Aggie Research Program (ARP)

Poster Session Abstract Book

1:00 PM-3:00 PM

MSC Bethancourt Ballroom (MSC 2300 A)
1a. Implementing a Faculty Development Project in the College of Engineering
Sin-Ning Liu
Psychological & Brain Sciences
Advisor: Dr. Mindy Bergman, Ph.D.

Improving Student Experiences to Increase Student Engagement” (ISE-2) was awarded to Texas A&M University by the National Science Foundation. ISE-2 is a faculty development program implemented in the College of Engineering and aims to increase student engagement, success, and retention in the College, especially for students who are underrepresented minorities, women, and first-generation college students. This poster introduces the different components that fit into this project, including the faculty development workshops focusing on implicit bias and active learning, student surveys, classroom observations, and faculty feedback. This poster also provides a timeline for the multi-year project from start to finish.

1b. The Role of Undergraduate Research Assistants in Faculty Development Program
Sin-Ning Liu
Psychological & Brain Sciences
Advisor: Dr. Mindy Bergman, Ph.D.

The ISE-2 project is a multi-year study with several sources of data, both qualitative and quantitative. This poster will showcase the research that the undergraduate research assistants will be responsible for in the 2018-2019 academic year, explain how this work fits into the greater scope of the ISE-2 project, and illustrates the practical implications for this work. Specifically, the research assistants will be conducting, coding, and thematically analyzing classroom observations, analyzing the transcripts of faculty focus groups, and doing content analysis of faculty teaching plans and final reflections.

2. Adapting the COPUS to Develop the Observation Protocol for Incivility and Ostracism (OPIO)
Ellen Hagen
Psychological & Brain Sciences
Advisor: Dr. Winfred Arthur, Jr., Ph.D.

The Classroom Observation Protocol for Undergraduate STEM (COPUS; Smith, Jones, Gilbert, & Wieman, 2013) details a process of collecting information on the range and frequency of behavior in a systematic way. We summarize the process of adapting the COPUS for use in coding incivility and ostracism as part of a larger research study. A set of codes were created for behaviors that reflect the construct of incivility, and two more codes were created according to our operationalization of ostracism. The next step of this project will involve training coders to accurately apply these codes to the interactions they are observing.
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3. The Effects of Team Composition on Team Performance: The Role of Incivility and Ostracism
   Ellen Hagen
   Psychological & Brain Sciences
   Advisor: Dr. Winfred Arthur, Jr., Ph.D.

We review the team composition and team performance literature and present a model for how team composition may impact team performance. Overall, the literature shows that more demographically heterogeneous teams display lower performance due to reduced cohesion and communication, while teams that possess members with heterogeneous backgrounds and knowledge display higher performance (Mannix & Neale, 2005). Incivility and ostracism may mediate this relationship as well (Baumeister, Twenge, & Nuss, 2002; Porath, Foulk, & Erez, 2015). Based on our findings, we propose a model in which team composition impacts team performance through the occurrence of incivility and ostracism.

4. Intelligent Motion Video Guidance for Unmanned Air System Ground Target Tracking
   Vinicius Guimaraes Goecks
   Aerospace Engineering
   Advisor: Dr. John Valasek, Ph.D.

Tracking motion of ground targets based on aerial images can benefit commercial, civilian, and military applications. For this research program, a small fixed-wing unmanned air system carries a non-gimballed camera and maneuvers itself to keep the ground targets in the image frame. Previous approaches achieved satisfactory tracking performance using reinforcement learning algorithms trained offline in a simulated environment. This research program extends previous approaches allowing the vehicle to improve its controller in real-time while tracking the ground target in the real world. This research program also extends previous work by removing assumptions of constant airspeed and altitude used in simulation.
5. Effect of Ethanol on Structure and Function of the Fetal Circulation  
Monica Nguyen  
Biomedical Sciences  
Advisor: Dr. Christopher Quick, Ph.D.

Fetal exposure to alcohol can induce Fetal Alcohol Spectrum Disorder (FASD), which has been shown to affect neurological, musculoskeletal, and cardiovascular development. While gross cardiovascular malformations have been reported, the effects of ethanol on microvascular development have not. The chick chorioallantoic model (CAM) is an established model that allows access to the microvasculature network. This platform allows for measurement and manipulation of hemodynamic properties in order to better characterize ethanol-induced microvascular dysfunction. The purpose of the current work is to optimize the CAM for low-dose ethanol exposure to study the effects of alcohol on fetal microvascular network structure and function.

6. Lab-design Metal 3D Printer  
Ming Li  
Engineering Technology & Industrial Distribution  
Advisor: Dr. Chao Ma, Ph.D.

Big changes are brought by 3D printing in various industries nowadays. Metal 3D printing opens up opportunities for engineers to make the 'impossible' product. Commercial metal laser-based 3D printer is costly and requires a big amount of materials. The aim of this project is to develop a lab-designed laser-based 3D printer (laser station) which is highly flexible in material and easy-to-operate. Equipped with a 200W fiber laser, laser station can be controlled via pc by setting various processing parameters. Metal powder materials are processed in an inert gas chamber with an oxygen monitor system. Laser station significantly increases the productivity in research and provides great opportunity for undergraduate researchers to get involved into 3D printer

7. Effect of Cd on Chicken Embryo Heart Development  
Naomi McCauley  
Nutrition and Food Science  
Advisor: Dr. Linglin Xie, Ph.D.

Cadmium is considered the 7th highest priority hazardous substance due to its carcinogenic/teratogenic properties and bioaccumulation in organ tissues. Previous research shows that cadmium causes cardiovascular inflammation in rats and thinner ventricular walls in chickens, with less morphological abnormalities observed when exposed at later stages. Our study aims to elucidate the teratogenic effects of Cd in early chicken embryonic development. CdCl2 injections of 2, 50, and 100 mg/L will be given at Hamburger-Hamilton(HH)13-16 and HH27-28. Various congenital heart defects are expected, including a correlated decrease in ventricular wall thickness with increasing Cd dosage compared to the control.
8. Behavioral Analysis of Captive Red Jungle Fowl

Travis Williams
Poultry Science
Advisor: Dr. Giri Athrey

The Red Jungle Fowl (RJF) is one of the main genetic ancestors to all modern chickens. As one of three research colonies of RJF in the United States, we have a unique opportunity to study behavior that occur within our colony. The RJF, while acclimated to captivity, still exhibit wild behaviors. Understanding the behaviors will provide insights into various inter-individual interactions, including aggression, fear and flightiness, which are also observed in domesticated chicken. Currently, this project is at the project proposal stage and will only discuss the projected materials, methods, and project description.

9. Corrosion Study of Copper Concentrate Pipeline

Yenny Paola Cubides Gonzalez
Materials Science & Engineering
Advisor: Dr. Homero Castaneda, Ph.D.

This research projects intends to use a series of advanced electrochemical techniques for characterizing and estimating corrosivity of a copper concentrated fluid (slurry) in specific pipeline samples. The anticipated technical outcome is the methodology and corrosivity index determination in simulated operation conditions for different slurry samples that can guide Freeport McMoRan to find the path for the most effective selection of corrosion control and prevention action. This robust study of corrosion of pipeline that transports slurries at different grades offers a unique approach to investigate the corrosion rate and the mechanism influencing this process.

10. InNervate VR: A Student Pipeline Project to Visualize Canine Anatomy and Muscle Movement

Margaret Cook
Visualization
Advisor: Dr. Jinsil Hwaryoung Seo, Ph.D.

Due to increased technology accessibility, higher education anatomy curriculum is undergoing an extensive renovation. Virtual reality applications for anatomy education have been one of several new trends to change anatomy education. Using an industry-style pipeline, undergraduate researchers will work to develop anatomically accurate models of canine muscles, which will then be textured, rigged, and animated for use in an educational virtual reality platform: InNervate VR. The end goal of the project is to create and measure the efficacy of a visually dynamic experience for the user, allowing them to generally explore canine limb anatomy, and to specifically visualize deficits in muscle movement, produced by user interaction with the canine nervous system.
11. EU - Mercosur Free Trade Agreement Implications for Agriculture
Yuri Clements Calil
Agricultural Economics
Advisor: Dr. Luis Ribera, Ph.D.

European Union (UE) and Southern Common Market (Mercosur) are negotiating a free trade agreement. Using gravity model, this study attempts to quantify the possible effects of reducing agricultural trade barriers between Mercosur and EU. EU tariff barriers cause trade distortions of Mercosur agricultural exports, and a free trade agreement will generate gains to both Mercosur and EU due to the increase in trade in agricultural products. The results have implications to trade flows, productivity gains, price volatility, and food availability.

12. The Cross-Linguistic Influence of English Instruction on Spanish Writing
Keith Graham
Teaching, Learning & Culture
Advisor: Dr. L. Quentin Dixon, Ph.D.

Writing is important in today's world, but mastery of writing is a complex process and difficult for English language learners (ELLs). Ready-Set-Write! is a 10-week writing intervention targeting struggling second grade ELLs. For this poster presentation, we will share selected data on one measure of writing, story elements, from Year One of the after-school intervention. Specifically, we investigated whether students were able to produce more story elements between a pre and post test in Spanish as a result of receiving instruction in English. Through this data, we examined the cross-linguistic influence of second language instruction on the first language.

13. Polymer Coatings for Corrosion Protection of Metal Substrates
Hanna Hlushko
Materials Science & Engineering
Advisor: Dr. Svetlana Sukhishvili, Ph.D.

This work explored layer-by-layer deposited polymer coatings for corrosion protection of metal substrates. The ability of antioxidant polyphenol-containing polymers to form hydrogen bonds and bind metal ions was used to assemble them with positively or negatively charged clay nanoplatelets. Clay nanoplatelets introduced extra barrier protection, while the polymer worked as a binder between clay particles and the substrate and provided antioxidant functionality. The coatings were deposited at surfaces of silicon wafers and pre-polished metal substrates using spin-assisted deposition. Influence of the nanoplatelets chemical composition and number of deposited bilayers, on film performance will be explored using electrochemical techniques.
14. **Ex ovo optimization**  
Anson Harris  
Veterinary Physiology & Pharmacology  
Advisor: Dr. Christopher Quick, Ph.D.

Conventional animal models to study angiogenesis and angioadaptation have typically been optimized for fully developed adult experimental subjects. Current models to study embryonic development of the vasculature pose great challenges, and require refined surgical techniques, multiple survival surgeries, low rates of viability, dedicated and customized equipment, and rigorous animal husbandry. The chick chorioallantoic membrane (CAM) model shows great promise as an alternative animal model for microvascular research, and has already been used extensively to study angiogenesis in relation to tumor growth. However, conventional windowing methods limit the study of a developing microvascular network. The present work focuses on developing an ex-ovo CAM model optimized for microvascular studies. Three critical constraints have been identified that must be met. 1) environmental constraints: regulation of temperature, humidity and oxygen for extended periods outside of the incubation chamber, 2) visualization constraints: ensuring a planar surface and easy access for intravital microscopy, and 3) containment constraints: maintaining sterility during measurements. Furthermore, to make this new animal model widely accessible to investigators, efforts have focused on minimizing cost and maximizing reproducibility and scalability.

5. **Experimental Platform to Test Competing Hypotheses about Microvascular Adaptation**  
Kelbi Padilla  
Veterinary Physiology & Pharmacology  
Advisor: Dr. Christopher Quick, Ph.D.

Systemic blood pressure and tissue perfusion are determined by radii of microvessels. Adaptation of microvascular radii is complex because individual vessels respond to mechanical stimuli while a network of microvessels collectively adapt their radii to ensure blood supply matches tissue demand. We propose a novel mechanism for adaptation that does not assume non-physiological, “set points,” but instead predicts these hemodynamic variables from physiological “balance points.” The microvasculature network will be mapped using the chick chorioallantoic membrane (CAM) model, and a mathematical model will be developed to predict changes in blood flow and radii of the network. Vessels will then be occluded, and the resulting radii of the microvascular network will be compared to model results.
   Alessandra Ribota  
   Hispanic Studies  
   Advisor: Dr. Gabriela Zapata, Ph.D.

The objective of this presentation is to offer an in-depth description of the structure and beneficial effects of an inclusive research initiative that involved the collaboration of a graduate mentor and 12 undergraduate students in a Hispanic Linguistics program at an American university. The initiative had research, pedagogical, and service-oriented goals, as its main purpose was to develop research-guided, theoretically- and pedagogically-sound open-source instructional materials for the teaching of Spanish in university courses. The project also included: (1) applied, active, and project-based learning activities; (2) ethical reflection and practice; and (3) collaboration.

17. **Carbon Dioxide Utilization through Polymer Synthesis Integration**  
   Jared Enriquez  
   Chemical Engineering  
   Advisor: Dr. Mahmoud El-Halwagi, Ph.D.

As anthropomorphic levels of carbon dioxide continue to rise, it is necessary to implement responsible production practices to minimize the greenhouse gas created in industrial processes. One such process of interest is that of shale gas, which is expected to increase in production and become our dominant natural gas source within the next few decades. Currently, carbon dioxide sequestration techniques like enhanced oil recovery (EOR) and geological sequestration have helped alleviate some of the burden.

However, these methods only serve to store limited amounts of CO2 and do not reduce the overall global net levels. In this study, the utilization method of polymerization is investigated as a potential integrated process to turn CO2 into value added products. Through Aspen modeling and simulation, the integrated process can be optimized and the overall economics can be analyzed to determine financial viability. The results of this study will hopefully encourage further look into CO2 utilization methods as not only an environmentally oriented practice, but as a profitable and sustainable option.

Daniel Browne
Biochemistry and Biophysics
Advisor: Dr. Timothy Devarenne, Ph.D.

Botryococcus braunii is a species of green algae that forms colonies and produces petroleum-equivalent liquid hydrocarbons. This organism could be an industrial-scale source of renewable and valuable advanced bioproducts. However, it is first necessary to build a strong understanding of the basic biological properties of B. braunii. A key component of this process is the cultivation and harvesting of the algae for further study. Some research has already been conducted on methods for harvesting B. braunii. These methods include magnetic nanocomposite flocculants, polymer-based immobilization, starch-based flocculants, and thermo-reversible gels. This project will focus on testing and optimizing a method for high-throughput harvesting and storage of algae biomass.

19. Developing Novel Quantitative Tools to Predict Intestinal Ileus and Intestinal Edema

Megan Dole
Biomedical Sciences
Advisor: Dr. Christopher M. Quick, Ph.D.

One the one hand, peristalsis is necessary for intestinal lymphatics to pump excess fluid out of the intestine wall to prevent edema. On the other hand, intestinal edema can lead to a temporary cessation of peristalsis (i.e., ileus). Because intestinal edema can be both cause and effect of ileus, we developed a mathematical model to identify changes in critical parameters that can lead to prolonged ileus after surgery, chronic inflammation, or ischemia-reperfusion injuries. Unlike common modeling approaches, equations were linearized and solved algebraically, which provides a novel, general tool that translates basic research in intestinal fluid balance into clinically-relevant research.

20. Neurological phenotypic diversity seen in Collaborative Cross mice following Theiler’s Virus infection

Raena Eldridge
Biochemistry and Biophysics
Advisor: Dr. Candice Brinkmeyer-Langford, Ph.D.

Theiler’s murine encephalomyelitis virus (TMEV) has previously been studied in C57BL/6 mice and SJL mice as models of epilepsy and multiple sclerosis (MS) respectively. However, C57BL/6 and SJL are inbred mouse strains with very little genetic variation. The purpose of this study is to investigate TMEV infection using mouse models that better represent the genetic variation seen in humans. Mice of the Collaborative Cross (CC) resource have been developed to encapsulate diverse genetic backgrounds, leading to equally diverse phenotypic responses to TMEV. Using multiple phenotyping methods we have characterized TMEV infection in different CC strains, which may lead to new mouse models for other neurodegenerative diseases.
21a. **Latent class analysis of acculturative risk on telomere length**  
Francisco Montiel Ishino  
Health & Kinesiology  
Advisor: Dr. Tamika Gilreath, Ph.D.

Acculturation is the process by which Hispanic/Latinx immigrants assimilate into a new country through language, culture, and health habits. Through this process Hispanic/Latinx immigrants experience varying amounts of psychosocial stress, which has most recently been associated with telomere length. Shorter telomere length is associated with chronic, noncommunicable diseases. It is unknown if there are differences in how Hispanic/Latinx subgroups are at greater risk of shorter telomere length related to the acculturative process. Latent class analysis was used to identify patterns of highest risk among Hispanic/Latinx subgroups while accounting for differences in sociodemographic characteristics.

21b. **A latent class analysis of household environmental factors on child tropical neglected disease outcomes**  
Francisco Montiel Ishino  
Health & Kinesiology  
Advisor: Dr. Tamika Gilreath, Ph.D.

Tropical neglected diseases like malaria, chronic-obstructive respiratory issues, and diarrhea are the major source of morbidity and mortality in Tanzanian children. Household environmental factors are associated with child health outcomes, but limitations exist in which factors are most relevant. To separate the household environmental risk factors of tropical neglected diseases, latent class analysis was used. We found three separate classes differentiating child risk of tropical neglected diseases. Findings can be used to assist in child health promotion outreach and development of rapid field risk assessments in Tanzania.

22. **Adaptation of Hepatic Capsule in Fluid Volume Regulation**  
Chanyanuch Nakapakorn  
Biomedical Sciences  
Advisor: Dr. Christopher M. Quick, Ph.D.

Fluid leaves the hepatic sinusoids, exits the interstitial space through lymphatic drainage, and transudes out into the peritoneal cavity. The ascites fluid collecting in the peritoneal cavity is viewed as a failure of lymphatic vessels to remove fluid. However, it was recently found that permeability of the hepatic capsule can adapt to chronic changes in transudation. We therefore incorporated capsular adaptation into a hepatic fluid balance model to quantify its role in lymph flow and ascites formation. Solving the model equations algebraically predicts that decreased capsular fluid permeability reduces ascites volume and augments lymph flow.
23. **Lab-designed Laser-based 3D Printer**  
Ming Li  
Engineering Technology & Industrial Distribution  
Advisor: Dr. Chao Ma, Ph.D.  

Big changes are brought by 3D printing in various industries nowadays. Metal 3D printing opens up opportunities for engineers to make the 'impossible' product. Commercial metal laser-based 3D printer is costly and requires a big amount of materials. The aim of this project is to develop a lab-designed laser-based 3D printer (laser station) which is highly flexible in material and easy-to-operate. Equipped with a 200W fiber laser, laser station can be controlled via pc by setting various processing parameters. Metal powder materials are processed in an inert gas chamber with an oxygen monitor system. Laser station significantly increases the productivity in research and provides great opportunity for undergraduate researchers to get involved into 3D printer.

24. **Childhood Food Insecurity**  
Marita John  
Sociology  
Advisor: Dr. Svetlana Sukhishvili, Ph.D.  

In this research, we observed a majority of influential factors for Childhood Food Insecurity by analyzing trends and causes throughout history and current events. The research on childhood food security was conducted with a primary focus on our community, the Brazos Valley, in order to compare and contrast the results with national childhood food security. By exploring the correlations and causation of attributes in different circumstances it was possible to narrow down the cause of this growing crisis to socioeconomic factors and nutritional factors. Community service was performed through a non-profit organization for the majority of this research to analyze the real world issue out in the field.

25. **Prediction of ascites fluid volume formation from critical parameters governing fluid transport**  
Nicholas Tan  
Biomedical Sciences  
Advisor: Dr. Christopher M. Quick, Ph.D.  

Ascites, the fluid accumulating within the peritoneal cavity, is the result of complex interactions of intestinal and hepatic filtration from capillaries, transudation in peritoneal cavity, and lymphatic drainage. To address such complexity, investigators have resorted to quantitative modeling to relate observed ascites volume to the mechanical properties of the system. We first assumed a six-compartment model, where fluid flows are governed by the standard Starling-Landis and Drake-Laine equations. Unlike conventional models, we solve these equations algebraically to yield a general formula for ascites volume in terms of critical parameters. This allows prediction of a novel concept, "Ascitegenic Gain," the rate of change in ascites volume in relation to changes in capillary pressure.
26. **Historical Analysis using Geographic Information Systems (GIS)**  
Karla Garza  
Teaching, Learning & Culture  
Advisor: Dr. Lynn Burlbaw, Ph.D

The TAMU historical education dataset is a unique collection containing a range of rare preserved documents. To organize the complex datasets, Excel has been employed to link together the documents and their digitized contents. While this organizes and digitizes data, this does not help visualize and join these datasets to geographic locations. A GIS has been used to develop meaningful conclusions and visualize the locations of documents from the early 1900s. By means of a GIS, new questions have been raised about the dataset in correlation to the geography and other features in this time period.

27. **Analyzing Historical Data through Graphic Representation**  
Karen McIntush  
Teaching, Learning & Culture  
Advisor: Dr. Lynn Burlbaw, Ph.D

Analysis of primary documents in Brazoria County, Texas has provided insight into teachers’ lives during the early 20th century. This presentation will demonstrate how Excel can assist in the analysis of archival data with a focus on the conditions of the schools, the grades being taught in the schools, the number of children attending each grade, and teacher certification/teacher education and its possible correlation with teacher compensation. The dataset includes digitized documents that have been coded using Excel to provide visualization of information for the one-room schoolhouses in this region for both White and African-American children.

28. **Thieler’s virus and Its Effect on the Gait and Grip-strength of Genetically Diverse Mice Strains**  
Austen Herron  
Veterinary Integrative Biosciences  
Advisor: Dr. Candice Brinkmeyer-Langford, Ph.D.

Thieler’s virus (TMEV) causes various neurological conditions in mice which are similar to multiple sclerosis, epilepsy, amyotrophic lateral sclerosis, and Parkinson’s disease in humans. One determinant of the outcome for TMEV-infected mice is their genetic makeup. Different genetic backgrounds produce different immune responses, a phenomenon that occurs similarly in humans. Each disease state in the mice causes observable neurological symptoms, such as an altered gait, paralysis, paresis or weakness. Using the DigiGait system and grip test, we are able to quantify these observations to better understand the disease progression in genetically and immunologically diverse strains of mice.
29. **Detection and characterization of inoculated fungal endophytes in two genotypes of cultivated cotton.**

Cesar Valencia  
Entomology  
Advisor: Dr. Gregory A Sword, Ph.D.

Current research considers Beauveria bassiana, Phialemonium inflatum, and Chaetomium globosum to be endophytic in several species of plants, however they are most commonly found in nature as soilborne, fungi, or in the case of C. globosum as saprophytic fungus, that are capable of transitioning into plant endophytes and sometimes function as a deterrent to certain cotton pest species, though the method of transmission is unclear. The goal of this project is to discern, through a variety of microscopy techniques, whether or not these fungi are actually establishing as endophytes in the cotton plant tissues by identifying the presence of hyphae or any other fungal structures within the tissues, or if they are in-fact just working as epiphytes that interact with the plant through the rhizosphere.

30. **Cotton aphid infestation responses to experimentally elevated levels of a phytohormone**

Cody Gale  
Entomology  
Advisor: Dr. Gregory Sword, Ph.D.

Endophytic fungi establish a beneficial symbiosis with a host plant. Our research focuses on KOMA, a phytohormone which was found in the plant tissues after the plant was inoculated with the fungus, Phialemonium inflatum. We are testing the hypothesis that the accumulation of KOMA is responsible for differences in aphid infestation of P. inflatum-treated plants compared to controls. To begin testing, we first slice the stems of cotton plant and then inject them with 3μL of KOMA-containing solution. Then we close the slice with a grafting clip and immediately put the aphids on them. We will count aphids 1 week post-infestation.

31. **Testing the Hypothesis that the Intestinal Lumen Acts as a Reservoir to Delay ARDS**

Jason Poston  
Biomedical Sciences  
Advisor: Dr. Christopher Quick, Ph.D.

Acute respiratory distress syndrome (ARDS) is a life-threatening complication of successful fluid resuscitation to treat hemorrhage. According to the gut lymph hypothesis, ARDS is caused by intestinal ischemia and subsequent transport of inflammatory mediators from the intestine wall to the lungs through the mesenteric lymphatics. We developed a five-compartment mathematical model consisting of the microvasculature, the intestinal interstitium, peritoneal cavity, the intestinal lumen, and the systemic venous circulation. The model results indicate that the lumen acts as a reservoir that sequesters inflammatory mediators, therefore delaying mesenteric lymph-induced ARDS. Furthermore, the model also suggests that timely enterocentesis may prevent ARDS.
32. Modeling Ventricular Diastolic Volume as Both Cause and Effect of Ventricular Wall Stress
Vanessa Liu
Biomedical Sciences
Advisor: Dr. Christopher Quick, Ph.D.

Chronic changes in filling pressure affect ventricular wall stress, leading to growth and remodeling that alters diastolic volume. Adaptive mechanisms are difficult to characterize, however, because resulting changes in diastolic volume will in turn affect ventricular wall stress. To characterize a system where ventricular diastolic volume is both cause and effect of ventricular wall stress, we developed a general algebraic formula that predicts diastolic volume and wall stress in terms of mechanical properties of the cardiovascular system. The model predicts that normal adaptive processes will result in enlargement of heart in response to pathological changes in vasculature.

33. Why Intersectionality Matters: Examining Incidents of Racial Bias/Violence Targeting Black Undergraduate Women
Kevin Bazner
Educational Administration & Human Resource Development
Advisor: Dr. Chayla Haynes Davison, Ph.D.

In recent times, the state- and institution-sanctioned violence against Black people has gained increase media attention. Still, so little is known about Black women’s experiences with racial trauma and assault because the challenges facing Black people and Black men are understood by institutional leaders and the general public as one in the same. Critical race scholar Kimberle Crenshaw began using the concept of intersectionality to illuminate how Black women can simultaneously experience multiple forms of oppression. Research about Black women that does not contend with how they experience intersectional oppression contribute to the invisibility and erasure of Black women in scholarly and public discourses. To that end, this poster presentation involves the researchers sharing how intersectionality aided in their ability to examine documented incidents of racial bias/violence targeting Black undergraduate women.

34. Design of a Mechanical Model of a Closed-Loop Cardiovascular Model for Education
Jacob Brown
Biomedical Sciences
Advisor: Dr. Christopher Quick, Ph.D.

Blood pressure and flow in the cardiovascular system arises from the complex interaction of the ventricles, arteries and veins, and the small resistive vessels. Although the individual parts are simple, their interaction can be difficult to predict or understand. Although the minimal closed-loop mathematical model provides a platform for students to learn about the cardiovascular system, there is no equivalent mechanical model. We therefore are developing a mechanical model amenable for hands-on learning. The preliminary design includes inexpensive parts that can be easily assembled, as well as fifteen parameters that can be adjusted to simulate normal and pathological conditions.
35. **Algebraic Model of Cardiac Ejection Fraction Accounting for both Preload and Afterload**  
Kalli Crabtree  
Biomedical Sciences  
Advisor: Dr. Christopher M. Quick, Ph.D.

Ejection fraction (EF) is the most common clinical index used to quantify cardiac performance. Although the blood volume ejected with each contraction is sensitive to ventricular preload, existing algebraic formulas only include the effect of ventricular afterload. Therefore, we solved the equations of the standard minimal closed loop cardiovascular model to yield a formula for EF in terms of mechanical properties that affect both preload and afterload. The resulting formula accurately predicts EF for normal and heart failure subjects. The present work thus transforms basic research in cardiovascular biomechanics into a simple and accurate tool for clinically relevant research.

36. **Disruptive Technology Usage by Non-State Actors**  
Annie Lui  
Political Science  
Advisor: Dr. Danny Davis, Ph.D.

Disruptive technology changed how terrorism and warfare are executed. Non-state actors, ie terrorist groups, have rapidly adopted the use of disruptive technology. The use of commercial-off-the-shelf drones as weapons delivery is one real-life example of a disruptive technology adopted by non-state actors. Gathering real-life examples from around the world, this research aims to understand the relationship between non-state actors and disruptive technology. Specifically, the technique in which these technologies are identified and weaponized. Using this current understanding, the research will look forward at what developing and proposed technologies are likely to be the next iteration of disruptive technologies.

37. **Analysis of Unconventional Warfare: Kinetic, Cyber, and Information Environment**  
Austin Spacek  
Political Science  
Advisor: Dr. Danny Davis

Unconventional Warfare has increasingly become more technological in nature. The ability to analyze past unconventional warfare tactics, that occurred in Eastern Europe, can assist in countering this new hybrid warfare. This research will develop a greater understanding of past campaigns using various cyber, information, and kinetic events, individually and combined, in the context of regime change in democracies. The information derived from this research will be allow researchers to determine how Unconventional Warfare techniques are being used and potential interdiction strategies which could be utilized by the E.U. and NATO to lessen the impact of these ongoing threats.
38a. Exploratory Review of Public and Private Domain K-12 Robotics Curriculums
Aamir Fidai
Teaching, Learning & Culture
Advisor: Dr. Robert Capraro, Ph.D.

The use of robotics in STEM (Science, Technology, Engineering and Mathematics) education has been shown to have a positive effect. This study reviews robotics curriculums that are available in public and private domain. The goal of this study is to analyze the public and private domain robotics curriculums to identify the similarities and differences among them while determining their alignment with state and national educational standards. We also aim to provide a summary of each curriculum and its perceived efficacy in focus areas within STEM education. The researchers hope that information from this review and analysis will aid students, parents, teachers and administrator to make more informed decisions regarding their adoption choices of robotics curriculum.

38b. Effects of LEGO Based Interventions on Students' STEM Achievements
Aamir Fidai
Teaching, Learning & Culture
Advisor: Dr. Robert Capraro, Ph.D.

Effects of LEGO Based Interventions on Students' STEM Achievements LEGO is a popular children’s toy brand and a major player in educational robotics marketplace. FIRST LEGO League is one of the most popular robotics club and competition in the world. LEGO Mindstorm NXT is one of the most widely used educational robotics product in the world. This meta-analysis analyzed 18 quantitative studies and determined that robotics-based interventions had a positive effect on students’ STEM achievements along with an improvement in their attitudes towards STEM courses and professional STEM fields. The researchers hope that the positive effect size identified in this meta-analysis will encourage further use of robotics-based interventions with student populations not yet engaged through previous studies.
39. Exploring beneficial fungi via insect-plant-microbe interactions
Leah Buchman
Entomology
Advisor: Dr. Greg Sword, Ph.D.

Insect-plant-microbe interactions can play an important role in plant growth and resistance against herbivorous insects. We examined the potential for these beneficial interactions in two systems; endophytic fungi-sorghum (Sorghum bicolor), and endophytic fungi-soybean (Glycine max)-cabbage loopers (Trichoplusia ni). Sorghum treated with the fungal endophyte, Chaetomium globosum were assessed for plant growth enhancement in different growing mediums while soybean treated with these fungi were assessed for insect resistance/tolerance. Both systems were evaluated for fungal recolonization. We observed sorghum plants treated with the fungi, C. globosum had significant effects on plant growth across the different growth mediums. Thus far, our findings indicate significant effects of C. globosum treatment on T. ni larval performance and preference on soybean as well. Significant fungal recolonization, after treatment and growth was present in both systems. Future work will focus on adult female T. ni, oviposition preference on fungi treated soybean plants.

40. Bay Salt and its Effects on Historical Food Preservation
Grace Tsai
Anthropology
Advisor: Dr. Karen Kubena Ph.D.

The Ship Biscuit & Salted Beef Research Project aims to determine the effects of food on the health of seventeenth-century sailors. A method of food preservation on voyages was salting meat, specifically using bay salt. In this project, salted beef and pork were recreated using historical and archaeological sources, and stored in barrels on tallship ELISSA in Galveston, Texas for 6 weeks. Samples were routinely collected and subjected to microbial and nutritional analysis. This poster examines the mineral and microbiological content of bay salt to understand its effects on meat preservation and the potential reasons historical recipes specified its use for salting.

41. Binder Jetting 3D Printer
Wenchao Du
Engineering Technology & Industrial Distribution
Advisor: Dr. Chao Ma, Ph.D.

The objective of this project is to create a modular ceramic Binder Jetting 3D Printer from scratch for use in advanced biomedical and aerospace applications. Two phases of this project will encompass: 1) creation of a prototype using an existing design and 2) modification to meet special requirements. The main changes will be a customized roller system, higher printing resolution, and scalable print volume. A self-made high-flowability alumina powder will be tested. Future modifications and improvements include re-coding the slicing software and Marlin firmware, adding bed heating resistors, and creating a replacement boost-demultiplexing circuit board for an updated jetting cartridge.
Advanced finite element modeling has become a cornerstone in understanding the behavior of complex systems and producing optimal designs. Despite the importance of this method, challenges related to lack of fundamental and practical understanding coupled with a steep learning curve persist. This drastically decreases both the productivity in obtaining results and the confidence in the results, and mostly inhibits the use of this invaluable modeling method.

The goal of this project is to create a practical understanding of finite-element modeling through documenting the learning experience of students. The project outcome includes a holistic manual that presents finite element topics in a comprehensible order. In addition to identifying the major components of a modeling strategy, the relations between them and their physical significance are described.

Collaborative Service Learning Investigation in Brazos County, TX
Andrew McNeely
Sociology
Advisor: Dr. Sarah Gatson, Ph.D.

Building on prior ethnographic service-learning research in Brazos County, TX, we use qualitative methodology to more closely examine the relationship between religious organizations and food insecurity. This poster highlights two key components of our work this semester: the collaborative, interdisciplinary approach of the team, as well as the projected goal of an alternative food production intervention.