investments in mericarp and in seed affect germination latency, whole seed mass (mericarp and seed) and live seed mass of 177 Callirhoe scabriuscula seeds was measured. For each seed, we derived an investment ratio as the ratio of the mericarp mass to that of the whole seed (mericarp and live seed). Following this, we attempted to germinate seeds across two trials to determine how investment ratio influences germination latency. Across all seeds, investment ratios were consistent, averaging 0.51. In Trial 1, 95% (38 of 40) of seeds germinated. In Trial 2, 97.5% (38 of 39) of seeds germinated. Across both trials, germination latency varied from 5 to 30 days with an average latency of 15.93 days. Germination latency was independent of investment ratio, suggesting that some other factor is responsible for the considerable variation in germination time in this species.
Columella Morphology in *Ictinia mississippiensis*-Adina Hernandez

Faculty Mentor: Dr. Ben Skipper  
Department: Biology

Birds, like reptiles and amphibians, have a single middle ear ossicle known as the columella. The columella acts to transmit vibrations from the tympanum and cartilaginous extracolumella tissue to the fluid of the inner ear. Morphological studies of the avian columella are few and primarily have examined variation among species. To date, fewer have explored morphological variation within a single species. This research aims to examine variation of the columella of Mississippi Kites (*Ictinia mississippiensis*), an intermediate-sized raptor. Morphological comparisons are being made between adult male vs. female kites and between adults vs. young. Currently, the columella of 9 adult and 7 young kites have been extracted and are being photographed under microscopy. Following photography, columella morphology will be measured with the aid of the imaging software ImageJ. Although the significance of variation, if any between the sexes or ages, is not known, understanding the variation of this important, but often overlooked, component of the avian skeleton will add to our understanding of avian evolution and adaptation.
Quantifying autophagic flux with Halo-Tag LC3 in HeLa cells expressing CinF-Rian Hernandez

Faculty Mentor: Dr. Emerson Crabill
Department: Biology
Sponsorship: Undergraduate Research Faculty-Mentored Grant

*Coxiella burnetti* is an intracellular bacterial pathogen that causes Q-fever in human hosts. *C. burnetii* manipulates a cellular pathway called autophagy, a process cells utilize to break down old or leftover materials, for its own benefit as an intracellular pathogen. When a vacuole containing *C. burnetti* fuses with a lysosome, its interior becomes acidic and this causes our pathogen to become metabolically active, enabling its replication and spread to subsequent cells. We look to see the effect of upregulating a gene called *cbu0513* that encodes for the protein, CinF. In previous studies, CinF has been linked to an increase in autophagy, marked by an increase in the protein LC3 which is then itself degraded. Autophagic flux is a degradative process that makes it difficult to measure most proteins because they are degraded throughout time. However, using a modified stable protein, called Halo-Tag LC3 which binds to the vacuole-lysosome complex in the same fashion, we can utilize immunoblotting to visualize the Halo-Tag LC3. This is because, upon proteolysis, the Halo-Tag LC3 becomes stable, allowing for the accumulation of a measurable quantity of LC3. Using these techniques, we will be able to calculate autophagic flux by quantifying banding intensity, which correlates to the number of autophagic interactions seen within cell culture groups.

Human Pathogen *Coxiella burnetii’s* Host Protein Interaction-Katie Storrie

Faculty Mentor: Dr. Emerson Crabill
Department: Biology
Sponsorship: Graduate Research Fellowship, Head of the River Ranch Grant

*Coxiella burnetii* is a zoonotic bacterial pathogen that can cause disease in both humans and animals. Because of the bacteria’s high virulence, low infectious dose, and airborne transmission it is a pathogen of considerable interest for study. The pathogen possesses a Type 4 Secretion System which it uses to translocate bacterial proteins inside of a host cell. EmcA is a newly discovered protein effector of *C. burnetii* that plays a yet unknown role in host immune suppression. This study, utilizing Yeast 2 Hybrid assay, attempts to illuminate the function of the EmcA protein effector and how it interacts with human host proteins.
Natural Language Processing Models for Technical Support-Jorge LeonFrausto

Faculty Mentor: Dr. Roya Choupani
Department: Computer Science

From a business perspective, machine learning text classification algorithms are valuable when they structure and analyze text in a cost-effective manner, thereby expediting business processes and decision-making processes. Entity identification in technical support is critical to properly responding to and addressing technical issues. The affected application dictates the procedure to be followed for resolution.

The objective of this project is to compare different Machine Learning Natural Language Processing (NLP) methods to classify technical support issues. The models take free-form text as input. Dataset was obtained from existing technical support cases. The project has two main components: pre-processing and application of NLP techniques; and, creation of models.

Constructing a Cybersecurity Knowledge Graph Using the Unified Cybersecurity Ontology-Adam Boyer, Jordan Wade, Alexander Ametu

Faculty Mentor: Dr. Erdoğan Doğdu, Dr. Roya Choupani, Mr. Jason Watson
Department: Computer Science

As the amount of software in the world multiplies, and IoT devices become commonplace, cybersecurity has become a major concern for people and organizations. There are many publicly available datasets for analysts and researchers to query for information about cybersecurity vulnerabilities, weaknesses, and common attack patterns. It would be beneficial to have all these separate datasets combined into one place and represented as a knowledge graph as a reference point. An earlier project named SEPSES set out to achieve this goal with limited success. We continue their work but with the addition of the Unified Cybersecurity Ontology (UCO). With the UCO, an agreed-upon ontology or language for cybersecurity knowledge graphs, future knowledge graph creators should be able to integrate with our knowledge graph in construction. An area of concern for cybersecurity knowledge graphs currently is the integration with different platform logs. We believe that with this base knowledge graph, future research will be able to integrate specific platform logs using the UCO and possibly achieve real-time vulnerability detection and mitigation.
Continuing Support: First-Generation Graduate Student Support Initiatives - Rachel Brandon-Hopper

Faculty Mentor: Dr. Amy Murphy
Department: Curriculum and Instruction

As higher education theory and practice surrounding the first-generation student experience continue to evolve, there is a notable lack of scholarship surrounding these students as they enroll or plan to enroll in a graduate-level learning environment. The current state of first-generation graduate student support indicates an immediate need for practical and theoretical change. Many of these students are expected by faculty and staff to have the same sociocultural knowledge regarding graduate school as their continuing-generation peers. These expectations emphasize a lack of understanding surrounding the vast socioeconomic and cultural experiences faced by first-generation students beyond their undergraduate education. This project utilized professional interviews and a review of current first-generation literature to identify key areas in need of improvement within higher education. Georgetown University’s McCourt School of Public Policy’s orientation and foundations course for first-year graduate students and the University of North Carolina at Chapel Hill’s Carolina Grad Student F1RSTS program for first-generation graduate students are two prime models for practitioners to utilize when creating first-generation focused programming for their graduate students. As the first-generation undergraduate population continues to grow, their graduate student counterparts should also increase. Revitalizing current theoretical and practical findings to better meet the needs of first-generation graduate students is the direction that higher education must take to continue supporting and educating this unique and significant student population.
AISC Steel Structure - Steven Guebara

Faculty Mentor: Dr. Anthony Battistini
Department: David L. Hirschfeld Department of Engineering
Sponsorship: Undergraduate Research Faculty-Mentored Grant

The objective of the project is for students to gain a true visual understanding of steel framing and connections by creating a sculpture that will feature different standard steel shapes and connections that can be physically examined. The sculpture will include a variety of details for both bolted and welded connections as well as types, such as Web Plate, Angle Cleat, and Moment End. This project work load will begin by researching different connections used to hold steel beams. Online resources as well as my mentor will be used to obtain the measurements needed for each steel connection method. These resources will also help with the making of the CAD (computer aided design) drawings for the sculpture. Discussions with steel companies will help manage the cost of this project by the amount of donated steel that will be used for the design. By the end of this project, I should have improved my research methodology, CAD work, and communication skills. Additionally, this project can also help others around the ASU campus gain a understanding of the process of connecting steel beams within a structure, while also promoting the engineering department.
Construction of Multifunctional Robotic Assistant using Raspberry Pi and Python-Edmundo Garcia, Jose Beltran

Faculty Mentor: Dr. Mohammad Shafinul Haque
Department: David L. Hirschfeld Department of Engineering
Sponsorship: Undergraduate Research Faculty-Mentored Grant

A personal assistant robot can be helpful in a lot of forms, it can improve productivity by performing repetitive tasks, reduce human labor, increase safety in hazardous working environments, and be more efficient without getting tired, taking breaks, or making mistakes. The objective of this project is to construct an assistive robot by implementing different complements to improve its functionality and control system. The assistant robot will have the capacity to be controlled remotely and will run using the Raspberry Pi computing module programmed with Python language. This programmable robotic assistant will be used in the ASU engineering laboratory as a form of attraction for future engineering students as this research project involves a significant amount of engineering topics combined, as well as it will act as an interactive stimulation for future applicants interested in becoming an engineer.

Design and Control of Active Rear Wing System-Adrian Campos, Sarah Odale

Faculty Mentor: Dr. Mohammad Shafinul Haque
Department: David L. Hirschfeld Department of Engineering

Active aerodynamics are a critical aspect of automotive engineering, optimizing vehicle performance during cornering, acceleration, and braking by dynamically adjusting rear wing configurations. In this study, a scaled-down 3D printed rear wing prototype is analyzed to determine the optimal wing angle maximizing the downforce and reduced drag. A full-scale rear wing design is collected from literature and a 7th scale prototype is developed. The scaled-down design is modified to accommodate control system attachment. Next, the prototype is 3D printed, and an Arduino-based control system is developed that facilitates the angular motion of the rear wing. Fluid flow simulation is performed in Solidworks to determine the optimum wing angle. The simulation results are compared with the literature and reasonable agreement is obtained. The research offers data-driven evidence for the effectiveness of active rear-wing systems.
Using MOD16A2 Evapotranspiration Images to Assess the Irrigation Efficiency of Pecan Orchards Irrigated with Flooding versus Sprinkler Systems—Rylee Slate

Faculty Mentor: Dr. Aldo Piñón-Villarreal
Department: David L. Hirschfeld Department of Engineering
Sponsorship: Undergraduate Research Faculty-Mentored Grant

Pecan orchards are known to consume large amounts of water seasonally. The purpose of this study is to use satellite-derived evapotranspiration (ET) images to assess the water use, irrigation efficiency (ratio of ET to water applied) and yield for pecan orchards grown with two irrigation methods. Two pecan orchards within the Chihuahuan Desert were identified for comparing their irrigation efficiency and yield. The first one is located in the Mesilla Valley, New Mexico near Las Cruces, NM and it uses flood irrigation. The second one is located in an agricultural valley of central Chihuahua, Mexico and it uses sprinkler irrigation. Monthly irrigation applications and yields from 2022 season were obtained from the pecan producers. A series of eight-day ET images produced using the MOD16A2 algorithm from the 2022 which covered the orchard areas were downloaded from the USGS earth explorer website (https://eartheplorer.usgs.gov). GIS shapefiles were delineated in ArcMap 10.7.1 using high resolution aerial photography. The next steps are to (i) change the 2D projection of the ET images to match that of the orchard shapefiles, (ii) superimpose the shapefiles onto the ET images and extract ET pixel statistics, and (iii) determine the seasonal water use and irrigation efficiency to compare watering methods and crop yield between orchards. Results from this study will shed light regarding potential seasonal water savings that can be achieved by using more efficient irrigation methods.
The Relationship Between Environmental Mercury Exposure and the Incidence of Chronic Disease-Jose Jiminez

Faculty Mentor: Dr. Babajide Sadiq
Department: Health Science Professions

There have been limited studies conducted on the effect that environmental mercury has on the incidence of chronic diseases as a risk factor, rather than a direct cause. A total of six articles were gathered and reviewed to study the potential link between environmental mercury exposure and the effects it has on the human body. As mercury gets released into the environment, it can remain in the atmosphere, water, soil, and even food where humans may be exposed. Mercury has a tendency of accumulating in humans over time, where various organs and body systems may get disrupted and damaged. Continuous exposure to environmental mercury would lead to an increase of mercury accumulation levels in the body and a higher level of burden, which may have a correlation to a greater susceptibility to chronic disease later in life. Moreover, an increased release of environmental mercury will only increase the scale of the public health consequences.
Welcome to *Jurassic Park!* Or...not? Do films really promote tourism?-Mary Benes

Faculty Mentor: Dr. Gayle Randall  
Department: Management and Marketing

Movies have long been credited to the promotion of tourism to film locations. But do they really influence travel? While literature supports the idea of film-induced tourism, and common sense seems to agree, the exact nature of film-induced tourism is more complicated. The three film franchises *Jurassic Park*, *Indiana Jones*, and *Night at the Museum* were chosen due to their differing film locations, ranging from international to domestic. By examining the World Bank’s data on changes in GDP, any impact that the *Indiana Jones* movies had on their setting would be recorded. Similar methods were applied to the state of Hawaii’s recorded GDP for the *Jurassic Park* movies. Finally, Google Trend’s data on user searches was used to see if interest in a particular location increased with the film’s release for the selected franchises, including the *Night at the Museum* trilogy. The data found showed that contrary to popular belief, there was no significant increase in tourism to the film locations in the years following the film’s release, even if interest was high. However, that isn’t to say there was absolutely no effect to tourism. While tourists may not travel solely because of a film, they may be more likely to visit filmed locations if already in the area. Overall, movies are one of the most accessible gateways to new and foreign places. Even though films may affect tourism less potently than assumed, that doesn’t mean they can’t still provide valuable information to watchers and tourists everywhere.
The Difference in Fashion Marketing Between Genders Throughout Generations and Its Effects - Emily Lee

Faculty Mentor: Dr. Gayle Randall
Department: Management and Marketing

This research is to find how fashion marketing has changed through generational cohorts as technology and social media has become second nature specifically to Generation Z. There is a difference in how the fashion industry has chosen to promote fashion due to the influence of Generation Z digital behaviors, especially between genders, as previously there were strict male and female norms and now, not so much. To explore this phenomenon, I utilized the amount of Google searches that correlates with the generational fashion marketing to seek how successful the fashion marketing was and how it has differed from in the past due to technology becoming more. I raise the question if fashion marketing has increased with more variety than before when technology was not the norm. The change in fashion marketing is also due to fashion trends that have evolved over time. This has an impact on how the marketing is created and released to maintain and gain more customers. Fashion marketers have to be aware of the social changes as well since it has a huge impact on how fashion is marketed. The results show how all factors take part in a successful marketing strategy and campaign to consumers.
Dual Language Immersion Program Lesson Planning—Sadie Sims

Faculty Mentor: Dr. Karen Cody
Department: Natalie Zan Ryan Department of English and Modern Languages

As of January 2022, the Texas Education Agency released a Dual Language Immersion Program framework. This framework includes a broad variety of information and requirements for the program. The aspect which this research focuses on is the lesson planning format. Through this research project, I found very few resources have been found in the way of lesson planning for these programs. There are existing schools across the country that implement similar programs and have provided sample lesson plans, however there are very few and there are even fewer templates. This research evaluates the lesson plan samples found against the Texas framework with the context that they come from multiple states and are not required to align perfectly. Through these lesson plans, the framework, and further foreign language education research, a lesson planning template has been developed. This template implements the best parts of each plan evaluated and the most effective teaching methods for foreign language learning in order to meet the requirements in the new rubric and be most effective in a live classroom setting. The research will also show the importance of such a model due to the effectiveness of dual language both for emergent bilingual students and language learners.

Accessibility Errors at Angelo.edu and Their Effects on Students with Disabilities—Jeff Caldwell

Faculty Mentor: Dr. Kevin Garrison
Department: Natalie Zan Ryan Department of English and Modern Languages
Sponsorship: Undergraduate Research Faculty-Mentored Grant

The U.S. federal government requires that all Title IV higher education institutions comply with specific web accessibility guidelines. Nevertheless, many schools have failed to build affordances for students with disabilities into their websites, as evidenced by the more than 8,000 digital accessibility lawsuits filed against schools in federal courts between 2017 and 2020. In addition, more students with disabilities are choosing distance learning. As a result, schools that fail to adhere to strict accessibility standards face an increased risk of litigation. Through a combination of automated software tests and subjective input of students with disabilities, our research reveals that several student-facing pages on the Angelo State University website fail to meet accessibility standards and that those failures negatively affect students with disabilities and their ability to locate important information, register for courses, and manage their student accounts.
Demonstratable Jet Engine and Thrust Difference Based on Fuel and Fan Shape-
SeungJun Ryu

Faculty Mentor: Dr. Trey Holik
Department: Physics and Geosciences
Sponsorship: Undergraduate Research Faculty-Mentored Grant, Research Travel Fund

In this project the primary goal is to design and ultimately fabricate a functional tabletop jet engine. The model will demonstrate the principles of air compression and combustion and create thrust. The model will have steel pipe as external casing and containment. The model will tentatively have three to five layers of fans to compress air. A propane/butane fuel injection will be followed by high voltage generator for initial ignition and combustion. The turbines are comprised of 1/32-inch CNC plasma cut stainless steel sheet metal. Various size and designs will be tested. 24V DC 775 motor is used for the main rotor system and will have electrical and physical connections to rotate and monitor the main shaft. A turbo fan will be located at the exhaust to create the turbo cycle of the engine. Parts will be detachable from the metal pipe casing and replaceable from the main shaft. The engine will be attached to a force meter to measure thrust. Turbine design and preliminary fabrication components will be presented.
Use of InSAR for Hazard Analysis and Prediction-Antawan Patterson

Faculty Mentor: Mr. Stephen Shields
Department: Physics and Geosciences
Sponsorship: Undergraduate Research Faculty-Mentored Grant

The research conducted is a rendered implementation of InSAR (Interferometric Synthetic Aperture Radar) data obtained through a nationally recognized source, N.A.S.A.’s Alaskan Satellite Facility. Data collected are Sentinel-1 Interferometric Wide Swath imagery, with a revisit time of 12 days. Using SAR imagery, interferograms can be generated by detection of phase differences between a time interval; the resultant image is a deformation map showing change between the time intervals. This technology is used worldwide in detecting major changes to the land surface, such as around volcanoes, faults, and areas with land subsidence. Our change detection maps are focused around areas of known subsidence around Wink, TX which is near the western border of Texas with New Mexico. The deformation in our images could be related to the density of oil and gas operations of injection and withdrawal of fluids such as water, oil, and gas. We selected images with both a short and long time-interval, in order to get a relative sense of deformation rates. Change detection maps were created within ArcGIS, using the georeferenced images from Sentinel-1. Our change detection maps could be useful in assessing risk and potential hazards in areas with similar geology and similar subsurface extraction/injection of fluids.
**Why does anger increase punitiveness in mock juror judgments? - Seth Caldwell**

Faculty Mentor: Dr. Tyler Livingston  
Department: Psychology

**Introduction**

Capital trials often contain distressing evidence that can elicit strong emotions among jurors and perhaps bias their legal judgments (Phalen et al., 2021). Cognitive appraisal theory predicts that anger in particular is associated with feelings of certainty (Smith & Ellsworth, 1985) that might facilitate attributions of blame toward defendants (Goldberg et al., 1999). The current study tested the hypothesis that anger elicited via distressing evidence would be associated with longer sentence recommendations through mock jurors’ greater certainty in their verdict judgments.

**Method**

Community members served as mock jurors in a simulated capital trial (N = 198; M<sub>age</sub> = 49.1 years, SD = 18.8; 71% women). At the onset of the study, mock jurors self-reported their baseline emotional states including anger (Watson et al., 1998; α = .87). Next, mock jurors reviewed a case transcript adapted from a capital trial that contained distressing evidence (People v. Fields, 2004). Finally, mock jurors responded to the measure of emotion again to obtain a posttrial rating of anger (α = .81). The researchers subtracted baseline scores from posttrial scores to quantify change (∆) in anger.

**Results**

A t-test comparing anger ratings at baseline (M = 1.93/7, SD = 1.34) and posttrial (M = 3.22, SD = 1.79) revealed a significant increase (t(197) = 10.69, p < .001, d = 0.76). Mediation analysis using PROCESS model 4 in R (Hayes, 2018) tested the hypothesis that ∆anger would be associated with longer sentence recommendations through greater certainty. Indeed, ∆anger was positively associated with certainty (a-path; b = .09, t(196) = 2.11, p = .04). In turn, certainty was positively associated with sentence length recommendations (b-path; b = .09, t(196) = 1.69, p = .01). The bias-corrected 95% confidence interval for the indirect effect did not contain zero [.002, .404], indicating a significant indirect effect of ∆anger on sentence length recommendations through certainty.
Conclusions

Increased anger following exposure to distressing evidence in a simulated capital trial facilitated harsher sentence recommendations through increased judgment certainty. Findings supported predictions from cognitive appraisal theory applied to a legal context. Judges should remind jurors to evaluate the facts of the case against a strict interpretation of legal standards to mitigate juror bias in trials that contain distressing evidence.

Allegation severity and evidence strength affect perceptions of conflict resolution strategies-Alexandra Robison

Faculty Mentor: Dr. Tyler N. Livingston
Department: Psychology

Introduction

Between 1.8%-34% of women and 4.8%-31% of men report unwanted sexual contact during their years at university (Fedina et al., 2018). Title IX offices may implement a direct conference between the victim and the accused as a means of repairing harm and obtaining closure. This study examined whether allegation severity and evidence strength affected university students’ perceptions of benefits of direct conferencing in such cases.

Hypothesis

We predicted that participants would rate a direct conference as more beneficial when the allegation was less (vs. more) severe, and when the evidence against the accused was weaker (vs. stronger).

Method

Participants were 117 university students (M age = 20.5 years, SD = 4.7; 81.2% women). A plurality of participants were Hispanic or Latino/a (43.6%) followed by White (42.7%), Black or African American (8.5%), Asian (3.4%), and other/mixed race/ethnicity (1.7%).

Participants received random assignment to one of four conditions manipulating the severity (more vs. less) of a sexual misconduct allegation and the strength of evidence (strong vs. weak) supporting the allegation according to a between-participants factorial design. After reviewing the allegation and evidence, participants indicated the extent to which they believed a direct conference between the victim and the accused would be beneficial.
Results
A two-way analysis of variance (ANOVA) tested our hypotheses. First, there was a main effect of allegation severity \((F(1,113) = 11.01, p < .001, \eta^2_p = .09)\) such that participants rated conferencing as more beneficial when the allegation was less \((M = 4.35, SD = 0.98)\) versus more \((M = 3.68, SD = 1.18)\) severe. Second, there was a main effect of evidence strength \((F(1,113) = 4.06, p = .046, \eta^2_p = .04)\) such that participants rated conferencing as more beneficial when the evidence was weak \((M = 4.24, SD = 1.02)\) versus strong \((M = 3.81, SD = 1.20)\). The two-way interaction was nonsignificant \((p = .09)\).

Discussion
Our hypotheses received support. Ratings of benefits of direct conferencing were a function of allegation severity and evidence strength. Title IX offices can leverage this information to utilize direct conferencing under certain circumstances that have greater stakeholder support, such as when allegations are less severe and when there is less evidence supporting the allegation.

Social power enhances health outcomes-Seongjeong Yim
Faculty Mentor: Dr. Tyler N. Livingston
Department: Psychology

Introduction
Social power, defined as the perceived ability to control, influence, and evaluate others to achieve personal goals (Magee & Galinsky, 2008), disinhibits behavior by enhancing positive emotion (Cho & Keltner, 2020). Positive emotion also enables desirable health outcomes (Pressman et al., 2019). This study examined whether social power could enhance health outcomes by increasing positive emotion. We predicted that high-power (vs. low-power) participants would report more desirable health outcomes and that positive emotion would explain this relationship.

Method
University student participants \((N = 99; \text{Mage} = 20.20 \text{ years, } SD = 4.46; 73\% \text{ women})\) were randomly assigned to imagine that they occupied a position of high \((n = 49)\) or low \((n = 50)\) social power. Then, participants rated their present positive emotions (e.g., enthusiastic, inspired; \(\alpha = .96\)) and their health competence (e.g., their ability to accomplish their health goals; \(\alpha = .93\)).

Results
We used mediation analysis to test our hypotheses (Baron & Kenny, 1986). Going from low-power to high-power was associated with a 1.17-unit increase in health competence \((b = 1.17, p\)
< .001) as well as a 2.54-unit increase in positive emotion (b = 2.54, p < .001). In turn, a one-unit increase in positive emotion was associated with a 0.43-unit increase in health competence (b = 0.43, p < .001). Finally, we tested whether positive emotion explained the relationship between power and health competence. The effect of power on health competence became nonsignificant when controlling for positive emotion (p = .63), providing evidence that positive emotion mediated the relationship between power and health competence. Together, power and positive emotion explained 28% of the variance in health competence.

Conclusions
Our hypotheses received support. High-power (vs. low-power) participants reported enhanced health competence because they felt greater positive emotion. The present research applied psychological theory to test a causal relationship between power and health and identify the mechanism (i.e., positive emotion). Brief interventions designed to enhance social power could improve everyday health outcomes.

**Taking the Gray Out of Black and White: A Look at the Impact of Race on Perceptions of Sexual Harrassment in the Workplace**
Xena DesJardins

Faculty Mentor: Dr. Cheryl Stenmark
Department: Psychology
Sponsorship: Undergraduate Research Faculty-Mentored Grant

The purpose of this study was to examine the extent to which observers perceived sexual harassment in relation to the known race/ethnicity of the victim and the perpetrator. Four victim/perpetrator combinations were examined with photographs of fictional victims and perpetrators depicted as follows: White/White, Black/Black, White/Black, and Black/White. Participants read a series of scenarios describing various forms of sexual harassment and were shown photographs alongside the scenarios to manipulate their perception of the vignettes. Participants then rated each scenario presented on 7 dimensions: 1) offensiveness, 2) sexual harassment, 3) cause of behavior of the perpetrator, 4) level of perpetrator’s control over their own behavior, 5) likelihood of the perpetrator to repeat the behavior, 6) sympathy for the victim, and 7) anger at the perpetrator. Overall, the results of this study found that participants had the least negative reactions to sexual harassment when the victim was Black. In one scenario, when both the perpetrator and victim were Black, participants rated the harassment to be the least offensive, least representative of sexual harassment, least stable in the perpetrator, least sympathy for the victim, and least angry at the perpetrator. These findings suggest a significant lack of social accountability for sexual harassment in the workplace when
parties involved are Black and awareness need to be raised to address implicit bias of both management and working peers.

**How Come Some Can Overcome?**-Samantha Roman, Xena DesJardins

Faculty Mentor: Dr. Brittany Draper, Dr. Paige Trubenstein
Department: Psychology

This study investigated relationships between social capital and stress among college students. A total of 125 participants completed this study and data is reported for 108. The purpose of this study was to address gaps in the literature regarding social capital and stress in college students. This study advances the field of psychology by contributing new knowledge about the relationship between college students' level of social capital and stress. Addressing this gap is critical to advance the literature as students need access to resources and support during this transitional period in development, and it becomes necessary for students to utilize these resources in an effort to help them cope with their stress now, and in the future. Knowing how social capital and stress relate to these students during their time in college is crucial. By adding a new sample of students to this body of research, more information can be learned about the interaction of these variables in an attempt to help students utilize more social capital in an effort to help them cope with stress. To date, no research in this topic area has been conducted with a sample of college students in this region of the United States. This study helped to advance the field of psychology because new knowledge was contributed about the relationship between college students' social capital and stress by adding a new sample of university students. In general, the results suggested that as the use of social capital increased, stress for the students decreased.