Poster #1_ Computer Science (1) – Undergraduate

Feasibility of Research HPC in the Public Cloud

Mr Michael Lau

This study explored the cost and data management feasibility of research high performance computing on public clouds from the perspective of a hpc center. Compute costs were compared to traditional on premises HPC centers with a direct replacement and a per job method. Data management feasibility and storage costs were analyzed using direct luster replacement, cloud object storage and cloud block storage. Results indicated a much higher cost for compute and storage in the cloud vs on premise alternatives regardless of cloud implementation. The additional knowledge cloud computing requires from users may also impede the cloud from becoming an alternative to traditional hpc centers.

Intelligent Augmented Lifelike Avatar App for Virtual Physical Examination of Suspected Strokes

Mr Kevin Yao

The physical examination of a suspected stroke is time consuming, and there is a lack of stroke specialists for examining suspected stroke cases in a timely fashion. To fill this gap, we have developed an android/iOS app that integrates computer vision, sensor readings, and advanced algorithms to automate and streamline the NIH Stroke Scale physical examination. The user interface design is optimized for elderly patients while the app showcases an animated lifelike 3D model of a friendly physician who walks the user through the exam. The physical examination consists of five tasks specifically chosen by a neurologist as to provide insights on the area of the brain which may be affected. The first two tasks involve rolling the eyes to the left and then to the right, and then smiling as wide as the user can. We incorporated recent work on detecting facial landmarks using supervision by registration to analyze video data produced by patients performing these two tasks. The next task is to extend the arm and hold the phone at shoulder level for ten seconds. We used the smart phone gyroscope to detect gravity-normalized acceleration of the phone to determine stability of the hand. Next, we ask the user to touch the nose three times. We used Google's Mediapipe library to detect hand landmarks and performed a custom post-processing algorithm that filters and detects involves the relative velocity of the finger with respect to the face. Finally, we ask the user to walk in a straight line. We again collect data from the smart phone gyroscope and perform a moving-average analysis of the horizontal acceleration of the phone to minimize the effects of natural gait noise while capturing the large-scale trends in acceleration for a patient who is unstable while walking. The app then sends analyzed results of these tasks to the neurologist or stroke specialist for review and decisions.

Poster #3_ Computer Science (1) – Undergraduate

Social Media for a university campus

Mr Bernard Jirka

The social life of a college student can produce the best years of one's life or leave one fraught with anxiety and loneliness. During a pandemic the latter could be more likely as physical interaction with fellow students is limited. As the world turns to online solutions during this time, there is no adequate online platform to facilitate the social life of a college community. Our solution is to create a new social media platform designed specifically for a college community that focuses on bringing people together through conversations. This project will be successful when students are able to use it to communicate more effectively with their peers that they share organizations or classes with, or with new friends that they meet through the platform. The difficulties of an online, college social life will be a thing of the past once Social U has become the social media platform for college communities.

mApp

Mr Marc-Benedict Bacus-Mueller, Casey Chambers, Justin Hong, Michael Wakin, Trey Shaffer

Moving to a brand new city is a challenge in itself, and gathering all the information makes it even more tedious and time-consuming. Therefore we propose Mapp.city, a comprehensive website application that will help streamline the moving process by centralizing all the information about a city in one place. Mapp.city will display information about a city's history and statistics, nearby amenities such as grocery stores, public transportation, and overall housing and neighborhood information.

Computer Speak

Mr Ross Podell, Thomas Keller, Felicia Invedy, Hsin-Mei Lin, Shravan Kumaran

About 1 in 54 children has been identified with autism spectrum disorder (ASD) in the US [1]. Often, non-verbal autistic children may have difficulty understanding words and may have a poor cognitive association between words and their pronunciations and actual meanings. Our system aims to design an interactive tablet application that can help children learn and practice connections between words and their meaning. Specifically, the system will track children's eye movements, and locate what words they are looking at. The system will then display pictures or animations and sounds about this word, thus children can use the app to make connections between each word and its meanings. We'll evaluate our system by treatment and control groups: Treatment groups will be used with animation/sound being played, and control groups won't have the animation/sound while children look at the word. This system provides caretakers a way to help non-verbal autistic children easily and conveniently learn the relationship between words and their meanings.

ColorClimb

Mr Wesley Till, Landon Creel, Kevin Kuriachan, Mannan Mendiratta

In indoor rock climbing, routes are typically distinguished by color (i.e. all the holds on a certain route are the same color). This poses a problem to colorblind climbers when certain colored routes are placed next to each other. Color-Climb is a mobile application which allows colorblind rock climbers to easily identify routes. Color-Climb would allow a user to aim their camera at the wall, tap on a hold, and see all other holds of the same color be highlighted. The app mainly targets bouldering, where the entire route can be seen from the ground. The application will be evaluated on accuracy in identification and surveys on user experience.

Designing a Diabetes Self-Management Application for Underserved Populations

Mr Hector Ariza, Jorge Tolentino, Magdalena Nio

Managing chronic conditions, such as diabetes, is challenging for underserved populations due to shortages in health services that hinders patients' access to adequate health care. The emergence of remote patient monitoring (RPM) platforms such as mobile health (mHealth) applications have shown promise in providing a cost-effective solution to improve access to health care, keep patients motivated to follow a healthy regimen and remind them when a certain behavior is needed. While several diabetes self-management apps are commercially available, these apps are often not tailored to the medically underserved community. The objective of this work is to develop GlucoseCoach, a mobile app to help patients in underserved communities with diabetes self-management. GlucoseCoach will provide feature integrated communication with the patient's healthcare provider, data logging capabilities compatible with wireless communication between auxiliary devices, and data-driven, personalized educational materials feeds and notifications. A User-Centered Design (UCD) approach has been adopted to engage users and stakeholders in the design and evaluation process to obtain functional information requirements and improve the user satisfaction of the mobile app. Mixed methods have been applied, including: interviews with patients in underserved communities and healthcare providers, focus group with nurse educators, review of academic literature, best-in-business analysis of mobile applications for diabetes management, and usability evaluations. As a result of these efforts, a high-fidelity prototype of the mobile app has been designed. Future work involves an additional usability evaluation for further testing of the app design, and the development of a fully functional version of the mobile app.

C4-DST: Command, Control, Communications, and Computers (C4) Decision Support Tools and Visualizations

Ms Jacqueline Nicole Hernandez, Harrison Wissel-Littmann

"In time-critical operations, unforseen interruptions can have harmful effects on mission commanders' task performance and decision making. With the help of Interruption Recovery Assistance (IRA) tools, a previous study was conducted in which mission commanders were able to effectively and efficiently recover from interruptions. The IRA tool was provided in the form of an interactive visual emulator that carried out a realistic time-critical mission with aerial surveillance, a team of operators, and a mission commander. Throughout the mission, commanders made decisions about hostile activity based on information provided to them from sensors found in unmanned aerial vehicles (UAVs) deployed in the emulator. Ultimately, the tool helped supervisors better recover from interruptions and make decisions in a timely manner .

While the previous study successfully proved the value of the IRA tool, it is unknown how the IRA helped in the decision making process and whether it consistently has the effect under different decision making task settings. The current study will again attempt to mimic a mission control setup with a C4 testbed, where the user's behavior, ability to process information, and their awareness of the situation will be monitored with the help of eye-tracking technology. The end goal would be to test these IRA tools and technologies in other various time-critical environments that are prone to have unforeseen interruptions and that involve critical decision making."

Leveraging Physical Gesturing Interactions to Enhance Expressiveness of Computer-mediated Online Communications

Ms Jung In Koh

Current trends in computer-mediated communication (CMC) have allowed people to take advantage of a large variety of options for communicating with other individuals online, especially when co-located face-to-face communication such as situations due to COVID-19. These communication options typically come in two forms: high-bandwidth and low-bandwidth. The former allows people to see and hear each other's gesticulations and intonations at distinct locations from each other through Skype or Zoom, whereas the latter offers people to communicate in real-time primarily in the form of text and images via Slack or iMessage. Although the advantages offered by one type of communication are lacking in the other, one of the most common ways that people have attempted to bring the advantages of higher-bandwidth communication to lower-bandwidth communication is through the use of visual communication markers (VCMs) such as emoticons, emojis, and stickers that are embedded in existing text messages. They have shown an ability to enrich their communication as well as to substitute for nonverbal cues that are missing in lower-bandwidth CMCs. VCMs have their limitations, as the conventional means of accessing VCMs rely on input entry methods that are not directly or intimately tied to expressive nonverbal cues. This is important because we gesticulate when we talk, and these gestures "share the burden of communication with that speech." The role of hand gestures has been well studied in communication and some work has been done toward capturing the expressiveness of face-to-face communication through both facial (e.g., smiling) and limb (e.g., hugging) interactions. However, research into its utility in emotion-enhanced CMC remains largely lacking. In this work, I propose to elicit user-defined gestures that are highly representative of VCMs, and develop a two-stage hand gesture recognition system (trajectory-based and shape-based) to distinguish between these gestures with an accuracy of 82%. By developing such a system, I aim to allow people using low-bandwidth forms of CMCs to still enjoy their convenient and discreet properties, and also experience intimacy and expressiveness of higher-bandwidth online communication.

Instruction Prefetchers and Cache Replacement Policies

Mr Alex Christian, David Chapa

"Processing speeds are determined by how many instructions per cycle (IPC) a CPU can execute. However, the CPU's clock cycle and the number of cores are only one factor for IPC. A key bottleneck that restricts processor speeds is memory. When the processor runs an instruction that requires a memory access into a lower level cache or main memory due to a miss in the first-level instruction cache, the latency of the access lowers the processing speed. To avoid these misses and reduce latency, hardware methods such as cache replacement policies and instruction prefetching have been designed to achieve a higher IPC resulting in a speedup while using the same physical hardware. Cache replacement policies attempt to keep the most useful data in the cache so that the processor does not need to stall while waiting on an access to main memory. The instruction cache is the first place the processor looks when it needs the next instruction, so having the correct instructions already in the cache produces a speedup. Instruction prefetching attempts to avoid latency from main memory access times by predicting future instructions correctly and fetching them at the right time.

The purpose of this research is to combine instruction prefetchers and cache replacement policies to produce a higher speedup. By surveying a collection of instruction prefetchers and last-level cache replacement policies on a trace-based simulator, speedups for each prefetcher and policy were determined. After determining initial speedups, cache replacement policies were modified to be used on the instruction cache instead of the last-level cache, creating a combination instruction prefetcher and cache replacement policy to improve the processor speedup. In this paper, we will discuss the speedup effects of combining certain instruction prefetchers and cache replacement policies in the L1I cache."

Asynchronous Music Collaboration: Eliminating the Need for Editing by Hand

Ms Michaela Matocha, Jacob Metcalf, Ryan Cohen, Divia Joseph, Foreman McCauley

"Making music is currently an activity best done in person with a group of people. During a pandemic, or among a long distance friend group, this is not possible. Currently, the only way for groups to make music virtually is through a time consuming process of manually viewing and editing a collection of videos. Our project is a website which will provide backing tracks and a recording framework for users to create music videos automatically - compiling many videos into a single music video without the need for editing by hand. The site will still provide the option to make tweaks to the video produced before exporting it, but this project will have been successful if we can minimize the amount of adjustments that are needed to be made. For example, one of the biggest challenges is going to be the timing for switching between participants in a karaoke session. Implementing an algorithm which consistently switches between users in a satisfactory manner will limit the amount of adjustments that need to be made after a karaoke mashup has been generated.

The application will allow for stronger social connections between people from a distance. By adding an additional method of socialization through karaoke, we hope to ease the burden of loneliness and depression that many people currently suffer from."

Checkpointing Jupyter

Mr Jesus Cedillo, Alisah Cervantes, Elizabeth Christman, Rachel Jee, Roesha Nigos, Evan Young

Jupyter Notebook is a popular web-based development environment primarily using python for data modeling and analytics. In the current version of Jupyter, there is no support to preserve variables that exist in the Python interpreter. This lack of functionality has frustrated Jupyter Notebook users since they have to rerun their models every time they open their notebook, and some computations can take hours to run. There are existing workarounds to this issue, but they are not user friendly and do not have the full functionality of saving the kernel. Our solution is to build a new checkpointing feature in Jupyter's backend that allows the user to store the state of their entire Python kernel, rather than just the cells on the frontend, and then restore their previous kernel with an easy click of a button. We will leverage TwoSigma's existing FastFreeze project to build the checkpointing feature in Jupyter's backend and launch the finished application through Kubernetes. To evaluate our solution, we test our product with TwoSigma employees and other Jupyter Notebook users. The primary metrics we look to measure are functionality, correctness, and user experience. This project will help improve Jupyter Notebook user's experience and productivity, while also providing research and findings about adding checkpointing features in existing software

AutoNarrator

Mr Jonathan Yang, Nick Yannuzzi, Surya Krishnan, Jack Greene, Lauren Ruffner

"In today's society, everyone everywhere commutes nearly everyday. People are interested in traveling and tourism further shows people's interest to discover new places and explore new areas. New York City alone received 65.2 million visitors in 2018, so many of them most likely seeking to learn something new about the city [1]. There currently is no avenue for people to learn about their surroundings during their commute, this is an issue because people moving to a new town or city will have little knowledge and they will never feel like that place is home until they learn more about it [20]. Our solution is to develop a mobile app that vocalizes information about nearby landmarks during the user's commute.

   The app will run in the background while the user operates their vehicle or travels on foot, delivering information unique to the landmarks that the user comes across while moving. This passive form of information delivery will enrich the commute of many. People will have a better understanding of their surroundings and hopefully be more mindful of their neighbors and the environment. This will also be an outlet of attention for long or boring drives; keeping people more focused on what they are doing.The evaluation for the AutoNarrator will be based on how enriching and how novel users find the experience. Trial users will be involved in test drives while using the application.

Innovative Book Recommendation System

Ms Kim Nguyen, Gray Morley, Jennifer Martin, Priya Patel, Karthik Rao

Reading is argued to be one of the most influential activities one can do to expand their horizon of knowledge. Studies have shown that reading can reduce stress, help alleviate depression symptoms, strengthen the complex network of circuits and signals in the brain, and much more. The first thing we have to do to start reading is choose a book that we will enjoy. Unfortunately for many readers, the books they like are not tied to a set of genres that they enjoy and instead, they prefer a large variety of genres, lengths, topics, and so on. We are developing an application that can take in a journal or diary entry about what phase of their life or event the reader is going through and suggest them titles based on the keywords of what is in their journal entry. This is to introduce the reader to books where the character(s) are going through the same thing, or similar at the very least, of what they're going through. This introduces a level of personalization that is novel. The performance of this project will be evaluated by having users complete surveys to determine their level of satisfaction with the recommendations generated. If the users enjoy reading the books recommended, the product will have been a success. Reading titles recommended by our application could aid the readers through a confusing or tough time in their lives.

Soundcheck and Simplifying Live Music Services

Mr Noah Charles Urbanovsky, Mr Noah Charles Urbanovsky, Jacob Hessong, Xchel Diaz

In today's ongoing pandemic, the lack of social interaction is negatively impacting countless people's mental health and relationships. While music is shown to positively impact both mental health and friendships, there is currently no good way for a group of people to stream music together remotely through the internet. Our plan to address this problem is to create a new service that allows streaming service users to virtually listen to music together. This can be achieved through users linking their respective streaming service accounts and joining rooms with friends or with searchable tags to be able to listen to music and chat with others at the same time. To evaluate our solution, we will first conduct surveys/questionnaires to gather desire for this service, then gather groups to test the service and provide feedback in real time, then finally conduct final interviews with test participants to gather qualitative and quantitative data, such as ease of use, visual clarity and aesthetics, and effectiveness. In the end, this service will be a new avenue for people to meet and hang out with others while listening to music, benefitting mental health and providing much needed interaction and friendship.

Aggienova Templates

Mr Mahir Pirmohammed, Alexander Crabtree, Emily Sarria, Landon Holcomb

"The Aggienova research team studies exploding stars (supernovae) using data obtained by ground and space-based observatories, including NASA's Swift and Hubble space telescopes. Aggienova Templates is building a pipeline that manipulates supernovae data using a template supernovae spectrum to create more accurate spectra for data analysis. Some features we have added to this pipeline this semester are an animated summary plot and using multiple template files in a series. We have written scripts to update a Swift supernova database used by our pipeline with distances and other host galaxy information from online databases. This database is also used to update a Swift supernova website used by the Swift Optical Ultraviolet Supernova Archive to serve data to researchers. "

AGGIENOVA: Ultraviolet supernova explosions

Mr Jack Padgett, Macie Robertson, Thomas Magee, Adrian Martinez

Our team is using observations from the Swift Ultraviolet Optical Telescope. This data will be compared with data from theoretical explosion models which start with a progenitor star exploding into an assumed environment. We will be writing Python codes to verify the theoretical predictions and constrain the progenitor environment.

Exploring Identity Formation and Identity Salience Among Sexuality Educators: A Scoping Review

Mrs Caitlin Ballard

"Background: Despite receiving substantial amounts of skills-based training needed to implement sexuality education content, sexuality educators are reporting significantly low self-efficacy rates. Low self-efficacy among sexuality educators raises concern because of the important role educator self-efficacy has on student outcomes. Identity salience (defined as the likelihood that a given identity will be active across situations) has been linked to self-esteem, role commitment, and more specifically, role self-efficacy. In order to improve educators' self-efficacy to deliver sexuality education, going beyond skills-based training and incorporating factors shaping identity salience is important because salience affects educators' self-efficacy. To begin addressing the low self-efficacy among sexuality educators, a conceptual framework accounting for factors known to shape sexuality educators' identity salience should be considered.

Methods: To better understand the nature and background of identify formation, identity theory and self-efficacy a scoping literature review was conducted to reveal how person identity, professional identity, training, identity salience, and self-efficacy for teaching are defined and measured. This scoping review identifies variables used to measure factors influencing sexuality educators' identity salience. The variables identified in this review will inform the development of survey items to better inform the proposed conceptual framework.

Conclusions: This review provides a comprehensive overview of the literature on identity formation, specific to the variables being used to measure person identity, professional identity, and training. This review also highlights available methods currently used to assess/measure identity constructs, as well as important gaps in the research."

Eye of the Beholder: How Hair and Persona Influence Tinder Outcomes

Mr Thomas Karl Von Buettner

Introduction: Tinder is a popular phone-based app that provides pictures and a brief description about potential partners and has been termed the hookup app (Wilhite & Fromme, 2019). Studies examining hair and eye color show evidence of positive assortment, or attraction to self-similar characteristics (Little, Penton-Voak, Burt & Perrett, 2003). The current study examines how hair color and persona may influence responses from different types of users on Tinder.

Methods: Tinder users (N=200) had an opportunity to match with our confederates' profiles. Four Tinder profiles were created, representing two independent variables (IV) of Hair Color (Blonde vs. Brunette) and Persona (Partier vs. Athlete). Photos of an attractive white female confederate were taken displaying them from the waist up with persona cues indicated by setting, house party or gym. Hair color of the confederate was altered with a wig.

Four observers for each of the conditions swiped right on 50 male tinder profiles. After 12 hours observers filled out a basic checklist indicating whether the user liked and/or messaged the profile, the age and ethnicity of the user.

Results: A 2X2X2 ANOVA was conducted with Persona of Confederate (Partier vs. Athlete), Hair Color of Confederate (Blonde vs. Brunette), and Age of User (College Age vs. Young Adult) as the IV. College Age were under the age of 22 (more dependent and expected to be dating) while Young Adults are 23-25 year old (more independent and expected to be married). Ignoring is the Dependent Variable (DV). There was a significant three-way interaction $F(1,192) = 10.08$, $p < .05$?2 = .046.

 For college age Tinder users, they ignore blonde partiers (59%), blonde athletes (42%), brunette partiers (55%), and brunette athletes (38%) about the same amount. However, for young adult tinder users, they ignore blonde partiers (91%) and brunette athletes (69%) more than the blonde athletes (33%) and brunette partiers (20%).

A 2X2X2 ANOVA was conducted with Persona of Confederate, Hair Color of Confederate, and Ethnicity of User (White vs. Non-White) as the IV and messaging the confederate as the DV. There was a significant interaction between hair color of confederate, and ethnicity of user $F(1,192) = 5.04$, $p < .05$?2 = .049.

Whereas non-white users messaged blondes (42%) less than white users (67%), non-white users message brunettes (56%) more than the white users (35%).

Conclusion: Young adults seem to be more specific on what type of females they respond to, while college-aged respond to all females similarly. This may be because college-aged users use Tinder for ego enhancement as well as for finding a date. There is also a similarity effect. Users seem to be more responsive to a female with the hair color that is tied to their own ethnicities. This supports the positive assortment theory (Little, Penton-Voak, Burt & Perrett, 2003) where

people are attracted to people, they are like physically. In future studies to see if hair color is a proxy for culture, we could replace the persona with a cultural event (Oktoberfest vs Fiesta).

Promoting Sense of Belonging and Interest in Geosciences among Undergraduate Women through Mentoring

Ms Wenyi Du, Qiyue Zhang

Developing a strong sense of belonging with relevant people and groups satisfies a fundamental need and is a primary motivator of human behavior (Baumeister & Leary, 1995). Failure to develop belonging attachments is associated with poorer wellbeing and poorer academic outcomes among college students (Baumeister, et. al., 2007; Shook & Russ, 2012). Recent research indicates that faculty mentoring relationships help undergraduate students to develop a stronger general social sense of belonging with their peers (Thoman et. al., 2015). However, less is known about the role a student's network of mentors can play in helping them to develop a strong sense of belonging with their university. Mentor network and interest development theories indicate that college students with more diverse social support networks should develop a stronger sense of belonging with their university (Higgins & Thomas, 2001; Shook & Russ, 2015), which should, in turn, promote the development of deeper interest their field of study (Bergin, 2016); however, there have been scant empirical tests of the mediational hypothesis. To fill this gap, we investigated the longitudinal direct and indirect influence of having a diversified network of college mentors on interest development through university sense of belonging among undergraduate women in STEM majors.

The analytic sample for the study consisted of 277 undergraduate women majoring in STEM disciplines at nine universities in the U.S., all of whom expressed an initial interest in Earth Systems and Environmental Science careers. The participants completed surveys twice per year (fall and spring) beginning in the Fall of 2015. The data used for analysis in the current study were collected during Fall 2018 (i.e., the first time point where the university sense of belonging was collected). A preliminary analysis of the sample indicated no differences between those who completed the Fall 2018 survey (n = 277) and those that did not (n = 207) based on background factors such as year in school, race, or their interest participating in a longitudinal research study. In addition to the university sense of belonging (Shook & Russ, 2015), the biannual survey included validated

measures of each participant's network of college mentors (Hernandez et al., 2020) and deep interest development (Hulleman et al., 2010).

A regression-based mediation analysis was performed using the Hayes' (2013) macro to test the indirect effect of mentor network diversity on interest development through university sense of belonging, controlling for initial interest. Consistent with our hypothesis, the analysis revealed a statistically significant and positive indirect effect of the mentor network diversity on interest in geoscience through university sense of belonging, a√6b = .04, bootstrapped 95% CI = [.01,.08]. More specifically, students with larger and more diverse mentor networks had a stronger university sense of belonging (b = 0.19, p <.05), and belonging, in turn, positively predicted interest development (b = 0.20, p < .05). These results indicate that undergraduate women's interests can be supported and maintained through their increased sense of belonging, which can be satisfied by diversifying their mentor network resources.

Where Do Partners Sleep At? How Spatial Directional Biases Affect Common Life Preferences

Mr Omar Garcia

The literature offers evidence on how spatial directional biases affect preferences in perception and performance tasks, such that we respond to to left-to-right trajectories faster (e.g., living beings or objects moving). These effects have been replicated using reaction time and eye-tracking methods. Will other simpler preferences such as where a couple's dominant partner sleeps at obey specific directional biases? We tested over 250 right-handed participants by asking them to choose what side of the bed would the dominant partner will be placed at. We found a pattern preference for one side over the other above chance level. This suggests that complex and simple spatial preferences obey to specific directional biases.

PsycMentor program: First-semester student evaluations on mentorship efficacy

Mrs Katelyn Morin, Caitlyn Bower, Sophia Steelman, Sin-Ning C. Liu

"The Department of Psychological & Brain Sciences (PBSI) launched a new mentorship program as part of their new first-semester experiences course. First-semester students (i.e., freshmen & transfer students) enrolled in this mandatory course and were assigned a PSYCMentor. This PSYCMentor was a junior- or senior-level undergraduate student in PBSI who served as the mentor for these first-semester students throughout Fall 2020.

In order to assess the efficacy of the PSYCMentor program, students were asked to rate their agreement with 9 items about the program. An example item was: "I enjoyed being part of this program". The students were asked to evaluate the PSYCMentor program in the middle of the semester and at the end of the semester.

We sought to address two research questions:

RQ 1: Were the mentees' PSYCMentor program evaluations statistically significantly different between the middle of the semester and the end of the semester?

RQ 2: Do the mentees' a) race, b) gender, c) sexual orientation, d) parental education, or e) ability status impact whether a mentees' PSYCMentor program evaluations differed significantly between the middle of a semester and the end of the semester?

A repeated measures ANOVA determined that students' evaluations of the program did not differ statistically significantly between the middle of the semester and the end of the semester $F(1, 148) = .059$, $p = .81$.

A series of mixed ANOVAs determined that the race of a student does significantly impact whether a student's evaluation of the program differed statistically significantly from mid-term to the end of the semester $F(6, 140) = 2.37$, $p = .03$. However, a students' evaluation of the program did not differ statistically significantly from the middle of the semester to the end of the semester based on gender $F(1,145) = .907$, $p = .34$, sexual orientation $F(3,142) = .251$, $p = .86$, parental education $F(4, 142) = .915$, $p = .46$, or ability status $F(1, 141) = .173$, $p = .68$.

Everyday-Inspired Movies: Movie Recommendation System Based on Personal Social Media Posts

Mr Larry Powell

With the rise of social media platforms, people provide more of their life and personal information through these systems. With the rise of big data, these often public social media posts are opening possibilities in many domains such as healthcare. Currently, companies are using such social media information for ad content and recommendations. We propose a system that uses people's posts to understand their real-world situations in life and provide recommendations for movies. Recommended movies will be aligned with each specific viewer's real life and hopefully help them find the movies more relevant, resulting in a better experience and perhaps even motivating them to reach their goals or support them in hardships. The system uses natural language processing to understand people's posts, and with machine learning, we recommend the right movie and genre that specific viewers watch. Our work contributes to developing a new, personally relevant approach to movie recommendations.

Popularity Contest Gone Wrong: User Response To Democrat Primary Candidates' Tweets

Mr Thomas Karl Von Buettner

Introduction: Twitter is a social media site that allows individuals to post their thoughts to their peers and to the world. Social media allows politicians to bypass the news media and deliver campaign messages directly to their followers (Meeks, 2017). President Trump's widespread use of Twitter popularized the use of Twitter for politicians.

Politicians are now having to create an identity on social media. This identity is often manufactured to appeal to voters. Audience members cognitively and emotionally choose to follow public figures, leading to personal investment in seeing them triumph (Cohen, 2001).

The current study examines how users react to Democrat candidates' Tweets during the primaries for the 2020 election.

Method: There were 349 total tweets from nine Democrat candidates (Biden, Bloomberg, Booker, Buttigieg, Gabbard, Klobuchar, Sanders, Warren, & Yang). There were 288 tweets from six male candidates (83%), 61 tweets from three female candidates (17%). There were 270 tweets from six white candidates (77%), and 79 from three non-white candidates (23%). There were 290 tweets from straight candidates (83%), and 59 from gay candidates (17%)

Nine research Twitter accounts, one for each candidate, were built several weeks before tracking began to avoid looking fake. Researchers would go on Twitter twice a day and liked or made neutral non-political posts.

Screenshots were taken twice a day of the Democrat presidential candidates' tweets from February 26th through March 6th. Numbers of likes for Tweets were recorded.

Results: A 2 X 2 ANOVA was conducted with Gender of candidate (Male vs. Female) and Race of Candidate (White vs. Non-White) as the independent variables (IV), with likes for Tweets as the dependent variable (DV). A significant main effect for likes was found for Gender (IV1), such that there were significantly fewer likes for male candidates (m = 3,583) than female candidates (m = 9,775) Tweets, $F (1,345) = 4.616$, $p < .05$, $?2 = .013$.

There was a significant interaction between candidate's gender and race, $F (1,345) = 15.48$, $p < .05$, $?2 = .042$. For male candidates, the white's Tweets were given fewer likes (m = 2,157) than the non-white's Tweets (m = 8,782), but the opposite was found for female candidates where the white's Tweets was given more likes (m = 11,183) than the non-white's (m = 6,132) Tweets.

A Mann-Whitney t-test was performed with sexuality of candidate (Straight vs. Gay) as the IV and likes for Tweets as the DV. There were significantly fewer likes for straight candidates' (m = 1,540) Tweets than gay candidates' Tweets (m = 2,019), $W = 904$, $p < .05$.

Conclusion: Users of Twitter seem to praise minority candidates more than whites. However, this affirmation lessens when the candidate has two minority characteristics. Through social

media, minority political leaders are likely to start receiving more support in the presidential elections. Although Twitter users seem to like minority politicians' Tweets more, the last two candidates (Biden and Sanders) were white males. Future studies should investigate whether liking Tweets is related to voting for a candidate.

Heightening Awareness about Our Inability to Effectively Multitask

Ms Claire Bowman, Sydney Tetzlaff

Everyday people multitask at home and at work. Despite its prevalence, decades of research have shown that there are significant cognitive limitations associated with multitasking behavior, most notably the significantly increased response times (Sanbonmatsu et al., 2013). Additionally, research has repeatedly shown that there is a general tendency for individuals to believe that they have above average abilities to multitask (McKenna, 1993). In the context of driving, multitasking can be fatal. The proposed research seeks to examine the effectiveness of using a traditional computer-based task-switching paradigm versus a driving simulator intervention in an attempt to enlighten drivers about their actual multitasking skills, thus challenging their previously held beliefs and decreasing overconfidence. Participants (N = 200) will be randomly assigned to one of four conditions: 1 - control, 2 - online multitasking test, 1 - driving simulator, 2 - online multitasking test + driving simulator. All participants will initially complete a questionnaire assessing perceived multitasking ability and overconfidence, which will be assessed again at one and two weeks later. To determine the effectiveness of each intervention, a 2x2 repeated measures ANOVA will be conducted to examine how mean scores of overconfidence changed over time for each condition. The findings of the present research could help bolster initiatives that discourage distracted driving in young adults. Future directions will seek to expand the findings into the organizational context to inform best practices for driving occupations.

Type of STEM Field Moderates Gender Differences in Implicit and Explicit Identity Balance

Mrs Rachelle M Pedersen, Michael R. Avlonitis, Nyima I. Sanneh

Despite efforts to diversify undergraduate science, technology, engineering, and mathematics (STEM) programs, there is still a gender gap in many (male-dominated) STEM fields. That is, women are underrepresented in fields such as engineering and computer science (NGC, 2020). Research indicates that exposure to persistent gender stereotypes, often reinforced by numerical dominance, lowers women's sense of belonging and hinders personal-professional identity development, which in turn leads to women leaving STEM fields at a higher rate than their male peers (Dasgupta & Stout, 2014; Diekman et al., 2010). Balanced identity theory (Greenwald et al., 1998), suggests that individuals who achieve balance across central personal-professional identities will be more likely persist in their academic and career pursuits. In the present study, the three most relevant central personal-professional identities were: Self-STEM, Self-Gender, and the STEM-Gender association. These three central identities can be measured explicitly (i.e. survey scales) and implicitly (i.e. Implicit Association Tests; Greenwald et al., 2002). The present study sought to understand if identity balance varied as a function of gender identity (men, women) and major (Biological/Life Sciences, Engineering/Computer Science).

The current study is a part of a larger, 2.5-year longitudinal study of identity development and balance among ethnically diverse undergraduates in STEM majors within Biological and Life Sciences (73%), Engineering (18%), and Computer Science (9%) from three California State University schools. The analytic sample (measured Fall 2018) included 146 juniors and seniors (59% Hispanic, 58% female). Participants completed a series of three randomly displayed, online Implicit Association Tests (IAT; Greenwald et al., 1998), and answered a series of explicit survey questions, which included validated measures of participants' perceived gender identity (Luhtanen & Crocker, 1992), STEM identity (Chemers et al., 2011), and STEM stereotype endorsements (Schmader et al., 2004). Individual implicit and explicit balance identity scores were calculated based on the correspondence of Self-STEM, Self-Gender, and STEM-Gender IAT or survey scale scores.

First, a multiple regression analysis was conducted to determine if implicit balance scores varied as a function of female status or Biological/Life Science major status. The results indicated that Biological/Life Science majors reported higher implicit balance score and Engineering/Computer Science majors (b1=0.41 p<.01, √ü=.29) and females had lower scores than their male counterparts (b2=−0.23, p<.05, √ü=−0.18), but no gender by major moderation effect. A second multiple regression analysis predicting explicit balance scores reveal a significant moderation effect, such that males in

Engineering/Computer Science had higher explicit balance scores than males in Biological/Life Sciences, but females in Engineering/Computer Science had lower balance scores than females in Biological/Life Sciences (b3=1.30, p<.001, √ü=0.86). These results reaffirm the importance of utilizing both implicit and explicit measures of balanced identity and highlight the need to tease out the gender−specific nuances of balanced identities within the various STEM fields as opposed to STEM as a whole.

Poster #30_ Psychology (4) – Graduate

The Effect of Language of Numeric Problem Presentation among Spanish-English Bilingual Subgroups

Mr Omar Garcia, Guillermo Saldana

Bilingual cognition studies show a disconnection in how bilinguals perform reasoning tasks. Holding other factors constant (e.g., language type, culture), bilinguals appear to behave differently between their languages. Keysar et al.'s (2012) foreign language effect (FLe) predicts that bilinguals will rely on different strategies when using their first (L1) and second languages (L2), particularly in reasoning and decision making. This effect will produce differences in how bilinguals reach a logical conclusion to a given dilemma or problem. Yet, studies into FLe do not provide a clear answer on how bilingual subgroups (e.g., L1-dominant, L2-dominant, and balanced) recruit their languages to complete a given reasoning task. To test language of presentation differences, 281 Spanish-English bilinguals coming from different subgroups were given moral and numerical reasoning tasks in either of their languages. Results suggest that task type, language of presentation, and bilingual subgroup classification matter when reaching a decision.

Poster #31_ Psychology (2) - Undergraduate

COVID-19 Impact on the Mental Health of College Students

Ms Keerthana Sivakumar, Corine Harvey, Sydney Pattison, Mariana Cantu

"Acculturation is a factor contributing to mental illness in four-year university students [1, 10]. Additionally, students are now confronting the effects of the global pandemic of the COVID-19 virus, leading to the widespread in-person closure of educational institutions in many countries causing a rapid onset of online schooling, in addition to decreased socialization and adverse economic changes [12]. To investigate the impact of the COVID19 pandemic on the mental well-being of a college student we will conduct a study targeting freshmen and senior students at Texas A&M University. Our research question is: How do network and social capital accumulation affect the mental health stressors of undergraduate students'; with consideration for COVID-19 adaptations. Virtual interviews will be conducted using web-based software Zoom, and offer an in-depth understanding of stressors in relation to acculturation, social and cultural networks, and environmental factors, particularly those caused by COVID-19. We seek to generate understandings of stress and mental well-being for undergraduate students to develop a mentorship program from the data results that can aid students. We target the need to destigmatize mental illness, and provide education needed to address this type of illness present in the 4-year university population through a mentorship program.

Academic Lifestyle of First Year Psychology Students at Texas A&M

Ms Jamie Mares, Victoria Johnson, Lauren Endsley, Emily Larkins

"The PSYCMentor program was launched in Fall 2020 in the Department of Psychological & Brain Sciences (PBSI) at Texas A&M University. The program was part of a new first-semester experiences course in PBSI, and consisted of junior- and senior-level undergraduate Psychology major students mentoring groups of students in their first semester in the major.

As part of the program, the mentees were asked to rate their agreement with three items about their academic lifestyle. One example item is: "I am enjoying the lifestyle of being a university student".

We wanted to address two research questions:

RQ 1: Were the mentees' ratings of Academic Lifestyle statistically significantly different between the middle of the semester and the end of the semester?

RQ 2: Do the mentees' a) race, b) gender, c) sexual orientation, d) parental education, or e) ability status impact whether a mentees' ratings of Academic Lifestyle differed significantly between the middle of a semester and the end of the semester?

A repeated measure ANOVA determined that students' ratings of Academic Lifestyle were statistically significantly different between the middle of the semester and the end of the semester $F(1, 148) = 13.57$, $p < .001$.

Overall, the students' ratings of Academic Lifestyle at the end of the semester were significantly higher than their ratings of Academic Lifestyle in the middle of the semester.

A series of mixed ANOVAs determined that mentees' ratings of Academic Lifestyle did not differ between the middle of the semester and the end of the semester based on gender $F(1, 145) = 3.61$, $p = .06$, sexual orientation $F(3, 142) = 1.60$, $p = .19$, parental education $F(4, 142) = 1.31$, $p = .27$, or ability status $F(1, 141) = 1.54$, $p = .70$. However, students' ratings of Academic Lifestyle between the middle of the semester and the end of the semester were impacted by their race $F(6, 140) = 2.33$, $p = .04$.

Poster #33_ Psychology (2) – Undergraduate

Effects of STEM/STEAM Activities on Middle School Student Attitudes, Beliefs, and Perceptions of Learning and Career Paths

Ms Vinisha Vasan, Ria Sharma

"Hispanic, Native American, and black students are underrepresented in STEM/STEAM coursework and are more likely to drop out of STEM/STEAM degree programs in comparison to their Asian and white peers. But this lack of participation in STEM/STEAM professions has little to do with intellectual capabilities and everything to do with the students' attitudes, beliefs, and perceptions of STEM/STEAM careers. Research suggests the two main reasons for students' apathy towards STEM/STEAM learning and career pathways are a lack of qualified instructors and innovative learning opportunities. In this poster presentation, we introduce the preliminary results of a systematic literature review on the effects of innovative STEM/STEAM activities on career perceptions of underrepresented middle school students.

We utilized the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method to conduct this systematic review. Using our inclusion/exclusion criteria we restricted the results to articles published in the English language during or after the year 2000. Only the articles that were published in peer-reviewed journals, appeared in conference proceedings, or were committee approved Masters or Doctoral theses were considered for further review. As a result of further screening, we identified 12 quantitative articles, 1 qualitative article, and no mixed-methods articles. Full text analysis of the 13 articles resulted in the exclusion of 1 quantitative article. The inter-rater discussion resulted in the identification of 12 articles for inclusion in the final analysis. Our initial findings indicate that STEM/STEAM Activities foster a deeper interest and improved attitudes towards STEM/STEAM careers in middle school students."

COVID-19 Impact on the Mental Health of College Students

Ms Caitlyn Bower, Katelyn Robinson, Sin-Ning C. Liu, Sophia Steelman

The PSYCMentor program was launched in Fall 2020. This internship program for junior- and senior-level students in the Psychological & Brain Sciences Department (PBSI) allowed more advanced students in PBSI to mentor first-semester students. This mentorship program was part of the new first-semester experiences course launched by PBSI.

In the middle of the semester and at the end of the semester, the mentees of the PSYCMentor program were asked to rate their agreement with 16 statements regarding Academic Belongingness (e.g., "I feel at home at Texas A&M University").

In this study, we have two main research questions:

RQ 1: Were the mentees' ratings of Academic Belongingness statistically significantly different between the middle of the semester and the end of the semester?

RQ 2: Do the mentees' a) race, b) gender, c) sexual orientation, d) parental education, or e) ability status impact whether a mentees' ratings of Academic Belongingness differed significantly between the middle of a semester and the end of the semester?

A repeated measures ANOVA determined that students' ratings of Academic Belongingness were statistically significantly different between the middle of the semester and the end of the semester $F(1, 148) = 4.12$, $p = .04$.

Overall, the students' ratings of Academic Belongingness at the end of the semester were significantly higher than their ratings of Academic Adjustment in the middle of the semester.

A series of mixed ANOVAs determined that mentee's ratings of Academic Belongingness did not differ between the middle of the semester and the end of the semester based on sexual orientation $F(3, 142) = 1.01$, $p = .37$, parental education $F(4, 142) = .715$, $p = .59$, or ability status $F(1, 141) = .108$, $p = .74$.

However, students' ratings of Academic Belongingness between the middle of the semester and the end of the semester were impacted by their race $F(6, 140) = 2.32$, $p = .04$, and gender $F(1, 145) = 4.92$, $p = .03$.

Effects of Street Harassment Extending to the Workplace

Ms Melissa Paul

"This study examines the effects of unwanted sexual experiences in and outside of the workplace on work fatigue. Sexual harassment is unwanted sex-based verbal and/or physical acts inside the workplace from coworkers, managers, or supervisors, whereas street harassment is unwanted sex-based verbal and/or physical acts outside the workplace from strangers. The negative effects of sexual harassment on work-related attitudes and well-being are well-established (Ford & Ivancic, 2020; Jahnke et al., 2019; Taniguchi et al., 2016) as is the variation in sexual harassment frequency and intensity across demographic variables such as age, race, and marital status (Adikaram, 2018; Buchanan et al., 2018; Cassino & Besen-Cassino, 2019; Crenshaw, 1992; Minnotte & Legerski, 2019; Siddiqi, 2003). However, little is known about how street harassment impacts work outcomes. Thus, the goal of this project is to examine whether the known effects about sexual harassment and work fatigue are reproduced with street harassment and work fatigue. We also examine whether racial/ethnic minoritized women experience a higher frequency of street harassment as well as higher levels of work fatigue. Additionally, we examine whether unmarried and young adult individuals experience a higher frequency of street harassment and work fatigue than their married and older counterparts. To test these hypotheses, we recruited employed women to complete a survey via Amazon Mechanical Turk (MTurk). Regression analyses will be performed to examine these relationships. This study will contribute to the existing literature on sexual harassment while expanding our knowledge on street harassment and its impact on workplace outcomes for women.

Who is Whispering: A Qualitative Analysis of Whisper Networks and Their Information Sources

Ms Josselyne Saenz, Abby Patterson, Blaine R. Peters, Elizabeth Odom, Rose L. Siuta

Whisper networks (WN) refers to the transfer of information about sexual harassment and perpetrators of harassment occurring in a community or industry. This study focuses on the participants involved in whisper networks and aims to explore the factors that define who becomes a source of information in these networks. A total of 88 participants, mostly female participants, participated in a qualitative questionnaire available on Amazon Mechanical Turk. All gathered data used for the analysis was coded and analyzed by multiple trained coders using conventional content analysis. In addition, ATLAS.ti, a coding software, was utilized after a consensus was obtained for further analysis. Our findings revealed that individuals who participated in whisper networks reported that sources of obtaining information came from those they are close to (i.e., coworkers, work friends), those with lower power in the organization (i.e., subordinates and new employees), management, and from witnessing/experiencing the event. Those who did not participate in whisper networks also reported similar sources of obtaining information, which included coworkers and witnessing or experiencing sexual harassment (SH). These findings suggest that sources of information were primarily reported from interpersonal relationships, from those lacking power in an organization, and from personal experiences. Identifying the sources of information can help determine the effect of relational factors involved in WN participation, as well as provide insight to the origin and transfer of information in WN.

The Relative and Incremental Effects of Physical and Mental Health on Job Performance

Ms Haylie Elise Maguire

Employee health is critical to an organization's ability to produce and succeed. It is well-established that there is a positive relationship between health and job performance. When employees are in poor health, millions of dollars in productivity can be lost. Health is a multidimensional construct composed of both physical and mental aspects and each of them have been found to positively relate to job performance separately. However, the combined influence of physical and mental health has not been examined extensively. Data collected on employees during the COVID-19 pandemic provides a unique opportunity to explore how physical and mental health together relate to job performance. In the current study, over 400 remote workers responded to a survey assessing their physical and mental health as well as their job performance. We expected both physical and mental health to relate positively to job performance, and these hypotheses were both supported. We also expected mental health to account for unique variance in job performance above and beyond physical health, but not vice versa. Hierarchical regression analyses revealed support for these hypotheses as well. Theoretical and practical implications for individual employees and organizations are discussed.

Near-Peer Mentoring in STEM/STEAM Education

Mr Alexander Ling

The current professional and post-secondary STEAM and digital arts landscape lacks diversity. Students who identify themselves as Hispanic, Black/African American, Native American and those students who belong to low-SES families are less likely to choose and survive in the STEAM pipeline. Research suggests many reasons for these disparities including a lack of innovative new teaching and learning techniques to improve students' perceptions and attitudes towards careers in STEAM and digital arts. Near-peer tutoring has shown promise in improving students' academic outcomes and their attitudes towards targeted outcomes. Although initially confined to the domain of nursing education and educating future doctors, this innovative new social learning approach has shown potential to improve K-12 students' academic outcomes as well. In this poster we present the initial findings from a PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guided systematic literature review. Our initial search resulted in 270 articles that were published during of after 2000. We further restricted our search to articles that were published in English language and were either peer-reviewed journal articles, conference proceedings; or were committee approved master's or doctoral thesis. Initial screening of the articles resulted in exclusion of 229 articles. We screened the remaining 41 relevant articles and found 10 quantitative articles to be included in the final meta-analysis. We also found 20 qualitative papers to be included in the systematic literature review. Initial analyses indicate that near-peer mentoring has a positive effect on students' attitudes, perceptions and beliefs along with an improvement in their STEAM academic achievements.

Fear of COVID-19 in First Semester Psychology Students

Ms Sophia Steelman, Katelyn Robinson, Caitlyn Bower, Sin-Ning C. Liu

The Psychological & Brain Sciences Department (PBSI) at Texas A&M University launched a new first-semester experiences course for all of their new students in Fall 2020. As part of this course, the first-semester students were assigned a junior- or senior-level student in PBSI who served as their PSYCMentor.

In the middle of the semester and at the end of the semester, we asked the students participating in the PSYCMentor program about their Fear of COVID-19. At each of these time points, the students were asked to rate their agreement with 7 statements about their feelings about COVID-19 (example item: "I am very afraid of COVID-19").

In this study, we seek to understand two research questions:

RQ 1: Were the mentees' ratings of Fear of COVID-19 statistically significantly different between the middle of the semester and the end of the semester?

RQ 2: Do the mentees' a) race, b) gender, c) sexual orientation, d) parental education, or e) ability status impact whether a mentees' ratings of Fear of COVID-19 differed significantly between the middle of a semester and the end of the semester?

A repeated measures ANOVA determined that students' ratings of Fear of COVID-19 did not differ statistically significantly between the middle of the semester and the end of the semester $F(1, 148) = .02$, $p = .90$.

A series of mixed ANOVAs determined that the mentees' ratings of Fear of COVID-19 did not differ between the middle of the semester and the end of the semester based on gender $F(1, 145) = .32$, $p = .57$ or parental education $F(4, 142) = .22$, $p = .93$.

However, students' ratings of Fear of COVID-19 between the middle of the semester and the end of the semester were impacted by their race $F(6, 140) = 4.23$, $p = .001$, sexual orientation $F(4, 142) = 3.91$, $p = .01$, and ability status $F(1, 141) = 8.80$, $p = .004$.

The role of the ventral hippocampus on active avoidance and contextual learning: Implications for PTSD

Mrs Sarah Perry

A hallmark coping mechanism of post-traumatic stress disorder (PTSD) is avoidance, which can be defined as behaving in a way that decreases the likelihood of interacting with a perceived threatening stimulus. While avoidance is adaptive in dangerous situations, it becomes maladaptive if it continues in a safe environment (or more broadly, context), so it is important to research if avoidance is context dependent. Since the hippocampus is responsible for animals pairing important events to the context that they were in, it would likely be responsible for contextual regulation of avoidance. The ventral hippocampus is specifically of interest as it is shown to play a key role in modulating behavior in anxiogenic contexts, such as passive avoidance of a potential threat. Seventy-five Sprague Dawley rats were obtained for two way signaled active avoidance (SAA) in which the rat must completely cross to the other side of the conditioning box during a tone CS to prevent a footshock US and terminate the CS. In the first experiment, the rats were trained in one of two contexts, Context A or Context B, for either 4 or 8 days and then tested under extinction conditions (no termination of the tone and no shock) in both contexts in a counterbalanced order. Rats tested in the same context as they were trained in showed similar levels of avoidance behavior, but rats that were tested in a different context showed a statistically significant decrement in avoidance responding, thus displaying a context shift deficit. In a second experiment, the rats were trained for 4 days in the two-way SAA. To test if ventral hippocampus is responsible for the behavioral effect, the ventral hippocampus was inactivated with muscimol or injected with vehicle as a control during the testing sessions. As shown previously, rats given vehicle injections showed the same context shift deficit when tested in a novel context. However, rats given muscimol injections had similar levels of avoidance responses in both the novel and original contexts for testing, exemplifying that the ventral hippocampus mediates the context dependence of avoidance. These results exemplify that ventral hippocampus is important for constricting avoidance to the training context and improper functioning of this brain area could lead to context dysregulation of avoidance in conditions like PTSD.

Attachment Style and Disordered Eating among Young Adults

Ms Alicia Delcarmen Borges, Jennifer Eun Lee

The ability to form attachments in close relationships has been shown to influence wellness. A previous study has shown that higher avoidant attachment is associated with unhealthy eating habits (Faber, 2017). Few researchers have examined avoidant and anxious attachment style in relation to disordered eating. The current study examined the association between adult attachment-related anxiety and avoidance with disordered eating behaviors among young adults.

574 young adults aged 18-25 (Mage = 21.6; 68.5% women, 29.4% men; 58.5% white, 17.6% Black, 9.4% Latinx) were recruited from a Mid-South university and Amazon Mechanical Turk. Participants completed questionnaires about adult attachment styles (two subscales of the Experiences in Close Relationships - Revised Questionnaire) (Fraley et al., 2000) and disordered eating behaviors (four subscales of the Eating Disorders Examination Questionnaire) (Fairburn & Beglin, 1994). Associations among subscales were analyzed using bivariate pearson correlations.

Findings illustrated a significant positive correlation between anxious attachment style and all disordered eating subscales including: restraint ($r(574) = 0.20$, $p < .01$), eating concern ($r(574) = 0.34$, $p < .01$), shape concern ($r(574) = 0.36$, $p < .01$), and weight concern ($r(574) = 0.33$, $p < .01$). There was also a significant positive correlation between avoidant attachment style and all disordered eating subscales including: restraint ($r(574) = 0.09$, $p < .05$), eating concern ($r(574) = 0.22$, $p < .01$), shape concern ($r(574) = 0.14$, $p < .01$), and weight concern ($r(574) = 0.14$, $p < .01$).

Findings suggest adult attachment style impacts disordered eating behavior. Prevention programs treatments should consider targeting anxious and avoidant attachment styles in the development of eating disorders.

Independent but not Interdependent Self-Construal Increases Risk for Development of Chronic Pain

Mr Zachary Joseph Skrehot

The current study sought to determine whether self-construal can predict the development of chronic pain over a 9-10 year period. Self-construal theory dichotomizes one's identity into independence (difference from others) and interdependence (relation and connection to others). The lens through which an individual views themselves is an important component of their health behaviors and responses to health messages. Past studies found evidence that the interdependent relative to independent self-construal may have positive effects on health related measures. No prior longitudinal studies had directly examined the relationship between self-construal and chronic pain. We hypothesized that having an interdependent self-construal would buffer against the development of chronic pain over time. Data from the Midlife in the United States (MIDUS) dataset were used for this analysis. Our analysis showed that self-construal can predict the development of chronic pain. Additionally, independence was associated with an increased risk for developing chronic pain.

An Exploration of the Information Shared Through

Ms Abby Rose Patterson, Elizabeth Odom, Josselyne Saenz, Blaine R. Peters

Whisper Networks: A Qualitative Analysis of Informal Communication Regarding Sexual Harassment   "Whisper Networks involve the informal exchange of information between individuals concentrated on sexual harassment and abuse in workplace environments. The current study aimed to describe the specific content that is shared through whisper networks. The sample consisted of 88 participants that completed a survey through Amazon Mechanical Turk. The survey contained three different sections for participants to answer depending on their role in a whisper network. These sections included "not participating in warning others," "participating by warning others," and "participating by being warned by others."" Within each of these sections, participants answered open-ended questions regarding the content of shared information. The responses from participants were then examined by multiple research assistants, suspected bots were removed from the data set, and the remaining data was coded using conventional content analysis until an agreement was reached for all codes. The qualitative data will be further analyzed in ATLAS.ti, a coding software. The results of the study showed that a significant amount of information shared in whisper networks involves a variety of harassment behaviors that the participant is aware of having occurred in the workplace, including verbal sexual harassment, physical sexual harassment, and sex-based discrimination. The information shared in whisper networks also included discussions of those involved in the harassment events. Further, the content of whisper networks included discussions pertaining to the formal repercussions for sexual harassment and formal reporting systems espoused by the workplace or industry. The current findings suggest that the content of whisper networks includes all aspects of the sexual harassment events, its perpetrators and targets, as well as critical analyses of the formal systems meant to help targets of sexual harassment.

SpeakEasy

Mr Sahil Palnitkar, Umang Kantesaria, Cameron Lopez, Connor Riley, Campbell Hinrichs

The Covid-19 pandemic has amplified the use of video-conferencing applications which have drastically altered how we interact with others settings including work, school and social contexts. Approximately 7% of people in the U.S. who experience Social Anxiety Disorder and one of its sub-disorders, Glossophobia, the fear of public speaking, understandably may have difficulty in this new setting. Currently, several therapies exist for countering fear of public speaking, however, they are expensive, extremely time-consuming and not directed toward purely virtual settings. Our team is proposing a solution which helps people prepare speeches, such as presentations, interview responses, or other planned material, in a way that is completely free, does not require equipment such as VR devices, and can be used anytime. While not a replacement of traditional treatment, our solution seeks to help users improve confidence, presentation ability and gain lasting skills for any prepared speaking they engage in. The app allows users to direct the tool for their needs with a variety of settings such as tone and pacing, and after recording their speech, get targeted, digestible feedback from a natural language processing model, and then practice as many times as they see fit. This solution requires no long-term storage of information and no sign-up, while giving helpful, individualized feedback, meaning users can start improving quickly. We hope to have helped people, especially those who struggle with Social Anxiety Disorder, feel more confident and improve their public speaking skills long-term both in virtual and non-virtual settings.

Academic Motivation Among First Semester Psychology Students

Ms Lauren Endsley, Caitlyn Bower, Emily Larkins, Jamie Mares, Katelyn Robinson, Sin-Ning C. Liu, Sophia Steelman, Victoria Johnson

In Fall 2020, the Psychological & Brain Sciences (PBSI) Department at Texas A&M University established a new first-semester experiences course for all new incoming students (freshmen & transfer students). As part of this course, each student was part of a PSYCMentor team, led by a junior- or senior-level Psychology student, who served as their mentor throughout the semester.

During the middle of the semester and at the end of the semester, the students were asked to rate their agreement with three items related to Academic Motivation. An example item is: "I expect to successfully complete my degree in the usual allotted time frame".

In this study, we want to investigate two research questions:

RQ 1: Were the mentees' ratings of Academic Motivation statistically significantly different between the middle of the semester and the end of the semester?

RQ 2: Do the mentees' a) race, b) gender, c) sexual orientation, d) parental education, or e) ability status impact whether a mentees' ratings of Academic Motivation differed significantly between the middle of a semester and the end of the semester?

A repeated measures ANOVA determined that students' ratings of Academic Motivation did not differ statistically significantly between the middle of the semester and the end of the semester $F(1,148) = .74$, $p = .79$.

A series of mixed ANOVAs determined that the mentees' ratings of Academic Motivation did not differ between the middle of the semester and the end of the semester based on race $F(6, 140) = 1.63$, $p = .14$, gender $F(1, 145) = 4.76$, $p = .05$

sexual orientation $F(3, 142) = .31$, $p = .82$, parental education $F(4, 142) = .10$, $p = .98$, or ability status $F(1, 141) = .07$, $p = .80$.

Challenges of Teaching-Learning in Higher Education During the COVID-19 Pandemic

Mr Gunner Fussell

Since the COVID-19 pandemic truly took effect in March 2019 the world of education has been dramatically altered through the implementation of hybrid courses, asynchronous, and synchronous online courses becoming the norm. The effects this switch has had on faculty and students is still largely unknown due to the relatively short amount of time that has passed between the implementation of these styles of instruction and the current day. This study aims to gauge the experiences teachers and students have had since undergoing the change from in-person courses to these various models through the conduction of surveys administered through Qualtrics regarding this topic. Through this information on ease of implementation, challenges encountered, knowledge delivery, student performance, lessons learned, and resources needed, a more accurate determination of the effects COVID-19 has had on collegiate education can be determined. The survey participants will include the students and faculty from Texas A&M University, and these participants will be recruited by bulk mail/listserv. The data recovered will assist in understanding dynamics of learning and teaching under COVID-19 protocols in an effort to discover ways in which these methods could be improved in the future.

Investigating Mental Health of US College Students after One Year of the Breakout of the COVID-19 Pandemic

Mr Roque Pena III, Katie Chen

Introduction: Over the past year, college students have been adapting to various new environments in response to the outbreak of COVID-19. Studies have shown students' mental health negatively impacted by the pandemic, this paper aims to discover the stressors associated with the pandemic. A survey study conducted by researchers in May 2020 (Wang et al., 2020) found that college students' mental health was negatively impacted by the pandemic. Stressors and coping mechanisms were also identified. The current study aims to understand whether the conditions changed during the past year.

Method: A survey will be administered to students of Texas A&M University again. The survey will consist of questions to rank the severity of their mental health recently standard questionnaires (PHQ-9 and GAD-7) to assess the severity of depression and anxiety. In addition, previous stressors will be will be listed and ranked by participants by respondents to observe which stressors have become more or less prevalent. Questions will also be asked to understand what coping mechanisms were used.

Planned Analysis: Our hypothesis is that the frequency and severity of depression and anxiety will be lower than in the previous study since students' familiarity with living in a pandemic has increased. Using data from the survey, leading stressors will be categorized to identify the most common concerns among college students. Coping mechanisms will also be compared with the previous study to see if there were significant changes, and whether there were new strategies students used to adapt to the condition. Also, the frequency of anxious or depressive issues is expected to drop since students' familiarity with living in a pandemic has increased. Previous study found significant gender difference on depression and anxiety level. Analysis of variance will be used to test whether the differences still remain.

Flexing Work-Nonwork Boundaries:Time, Place, or Both?

Ms Melissa Paul

Flexible work arrangements (FWAs) are implemented by many organizations to provide employees with opportunities to make traditional boundaries more flexible. While telework has allowed employees to work in alternate locations than the traditional office (flexplace), organizations sometimes grant employees the freedom to choose their work hours throughout the day (flextime). Although organizations that offer flexplace may also offer flextime, they are distinct policies that can be implemented separately and are not always implemented together. Considerable research has focused on the outcomes of individual FWAs; limited research has examined the interaction between them or their joint influence. The focus of this project is to examine the extent to which flextime and flexplace have a combined influence on employee outcomes. The goal is to answer three research questions: 1) how is flextime related to employee outcomes, 2) how is flexplace related to employee outcomes, and 3) to what extent does the influence of flexplace on employee outcomes depend on flextime? These questions were answered using data from two surveys of 405 employees during the COVID-19 pandemic. Results indicate that flextime is positively related to job satisfaction and negatively related to turnover intentions and burnout. Flexplace was positively related to job performance and negatively related to stress and burnout. Contrary to expectation, FWAs had independent, rather than joint effects on the outcomes.

Poster #49_ Psychology (5) – Undergraduate

Whisper Networks & Motivation: An Analysis of Motivation to Share or Withhold Information in a Whisper Network

Ms Elizabeth Genevieve Odom, Blaine R. Peters, Abby Patterson, Josselyne Saenz, Rose L. Siuta

This study was designed to explore the motivating factors that determine whether one shares information regarding sexual harassment in a Whisper Network. A Whisper Network is defined as informal information-sharing regarding sexual harassment in a workplace or industry. The current study included 88 participants who answered an Amazon Mechanical Turk survey. The survey grouped participants into 'those that warned', 'those who were warned', and 'those who did not warn' others through participation in a whisper network. Participants then answered open-ended questions regarding their motivation behind sharing or not sharing information through whisper networks. Results indicated that in general, those that shared whisper network information were motivated by a desire to warn or protect others, the need for emotional support (especially for victims) or the moral obligation to do so. Those that did not warn others were motivated by fear, an inclination to respect others' privacy/reputation, or a lack of trust in the information's accuracy. These conclusions suggest that those that share information through a Whisper Network desire to help others who may be or have been affected, while those that do not are hesitant to spread possibly false information about others.

Poster #50_ Psychology (5) – Undergraduate

Factors Affecting the Desire to Work from Home Post-Pandemic

Ms Allison J Vollentine

Prior to the COVID-19 pandemic, working from home was a volitional activity that most work from home (WFH) employees opted into. During the pandemic, employees transitioned to WFH with little warning, and now, many companies are planning to continue to have employees WFH. The purpose of this study is to identify the variables associated with an employee's desire to continue to WFH after the pandemic. For this study, predictors were organized into the following three categories: individual strategies, organizational strategies (e.g., organizational policies), and reactions to WFH experiences. We predicted that individual strategies (e.g., preparation) and organizational strategies (e.g., supervisor support) would be positively related to the desire to WFH while adverse reactions to forced WFH (e.g., burnout) would be negatively related to the desire to WFH. Using survey data from 1217 employees at the beginning of the pandemic and around 400 of the same employees two months later, predictor variables were correlated with employee's desire to WFH. One individual strategy, multiple organizational strategies, and one adverse reaction significantly correlated with the desire to WFH. Future research is needed to determine how well these correlates of the desire to WFH actually predict who does WFH in the future.

Poster #51_ Psychology (7) – Undergraduate

Empowering Women in Physics: Forming Identity Through Outreach and Engagement

Ms Emily Hay, Jessica Randolph

We employed a student-centered approach to examine the impact of physics outreach on female undergraduate and graduate student volunteers. We conducted a series of interviews with current and former female students who facilitated physics outreach programs at Texas A&M University. We focused on how the individual experience of these students related to their formation of physics identity, recognition, and self-efficacy. We also report on the development of soft skills gained through outreach opportunities and their link to increases in motivation, confidence, and self-perceptions of becoming more expert in the field.

Poster #52_ Psychology (7) – Undergraduate

Effects of Out-of-School STEM Activities on Sixth Grade Students

Ms Nicole Rene Svetlov

By sixth grade, students are beginning to form early professional identities that will help them make career choices. At this stage, academic interventions to prepare students for rigorous higher- and post-secondary learning paths have shown to help middle schoolers to enter high school better prepared to graduate on time and with good grades. In this work in progress paper, we present preliminary results of a systematic literature review on the effects of out-of-school STEAM activities on sixth-grade students. We used the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) method to record our literature search results. Our initial search resulted in 189 articles. Through our inclusion/exclusion criteria we restricted the results to articles published in the English language during or after the year 2000. Also, we were only interested in articles that were published in peer-reviewed journals, appeared in conference proceedings, or were committee approved master's or Doctoral theses. After the initial screening, we identified 19 quantitative articles, 3 qualitative articles, and 12 mixed-methods articles. Full-text analysis of the 33 articles resulted in the exclusion of 13 quantitative articles, 1 qualitative article, and 4 mixed-methods articles. After inter-rater discussion, we identified 15 articles to be included in the final analyses. The preliminary results from this work in progress, systematic literature review indicate that out-of-school learning environments create more possibilities for applied, hands-on learning that is more impactful and motivating than traditional in-class teaching methods.

PSYCMentor program launched mid-pandemic: How did students mid-term academic achievement fare compared to end of semester?

Ms Victoria Johnson, Emily Larkins, Jamie Mares, Lauren Endsley, Cindy Liu

The PSYCMentor mentorship program was established in the Department of Psychological & Brain Sciences in Fall 2020. PSYCMentor was an internship program for junior- and senior-level undergraduate students in the department to mentor students who were entering into the major for the first time.

The students were asked to rate their Academic Achievement (example item: I am satisfied with my ability to learn at university, using a 3-item measure in the middle and end of the semester.

In this study, we seek to investigate two research questions:

RQ 1: Were the mentees' ratings of Academic Achievement statistically significantly different between the middle of the semester and the end of the semester?

RQ 2: Do the mentees' a) race, b) gender, c) sexual orientation, d) parental education, or e) ability status impact whether a mentees' ratings of Academic Achievement differed significantly between the middle of a semester and the end of the semester?

A repeated measures ANOVA determined that students' ratings of Academic Achievement were statistically significantly different between the middle of the semester and the end of the semester $F(1, 148) = 17.98$, $p < .001$.

Overall, the students' ratings of Academic Achievement at the end of the semester were significantly higher than their ratings of Academic Achievement in the middle of the semester.

A series of mixed ANOVAs determined that the mentees' ratings of Academic Achievement did not differ between the middle of the semester and the end of the semester based on race $F(6, 140) = 1.82$, $p = .10$, gender $F(1, 145) = 1.41$, $p = .24$

sexual orientation $F(3, 142) = .38$, $p = .77$, parental education $F(4, 142) = .25$, $p = .91$, or ability status $F(1, 141) = .05$, $p = .95$.

Poster #54_ Psychology (7) – Undergraduate

EyeDeal

Ms Elnaz Marediya, Donald Van Steenwyk, Tristan Seifert

Since the start of the pandemic, students and teachers had to go through many changes in the learning environment. To solve the communication and learning issues between students and teachers, my team and I propose to use eye tracking software that can be used to learn students learning behaviors so that teachers can get guidance on how to direct the lesson and their interactions with the students. This system can be used in an online learning environment so it can grab data from a students' eye movements and give suggestions to the teachers on whether or not each student or a group of students are absorbing the new material.

Perception of Facial Expressions of Emotion in Salvador Dali with reference to Darwin's Theory of Expression of Emotions

Ms Ashlie Frederiksen

Salvador Dali, a renowned surrealist painter, draws much of his notoriety as an artist from his creation of complex ambiguities. These ambiguities, while interesting to the eye, are simply a lens through which this poster will view Dali's representations of human emotion. This poster will investigate Dali's work with reference to Darwin's notion of universality of expression described in "The Expression of the Emotions in Man and Animals" (1872) and the use of critical features and modern models of expression (Omer et. al., 2019, Martinez, A. and Du, S., 2012). Amongst Dali's ambiguity, it is possible to identify expressions of emotion but it has not yet been studied how the brain is capable of perceiving and recognizing this aspect of the paintings. Through the analysis of 5 paintings, this poster will analyze how the brain is able to extract only the information crucial to interpreting expression consistently throughout representations of faces that are progressively more distorted. While Dali seems to have been unaware of his work, Darwin's findings lay a descriptive foundation for finding meaning in this ambiguity that modern research is able to build upon; This allows the scientific analysis of feature extraction to become the key in analyzing Dali's complex representation of the human face.

With the Passing of the Years- Existential Attitude in Miguel de Unamuno, Juan Carlos Onetti and David Toscana.

Ms Sara Rodriguez

Over the years, Existentialism has grown to be a recurrent subject in literature. As the world faced periods of war and rapid development in the 19th and 20th centuries, authors with various origins began to present--almost universal--anxiety in their writing. Researchers have previously discovered patterns between basic existential notions and main narratives in novels, essays, and short stories such as Duelo por Miguel Pruneda (2002), El Pozo (1939), Los Adioses (1954), Niebla (1914), and Vida de D. Quijote y Sancho (1905). Although previous studies have analyzed existential concepts on prominent literary pieces, further research that explores the connection between the portrayal of existential principles, culture, and generational differences and relates it to modern society is needed. This comparative study aims to examine the development of existential concepts through time in literary works of authors from diverse cultural backgrounds and periods, such as Miguel de Unamuno (1864-1936), Juan Carlos Onetti (1909-1994), and David Toscana (1961-), as an attempt to correlate their existential concerns to the ones of our present-day society. We developed an existential theoretical framework to conduct this research, including some of Hannah Arendt, Martin Heidegger, and Soren Kierkegaard's theories. As this project continues to progress, one of our goals strives to build an existential-cultural vision through literary texts. Moreover, this project seeks to demonstrate that, while the emphasis of some existential concepts in literary texts varies according to generational differences, Existentialism is still a constant concern for the contemporary writer.

Qualitative Analysis of Whisper Networks and the Context in Which They Arise

Ms Blaine Reece Peters, Josselyne Saenz, Abby Patterson, Elizabeth Odom, Rose L. Siuta

Whisper networks can be defined as a discrete method of communication, primarily between women, who have been targets of harassment or witnessed harassment taking place. This study investigates the prevalence of whisper networks in the workplace. More specifically, we aim to describe the context in which whisper networks arise as primary means of communication to share specific information about sexual harassment and sex-based harassment within a professional environment. A total of 88 participants responded to open-ended questions on a survey provided on Amazon Mechanical Turk. To ensure inter-rater reliability, the qualitative data was then analyzed across multiple coders trained in conventional content analysis. After a consensus was met on the codes, the data was further analyzed using the statistical software, ATLAS.ti. Although the process of further analyzing the codes is still ongoing, we have found that whisper networks are predominantly used in the following contexts: outside of work, at work, through technology, in private, through casual conversation, or at a time specific to when the event occurred such as by waiting for the right moment or as dictated by the temporal nature of the sexual harassment event. The aforementioned findings suggest that whisper networks are more likely to occur in specific contexts. By knowing the contexts in which whisper networks occur, we aim to identify them within the workplace and explore how to take the appropriate measures to support those affected by sexual harassment and sex-based harassment.

The Office of Medical Student Research Education's Medical Scholar Research Pathway Program Nurtures Future Physician-Investigators in Academic Medicine

Ms Mikayla Brianna Monk

With the goal of becoming successful life-long physician investigators, medical students that participate in the Medical Scholar Research Pathway Program (MSRPP) observe, practice, and acquire scholarly research skills first-hand under the guidance of engaged faculty mentors. MSRPP exposes medical students to scholarly research by designing personalized pathways that fit each student's career goals, research interests, and schedule. MSRPP participants are coached by the Program Director to select a research field from a broad range of disciplines, from biomedical to medical humanities, and are given practical advice on how to approach a mentor and set achievable learning expectations.

MSRPP participants are traditional pre-clerkship or clerkship four-year medical students. Through video chat meetings, the needs of students are assessed in dispersed geographical campuses across Texas. MSRPP's impact starts with the application and the mentor interview and culminates with the delivery of a formal oral presentation in MSRPP's Launch Talk series. Communication with peers across our multi-campus community of scholars is reinforced with student participation in our annual virtual Medical Research Colloquium (MRC). Of note, the MRC synchronous platform allows students to debut their research and receive live constructive feedback from a community of expert faculty investigators.

To assess MSRPP practices and reach, surveys were completed by the Program Director after one on one meetings with each student in the Fall of 2020. The survey consisted of various general identification fields, questions related to the student's current research plans, and the delineation of future steps. There were significantly more M1 than M4 students, with equal numbers of M2 and M3. The surveys recorded a total of 77 student meetings and 124 contact hours for action plans and recommended resources. Over half of Texas A&M medical trainees preferred clinical research that was in line with their residency choice, followed by translational research. Furthermore, our study revealed a strong desire for students to benefit from a formal structured program to hone in on the principles of scholarly research, thereby preparing students for successful careers in medicine.

In summary, through personalized coaching, MSRPP students achieve the confidence to select and approach the desired research mentor based on their common scholarly interests and goals. Upon completion of MSRPP, students develop critical thinking skills and strong communication skills that equip them to engage in best medical practices and to establish collaborations with cross-disciplinary experts in order to advance medicine. Thereby, MSRPP students will be the next generation of physician investigators, well-positioned to prevent, diagnose, and treat chronic and infectious diseases. They will have a direct and significant impact on modern patient care.

Project CHISPA: Calculation, Hi-Tech, Imagination, Systems, and Procedural Art

Ms Sarah Casey, Shahrzad Vaseti, Trent Riek

In this poster presentation, we provide an overview of project CHISPA (Calculation, Hi-Tech, Imagination, Systems, and Procedural Art), a unique ongoing research and outreach effort aimed at improving underrepresented middle school student awareness of and engagement in pursuing STEAM coursework and career paths. Our methods include introducing middle school students to industry-standard procedural and 3D modeling/rendering software such as Maya and Houdini. Students are also exposed to game development engines such as Unreal to introduce them to STEAM concepts behind digital entertainment. Middle school students attend a STEAM oriented charter school in a small-town setting. In addition to the middle school students, TAMU undergraduate students are also part of this research project, serving as digital content developers, research interns and near-peer mentors. Our focus is on building and leveraging the power of near-peer mentoring: a social approach to learning which brings together, current TAMU students who are pursuing future careers in the field of digital entertainment and visual arts; educational researchers; and industry experts. This research project will aid in improving TAMU Visualization students' procedural modeling skills as well as to lay the foundations for a new TAMU course focused on preparing future digital artists who are adept at creating culturally aware content. In this poster we present major components of project CHISPA along with the learning theories and frameworks that provide the foundation for this research.

Academic Adjustment in First Year Psychology Students

Ms Emily Larkins, Jamie Mares, Victoria Johnson, Lauren Endsley, Sin-Ning C. Liu

The PSYCMentor program was launched in the Department of Psychological & Brain Sciences (PBSI) at Texas A&M University. Students enrolling in their first semester in PBSI participated in a first-semester experiences course. As part of this course, each first-semester student was assigned a PSYCMentor, a junior- or senior-level student in PBSI who served as their mentor throughout the semester.

The students were asked to rate their agreement with 9 items at the middle of the semester and at the end of the semester, in order to assess their Academic Adjustment. These 9 items were further subdivided into three sub-scales: a) academic lifestyle, b) academic achievement, and c) academic motivation.

We aim to answer two research questions with this study:

RQ 1: Were the mentees' ratings of Academic Adjustment statistically significantly different between the middle of the semester and the end of the semester?

RQ 2: Do the mentees' a) race, b) gender, c) sexual orientation, d) parental education, or e) ability status impact whether a mentees' ratings of Academic Adjustment differed significantly between the middle of a semester and the end of the semester?

A repeated measures ANOVA determined that students' ratings of Academic Adjustment were statistically significantly different between the middle of the semester and the end of the semester $F(1, 148) = 14.82$, $p < .001$.

Overall, the students' ratings of Academic Adjustment at the end of the semester were significantly higher than their ratings of Academic Adjustment in the middle of the semester.

A series of mixed ANOVAs determined that the mentees' ratings of Academic Adjustment did not differ between the middle of the semester and the end of the semester based on race $F(6, 140) = 1.40$, $p = .22$, sexual orientation $F(3, 142) = .57$, $p = .64$, parental education $F(4, 142) = .61$, $p = .66$, ability status $F(1, 141) = .10$, $p = .75$.

However, gender did have an impact on the students' ratings of Academic Adjustment between the middle of the semester and the end of the semester $F(1, 145) = 4.69$, $p = .03$.

No Class Left Behind!

Mr Felipe Carlos, Drew Bezner, Dylan Lowry, Kevin Gamage, Scott Wilkins

Our approach at a homework tracker has been influenced by the numerous journal articles and surveys that have been written about mental health and its correlation with success amongst students. With that said, one of the biggest issues that college students face today is related to job-induced tensions. Academic stress and procrastination is the enemy for virtually every student, and it's why we have decided to make a tool that organizes a student's workload. We are trying to close the gap between academic stress and numerous assignment due dates, there is a need to build a tool that can organize and remind students of their assignments in an autonomous way. There are a few services out there that claim to structure due dates based on students' syllabi, but none of them are accurate or reliable. Our fix to these subpar services is a tool that can analyze any number of syllabi, and extract the assignments and their due dates to display to the user and annotate on a calendar. The goal of this tool is to reliably analyze syllabi and extract whatever information is relevant for the assignment deadlines, this helps the user stay organized and on track for a successful semester. An important aspect of this is that we will conduct user studies on various college students hoping to improve our tool in the coming months with feedback from users. This is a step to alleviate some of the stress that students face during the semester. We want to get to a point where the assignment deadlines and reminders is something they no longer have to worry about. This is a great advance in the field of higher education, this way students can focus on the more important parts of their college career.

What's in a Name?

Mr Noah T. Reed, Genevieve Bernard

Forenames as a Predictor of Psychopathological Personality Traits Forenames are commonly recognized as labels used to identify or distinguish ourselves from others and signal varying levels of behavioral traits within a gender group, with some gender-specific forenames appearing as more prototypical than others. Forenames have been discovered to influence how individuals are perceived by others and even how we perceive ourselves. Forenames have also been found to predict one's facial appearance and behave as social cues that aid in the categorization of one's age and race. Therefore, the proposed study seeks to explore the possibility that the gender-typical strength of forenames may contribute to gender differences in psychological disorders. To examine this effect, data from 74 individuals who were administered the Personality Assessment Inventory (PAI) was collected and the forenames of each individual were distributed to participants recruited through a student subject pool and Mechanical Turk (MTurk). Participants were instructed to "stereotype" a randomized subset of the 74 forenames according to their perceived masculinity/femininity, gender, race, and age. Following the collection of these ratings, the predicted associations between name ratings and scores on the PAI will be examined. We hypothesize that gender typical forenames will be associated with the personality traits characterized by gender differences in psychological disorders, as measured by the perceived levels of these traits and actual scores on the PAI. If these findings are statistically significant, this would provide support for the influence of forenames on personality, behavioral expression, and perception.

Poster #63_ Psychology (6) – Undergraduate

Attentional capture by threat is independent of uni- versus multi-modal threat intensity

Mr Alex Ogden, Hannah Kim, Matteson Hansen, Giselle Deleon

Stimuli that signal reward and threat automatically grab attention even when non-salient and discordant with current task goals. Stimuli predictive of greater reward have a higher potential to attract attention, indicating that such attentional bias is value-dependent. What remains unclear however, is whether threat intensity also modulates the magnitude of attentional capture. To address this, we operationalized threat intensity by utilizing loud white noise, shock, and a combination of both to provide distinct levels of threat. Doing so also allowed us to examine whether multisensory integration potentiates attentional bias. Indeed, threat perception in real life is a multisensory experience, for example, sight of a predator may be accompanied by a growling sound, and such integrative threat signals are known to modulate attentional capture. Participants first learned to associate four different colors with either shock, noise, combination, or no outcome. In a subsequent test, participants made a speeded eye movement towards a target circle, presented simultaneously with a distractor square. Each shape appeared in a color previously associated with one of the four outcomes. We found that a threat-signaling distractor impaired search, signifying attentional bias towards threatening stimuli. However, threat intensity did not modulate the magnitude of attentional capture despite higher perceived aversiveness of the combined outcome. These results suggest that threat-induced attentional bias is independent of threat intensity, and that although multisensory integration augments perceived aversiveness, it does not potentiate attentional bias to threatening stimuli.

Estimating discharge from Landsat

Mr Ryan Riggs

Satellite remote sensing can provide spatially-distributed estimates of river flow to supplement the gauge record. The past two decades has seen considerable development of remote sensing of discharge algorithms with improvements in accuracy and spatial coverage. This study presents a simple approach to efficiently estimate river discharge from Landsat imagery. The approach relies on the development of reach-level width-discharge rating curves derived from Landsat water occurrence data and modeled historical river flow. The modeled river flow estimates are from the Global Reach-level A priori Discharge Estimates for Surface Water and Ocean Topography (GRADES) dataset and the water occurrence data are from the Joint Research Centre Global Surface Water (GSW) dataset. We developed reach-level width-based rating curves by spatially joining flow frequency distributions from GRADES and width occurrence distributions from GSW along river cross sections generated from the Global River Widths from Landsat (GRWL) database. We then estimated discharge across the entire Mississippi Basin on rivers wider than 100 m from Landsat scenes using the width-based rating curves from 1984-present. For a preliminary validation effort, we used daily discharge measurements from 28 USGS gauges along the lower Mississippi and Missouri rivers, which produced a median RRMSE of 54%, a median NRMSE of 65%, a median Relative Bias of -27%, and a median RMSE of 1154 m3/s. An alternative remote sensing of discharge approach, which uses only same-day width-discharge matchups to generate the reach-level rating curves, yields a marginal performance improvement but at the cost of computational efficiency. These results suggest that our approach produces discharge estimates that are within the accuracy range of published remote sensing of discharge algorithms. The method presented in this study provides a simple approach to efficiently estimate river discharge with reasonable accuracy, and can be readily applied at the global level.

Water Circulation within South Atlantic Subtropical Gyre Constrained by Seismic Reflection Images

Mr Jingxuan Wei

South Atlantic water masses and circulation significantly influence the dynamics and water mass structure of the Atlantic Meridional Overturning Circulation (AMOC). Previous research in the South Atlantic has mostly focused on energetic regions such as the Brazil/Malvinas Confluence Zone along the western boundary and the Agulhas retroflection to the east. However, it is also important to understand water circulation and transport within the anticyclonic subtropical gyre that dominates above the North Atlantic Deep Water (NADW). Previous studies have observed a recirculation pattern of Antarctic Intermediate Water (AAIW) within the subtropical gyre, but the temporal variability of the scale and location of the recirculation is still uncertain. Here we present a water mass structure analysis at 30o S from Rio Grande Rise to mid-Atlantic Ridge by using Seismic Oceanography (SO). SO is being applied around the world to image mesoscale water mass structures using the seismic reflection method. Reflections in the seismic images are essentially temperature gradients that are proxies for isopycnal surfaces. We paid particular attention in seismic processing to imaging of structures that characterize the boundary between water masses. We imaged the upper South Atlantic Central Water, and identified a continuous water boundary (up to 300 km) that starts from the east of Rio Grande Rise between AAIW and NADW. The boundary becomes more turbulent and breaks into pieces and eventually disappears at its eastern extent near 20o W. The breakup of this boundary could imply: (1) a recirculation of AAIW within the subtropical gyre and (2) strong diapycnal mixing in the vicinity of mid-Atlantic Ridge. We combine seismic images with previous hydrographic measurements to investigate the temporal circulation pattern of AAIW within the subtropical gyre and quantify diapycnal mixing rate using a Garrett-Munk tow spectrum. Through SO, we hope to better constrain South Atlantic circulation and contribute to the understanding of AMOC as a whole.

Contact stiffness in gas-bearing shales estimated from velocity measurements under pressure

Mr MIN LI

Pore pressure has a direct influence on gas production from shale gas reservoirs. Based on the relation between pressure and seismic velocity in shale, many methods have been used to estimate pore pressure. The detailed mechanisms underlying pressure-velocity relation still remain to be understood. Grain contact models such as Hertz-Mindlin model and modified Digby model have been used to understand velocity variation with pressure in dry rocks. Winkler (1983) proposed a method to estimate the contact stiffness ratio directly from velocity measurement and compared the estimated ratio to the theoretical calculation from modified Digby model. Using velocity measurements under pressure in unconsolidated glass beads with a porosity of 38% and Berea sandstone with a porosity of 16%, he concluded that the contact stiffness ratio is insensitive to pressure but the estimated contact stiffness ratio from measurement is much higher than the theoretical calculation. We estimated the contact stiffness ratio from velocity measurements under pressure for 73 samples from gas-bearing shale reservoirs in Sichuan basin, China. The main mineral content of the shale samples is clay, quartz and calcite. The clay content ranges from 16% to 66%, quartz content ranges from 2% to 71% and calcite content ranges from 1% to 73%. Porosity varies from 1% to about 20%. Results show that both Vp/Vs ratio and contact stiffness ratio for a given sample are nearly constant even though Vp and Vs increase with pressure individually, confirming Winkler's results on unconsolidated glass beads and consolidated sandstone rock. For all the studied samples, Vp/Vs ratio varies from 1.5 to 1.9, depending on mineralogy composition. And contact stiffness ratio varies in general from 3 to 40. Similar to Winkler's observation, the theoretical calculated contact stiffness ratio using the velocity-contact stiffness relations from the modified Digby model severely underestimated the value from velocity measurements. Based on the modified Digby model, the Vp/Vs ratio is limited to the range from 1.15 to 1.73. However, for some samples, the Vp/Vs ratio is greater than 1.73, resulting in negative estimated contact stiffness ratio which is unrealistic. Although Digby model gives reasonable estimation for the majority of studied samples, it needs to be improved for real practical application to estimate pore pressure from seismic velocity.

FLUVIAL AND EOLIAN SEDIMENT SORTING AND ROUNDING IN A BASALTIC PRO−GLACIAL CATCHMENT: √û√ìRISJ√ñKULL GLACIER, ICELAND.

Ms Kashauna Mason

The SAND-E: Semi-Autonomous Navigation for Detrital Environments planetary analog project examines physical and chemical changes in basaltic sediments from a glacio-fluvial-eolian environment and tests operations of robotic and unmanned aerial systems technologies in the context of planetary exploration. As a component of the SAND-E project, this research examines fluvial sorting in a proglacial catchment and the contributions of fluvial sediment to the eolian system in the catchment.

 A detailed surface geologic map was created to connect source rocks to sediments along a glacier-proximal-to-glacier-distal transect and characterize catchment geomorphology. Bulk sand and pebble samples of fluvial and eolian sediments were collected every ~1 km along a ~8 km transect, and their size and sphericity was measured using a particle analyzer. In addition, the size of cobbles was measured using the Wolman cobble count method at every 1 km along the transect. Cobble count data show a decrease in the length of the intermediate axis from a mean of 1.95 to 1.32 cm between the proximal and distal locations, respectively. In addition, cobble aspect ratios increased downstream. The general decrease in size and increase in aspect ratio observed for cobbles is expected for sediment travelling downstream. Cumulative size distribution curves of the bulk finer sediments show no significant trend, however fluvial samples were more poorly sorted than eolian samples. The lack of significant size variation in the finer-size fraction signals that winds in the catchment were capable of transporting the sand fraction of fluvial sediments. The lack of rounding variation may be due to the relative proximity of the investigated sites to the source rocks.

Temperature-Triggered Failure Hazard Mitigation of Transformers Subject to Geomagnetic Disturbances

Mr Pooria Dehghanian

Geomagnetic Disturbances (GMDs) could potentially damage the power grid through reactive power losses and overheating the high-voltage power transformers. A high-impact Low-frequency event such as GMD could induce a hotspot temperature rise over the transformer's overall temperature during a full load condition leading to an accelerated asset loss of life and increased risk of failure. This paper focuses on the impact of GMDs on transformers heating and its consequences on transformer's loss of life cycle and failure risk. Moreover, this paper proposes a transformer hazard mitigation approach to reduce the temperature-dependent transformer risk of failure. The proposed method is tested in the synthetic Texas 2000-bus grid, and the results are numerically analysed, demonstrating the effectiveness of the algorithm.

Geometric and Soil Property Control on the Performance of Vadose Zone Well Injection

Ms Cuiting Qi

As growing populations require more water and greater storage capacity is needed to save water in times of surplus for use in times of shortage, managed aquifer recharge (MAR) is expected to become increasingly important. Vadose-zone well (VZW) injection is an efficient way to implement MAR in semiarid and arid regions. This study establishes a numerical model by COMSOL Multiphysics to simulate VZW injection in an unconfined aquifer and investigates the geometric and soil property control on the performance of VZW injection.

Microwave Sintering of a Lunar Soil Simulant: Effects of Sintering Conditions on Microstructure Evolution and Micromechanical Properties

Mr Shayan Gholami

In-situ resource utilization (ISRU) concept in outer-space exploration urges the need of a new construction technique which can be implementable and sustainable under the harsh condition. The microwave sintering is a popular processing technique which can melt down the lunar soil grains and reconstruct them into a more rigid state. This technique has the potential to produce structural components for outer-space exploration. This study examined the main microwave sintering design parameters on densification and micromechanical properties of FJS-1 lunar soil simulant. Experimental design was based on the Taguchi method with a L9 orthogonal array which evaluated the three primary sintering conditions: temperature, dwell time, and heating rate. Laboratory tests were conducted in multiple length scales, including density, porosity, optical microscopy, scanning electron microscopy aided by energy-dispersive spectroscopy, X-ray diffraction, and nanoindentation. Porosity was in a range of 8 to 11%. Chemical and mineralogical characterization showed three main mineral phases resulting from the microwave sintering, and nanoindentation determined elastic moduli of individual phases. The stiffness of individual phases were used to obtain effective elastic modulus of each specimen via the micromechanical homogenization method. Test-analysis results indicated that sintering parameters in the range attempted in this study did not drastically change stiffness of individual phases. Taguchi analysis results imply that the sintering temperature is the dominant factor changing the microstructure heterogeneity and densification during the microwave sintering process, while the effects of other two factors (i.e., dwell time and heating rate) were not significant. The collective results in this study imply that the microwave sintering can be a promising ISRU technique to densify lunar soils for potential lunar construction.

On Modeling of Accelerated Aging and Failure Estimation of Power Equipment Using Bayesian Inference

Mr Aaqib Peerzada

This work presents a new statistical parametric model to predict the times-to-failure of broad classes of identical devices such as on-load tap changers, switched capacitors, breakers, etc. A two-parameter Weibull distribution with scale parameter given by the inverse power law is employed to model the survivor functions and hazard rates of on-load tap changers. The resulting three-parameter distribution, referred to as IPL-Weibull, is flexible enough to assume right, left, and even symmetrical modal distribution. In this work, we propose an inferential method based on Bayes' rule to derive the point estimates of model parameters from the past right-censored failure data. Using the Monte Carlo integration technique, it is possible to obtain such parameter estimates with high accuracy.

Nonlinear substructure methods via computational plasticity to efficiently predict structural responses

Mr Patrick Walgren

Substructure analysis (also known as component mode synthesis or Guyan reduction) reduces the computational order of a structural component via a linear transformation from the structural degrees of freedom to a predefined set of retained degrees of freedom. This technique reduces the computational cost associated with structural analysis by eliminating predetermined degrees of freedom which are nonessential. For large multiscale applications such as aircraft and automotive assemblies, substructure analysis can predict both static and dynamic responses of bodies. However, while the method is exact for small-deformation linear elasticity, it is insufficient when considering large deformations or material nonlinearities.

In this work, we extend traditional substructure analysis to consider general nonlinear responses by leveraging the mathematical framework developed for computational plasticity. While computational plasticity captures nonlinear relationships between stress and strain, we show that the same mathematical formulation can describe nonlinear relations between an arbitrary number of forces and displacements. As a notional example to emphasize the generality of the aforementioned method, an infilled lattice structure exhibiting plasticity, hyperelasticity, and large deformations is modeled. Finally, the nonlinear substructure method is used to integrate multiple infilled lattices into one assembly for efficient design of such hierarchical structures.

Mitigating Transformer Loss of Life and Reducing the Hazard of Failure by the Smart Electric Vehicle Charging

Mr Milad Soleimani

The uncoordinated charging of electrical vehicles (EVs) in a distribution grid with high penetration of EVs can put distribution transformers in prolonged overload condition and cause accelerated assets loss of life and increased hazard of failure. A fuzzy logic-based approach is devised to quantify and mitigate the transformer loss of life and hazard of failure by managing the charging of electric vehicles (EVs). A decision making algorithm is proposed so that distribution system operators use the output of the fuzzy system and decide whether to delay the charging of each EV and pay the incentive to the EV owner. The data for the city of College Station, Texas, USA including temperature, price of electricity and load profile are collected from various sources to simulate different use cases. The example illustrates how the proposed management approach could mitigate the impact of EV charging on the transformers loss of life and hazard of failure. The main advantage of the proposed approach is the low cost and design implementation feasibility. The information that needs to be sent from the consumer to the distribution system operator is minimized, which helps in maintaining costumers' privacy.

Poster #74_ Engineering (1) – Graduate

Estimate and Evaluate the Number of Vehicles for Automated Material Handling System

Ms Yue Wang

We present a multi-phase approach to estimate and evaluate the requirement of the number of vehicles for an automated material handling system (AMHS) in a semiconductor manufacturing environment, where the monorail network is fixed and unidirectional, and with a certain number of workstations as demand nodes. The proposed approach deploys a mathematical model to obtain the most optimistic estimation. We subsequently experiment on balancing of the network flow and conducting cost analysis to recommend the practical estimation and the corresponding system performance. This approach provides a less complex method for manufacturers to evaluate the utilization of transportation resource of AMHS.

Fatigue of Additively Manufactured Inconel 718

Mr Shyam Sundar Balasubramanian

There are several additive manufacturing techniques for metals: powder bed fusion (PBF), direct energy deposition, binder jetting, and wire arc additive manufacturing. Since PBF provides better dimensional precision and surface finish, it has been utilized for fabrication of super alloy components in demanding applications such as in nuclear, energy, aerospace, and machinery applications. Even though a wide variety of metallic powders are available commercially, majority of the published literature covers research studies for popular alloys: Ti-6Al-4V, Inconel 718 (IN718), austenitic and martensitic stainless steels, and Al-10Si-Mg. The super alloy IN718 is widely used for manufacture of components subjected to high stress and elevated temperature due to its high strength and stiffness to weight ratios, excellent high temperature performance including creep, fatigue, oxidation /corrosion resistance.

Selective Laser Melting (SLM), one of the PBF techniques, uses a high-power density laser to selectively melt metal powder particles and systematically join layers to form a complex shape component. As seen with all additive manufacturing (AM) processes for metals, the SLM'ed IN718 components would contain one or more defects such as rough surface, porosity, shrinkage cavity, lack of bonding between layers, microcracks, thermal-induced deformation, balling effect, residual stresses, anisotropy, and partially melted metal powder on the outer surface of the components. Brittle particles in a ductile matrix also shorten fatigue and creep lives of AM metallic components.

To be accepted for replacing components fabricated by traditional techniques - such as machining or casting -the SLM'ed component must show favorable static and dynamic properties compared to those from traditional approaches. The objectives of this research presentation are to:

1. Demonstrate a new method to quickly obtain the fatigue properties.

2. Explain the new machine designed and show its operation."

Immersive Psycho-Acoustic Design and Evaluation Workfow (i-PADEW)

Ms Di Liu, Yung-Hsin Tung

We conduct comparative research of multi-stage computational simulation about acoustic building material by using a traditional simulation platform and virtual reality platform. The objective of this research is to validate the acoustic building material performance research workflow in the virtual environment.

An Agent-based Model for Considering Human-infrastructure Interactions in the Resilience Assessment of Power Networks

Mr Amir Esmalian

The inequities exist in the impacts of natural hazards on the affected communities calls for approaches which consider the social aspects in the resilience assessment. In this study, we developed an agent-based model which will not only consider the physical impacts on the infrastructure systems but also includes the households' tolerance and protective actions for mitigating the risks. The model consists of 1) the hazard component which exposes the community to a hurricane with varying intensity levels, 2) physical infrastructure modelled as power networks which provide electricity to the residents, and 3) affected households who prepare for the upcoming hazard and experience the power outages caused by the hurricane. The model assesses the extent of hardship that the community experiences from the power outages. This model provides a tool for experimenting scenarios which would lead to varying hardship levels to the residents of an affected community. The results of the model help disaster managers and utility companies in making informed decisions which consider the specific needs and expectations of the communities.

Sustainable Amphiphilic Herders For Efficient Oil Spill Treatment

Mr Dali Huang

Oil spills caused by damaged oil rigs, ruptured pipelines, and tankers could form immediate and long−term detrimental effects on marine systems and aquatic life. We further developed the oil herding technique for oil spill recovery. A herder is an amphiphilic oil−collecting surfactant which is applied to spray around the oil spill areas and is able to retract oil slicks, transforming them from a large thin layer to a small thick bulk. This herding treatment greatly simplifies further in−situ burning and the recycle process. The natural konjac glucomannan (KGM) material could be functionalized and examined here as an oil herder, which has the great advantage of nontoxicity, biocompatibility, and adaptability. Moreover, functionalized KGM is a non−ionic surfactant with no apparent Krafft temperature. The absence of Krafft temperature gives KGM surfactants the unique ability to retain surfactant ability at temperatures nearing 0 ¬∞C. It unlocks a new direction for efficient oil herders within low temperature water areas, especially for oil spill treatment in Arctic waters, in the offshore safety area.

Preparing and Optimizing Mix Design for 3D Printable Concrete

Mr Aagam Paras Gopani

3D printing concrete is an emerging construction technology that gives freedom to con-struct abstract shapes of structures, without the use of formwork. It promises to change the shape of the future of the construction industry, along with bridging the gap between people's needs and depletion of resources due to its enormous advantages, like lower production cost, increased safety, flexibility in design, and reduction in construction time, as compared to conventional building system with the use of formwork.

This paper presents the published and new original work to describe the relationship between fresh and hardened properties of concrete material, and how their properties influence the geometry of the product. The work is carried out in a material testing laboratory as per Indian Codes for cement and sand (maximum aggregate size of 4.75 mm). The research work explores raw materials like silica fume, fly ash, micro-concrete premix, AR glass fibers, chemical admixtures like superplasticizer and accelerator.

The aim was to produce a homogeneous mix design using the most compatible materials for printing. In all, 4 mix designs were optimized and recommended from a total of 58 mix design trials. From this, the most feasible mix design is selected on the basis of setting time, the capacity of layer build-up, the flowability of material, and shape retention property.

Although there are vast advantages of 3D printing technology, there are certain drawbacks that hold the industrial implementation of this system. Hence, it is necessary to overcome the hurdles of this system through careful and precise research, which would increase the applications of 3D printing concrete technology worldwide on a large scale.

Hybrid Rocket Propulsion

Mr Dante Malik Herrera

As the rocketry industry continues to grow, new advancements in propulsion systems are required to propel the next generation of space vehicles. For quite some time, solid and bi-liquid propellant rocket engines have been the industry standard for propulsion solutions; however , hybrid engines have been successful on smaller scales. Texas A&M's Sounding Rocketry Team has developed, tested, and flown a hybrid rocket engine, all at the undergraduate level. Further research into the characterization of this hybrid propulsion mechanism is the subject of this presentation.

Poster #79_ Geology/Geography/Geophysics (2) – Undergraduate

Comparison of in-situ rock strength of the input materials and prism sediments at the Hikurangi Margin

Ms Catherine Lloyd

At the Hikurangi Margin offshore New Zealand, where the Pacific plate subducts underneath the Indo-Australian plate, unique slow slip events (SSEs) have been observed. The International Ocean Discovery Program (IODP) Expeditions 372 and 375 explored the region where SSEs have occurred through drilling, coring, logging, and the installation of observatories. I analyze drilling parameters to investigate the rock strength at two sites located in the frontal thrust region (Site U1518) and on the incoming Pacific plate (Site U1520). Site U1518 drilled through one of the frontal thrust faults, the Papaku Fault at ~300 meters below the seafloor (mbsf) and recovered samples from both hanging wall and footwall as well as the fault zone. For Site U1520 located ~25 kilometers seaward from Site U1518, I focus on the shallower portion composed of the hemipelagic sediments, similar to the lithology at Site U1518. Using the drilling parameters including bit depth, weight on bit, torque on bit, and rotation speed recorded every 1 second during operation, I have analyzed the drilling performance curves to investigate how the formation strength evolves with depth at each site. The drilling performance analyses effectively demonstrate the strength difference between prism sediments at Site U1518 and incoming sediments at Site U1520. The prism sediments have smaller slopes in the performance curves, implying they have greater strength. This reflects different loading and compaction histories of the sediments at the two sites. The prism sediments are further compacted by tectonic loading, which is yet to apply to the incoming sediments.

Global Calcareous Nannoplankton Trends Across the Middle Miocene Transition: A Statistical Study

Ms Sydney Gutierrez-Gomez

Calcareous nannoplankton, a group of calcifying phytoplankton that includes Coccolithophores, are vulnerable to changes in Earth's climate and ocean acidification. This group has a long fossil recorded in marine sediments, which can provide information on how these organisms coped with climate change in the geologic past. The middle Miocene transition (~ 15 to 13.8 million years ago) was marked by a major increase in the Eastern Antarctic Ice Sheet, global cooling, a shift in the global carbon cycle, and changes in ocean circulation patterns. Calcareous nannoplankton records are documented at several sites worldwide, and this cooling event transformed communities at all latitudes, though compositional differences in the fossil assemblage were retained in the Atlantic Ocean suggesting that provinciality is an important factor to consider. Regardless of the compositional differences, there may be similarities among global localities that can be identified and provide information on the impact of global cooling to the entire nannoplankton community. To determine whether or not there is a similar global community response, calcareous nannoplankton datasets are compared from ocean drilling sites in the the North, South, and equatorial Atlantic Oceans to those from the equatorial Pacific Ocean using diversity metrics and multivariate statistical analyses. Our results show that nannoplankton populations from the equatorial Pacific Ocean are quite different from those in the Atlantic Ocean basins and the differences appear to be independent of temperature and climatic disturbances.

DESIGN CONNECTIONS IN THE TELEMEDICINE ENVIRONMENT

Ms Mailee Shaw

BACKGROUND: The successful implementation of telemedicine services is directly affected by several physical characteristics present in both the clinician and patient environments. OBJECTIVE: This report examined various environmental characteristics and sought to define their boundaries. METHODS: The report will be conducted as a systematic review, due to the limited number of relevant studies related to the chosen research question; ,"How do physical environment characteristics influence telemedicine delivery.

Recovery Assistance Trends and Lessons from Hurricanes Ike and Harvey

Ms Mykayla Marek, Maria Mendez Garza, Melissa Martin

Hurricane Ike and Hurricane Harvey made landfall in Texas almost a decade apart, and both hurricanes caused catastrophic damage to many homes, businesses, and other Texas infrastructure. In Galveston County, the focus area of our study, the cities most impacted by these hurricanes include Dickinson, Kemah, League City, Clear Lake Shores, and Friendswood. The Small Business Administration (SBA) Disaster Loan Program is the largest source of disaster assistance to homes and businesses that were impacted in the county. The purpose of our study examines how consistent the SBA Loan Program is across events and finding out what households, businesses, and nonprofits should expect in terms of availability, amount, and timing of assistance. Our methods include descriptive statistics using freedom of information act requests to the SBA for loan data on all businesses and households that received a loan after Hurricanes Ike and Harvey in Galveston County. Our findings suggest that although there were many similarities in how recovery assistance functioned between events, there were also differences in the average amount of funds and their timeliness.

Standardized flux seasonality metrics: A companion dataset for FLUXNET annual product

Ms Linqing Yang

Phenological events are integrative and sensitive indicators of ecosystem processes that respond to climate, water and nutrient availability, disturbance, and environmental change. The seasonality of ecosystem processes, including biogeochemical fluxes, can similarly be decomposed to identify key transition points and phase durations, which can be determined with high accuracy, and are specific to the processes of interest. As the seasonality of different processes differ, it can be argued that the interannual trends and responses to environmental forcings can be better described through the fluxes' own temporal characteristics than through correlation to traditional phenological events like bud-break or leaf coloration. Here we present a global dataset of seasonality or phenological metrics calculated for gross primary productivity (GPP), ecosystem respiration (RE), latent heat (LE) and sensible heat (H) calculated for the FLUXNET 2015 Dataset of about 200 sites and 1500 site-years of data. The database includes metrics (i) on absolute flux scale for comparisons with flux magnitudes, and (ii) on normalized scale for comparisons of change rates across different fluxes. Flux seasonality was characterized by fitting a single-pass double-logistic model to daily flux integrals, and the derivatives of the fitted time series were used to extract the phenological metrics marking key turning points, season lengths and rates of change. Seasonal transition points could be determined with 90% confidence interval of 6-11 days for GPP, 8-14 days for RE, 10-15 days for LE and 15-23 days for H. The phenology metrics derived from different partitioning methods diverged, at times significantly.

This Flux Seasonality Metrics Database (FSMD) can be accessed at U.S. Department of Energy's (DOE) Environmental Systems Science Data Infrastructure for a Virtual Ecosystem ((ESS-DIVE, https://data.ess-dive.lbl.gov/view/doi:10.15485/1602532; Yang and Noormets, 2020). We hope that it will facilitate new lines of research, including (1) validating and benchmarking ecosystem process models, (2) parameterizing satellite remote sensing phenology and Phenocam products, (3) optimizing phenological models, and (4) generally expanding the toolset for interpreting ecosystems responses to changing climate.

Using computational fluid dynamics to investigate the movement of antibiotic resistant bacteria within a dairy facility

Mr Hyoungmook Pak

As more antibiotics are becoming accessible and administered every day, more bacteria are developing resistance to different and multiple types of antibiotics. These bacteria can survive for a longer time and travel further distances if they become airborne. Computational fluid dynamics (CFD) is a powerful and emerging tool used to model dynamic fluid flow and behavior. This can help understand how the movement of air affects the transport of bioaerosols and spread of microorganisms. In this research, air flow within a dairy facility was investigated to examine how it affects the dissemination of antibiotic resistant bacteria. ANSYS software utilized various energy and fluid equations to calculate the turbulent air motion inside the dairy facility. CFD simulation results were compared with experimental results, such as air velocity measurements and microbiome data, to confirm and validate their accuracies. Both simulation and experimental results matched closely in illustrating how bioaerosols travel via wind and sediment on surfaces throughout the facility. This study demonstrates how the application of CFD in fluid flow can be used to investigate the movement of bioaerosols and plan preventative measures to restrict their spread.

Decomposition of Red Mangrove Leaf Litter in Litterbags

Mr Samuel H. Neely

In south Florida mangrove swamps, peat accumulates from decomposed fallen mangrove leaves in the leaf litter layer. Red mangrove (Rhizophora mangle) leaves experience high rates of consumption from macrodetritivores (>1mm), such as the coffee bean snail; Thus, detritivory may affect leaf mat thickness and peat accumulation rates. The goal of this project is to measure and compare surficial (0 mm depth) and subsurface (15 mm depth) leaf decomposition in three non-riverine mangrove swamp substrates to understand decomposition rates of R. mangle without the influence of macrodetrivitores. Litterbags containing R. mangle leaves were deployed at each field site and collected at set intervals throughout the year to estimate leaf litter decomposition rates. Regression plots were created within and between sites to compare percent organic mass remaining in surficial and subsurface litterbags. Preliminary results suggest that there is no difference in decomposition rates of leaf litter within and between sites. This may suggest that macrodetritivores may influence peat accumulation rates in mangrove swamps.

Canopy Cover Dynamics in South Texas Rangelands under Four Climate Scenarios

Ms Miranda Peterson

Grasslands cover 25% of the earth's surface, serve as a feed source for livestock and wildlife, and provide other environmental services. In particular, dryland rangelands support approximately 50% of the livestock in the world, however, 10-20% of dryland has already degraded because of climate change. Climate change has been shown to affect rangeland ecosystems and the people they support negatively. Therefore, a diversity of proactive management options are required to assess the impact of climate change on rangelands so that ecological and social resilience of rangelands can be maintained or enhanced. In my study, the objective is to project canopy cover dynamics on a South Texas refuge in response to different grazing and brush control schemes under different climate change scenarios using systems modeling. The expected results should show an increasing trend in canopy cover with increasing temperatures and precipitation which slows grass growth due to shading. Therefore, the lack of fine fuel reduces fire intensity and reduces the impact of fire on canopy cover. The expected feedbacks would be the key processes affecting brush encroachment. Moreover, my proposed model could be adopted and used by South Texas rangeland managers to explore potential consequences of future environmental variability and overcome challenges in adapting to global change.

Structural Phylogenetics of North America Desert Flora

Ms Andrea McClure

The extreme conditions in the North American desert ecoregions require unique functional and morphological adaptations in plants. This research will clarify gaps in our knowledge regarding plant diversification in North American deserts and the timing of when these specific adaptations occurred. Our objective is to integrate species distribution and molecular data to estimate the timing, frequency, and phylogenetic structure of lineages that have evolved the ability to survive in desert conditions. North American desert ecoregions can be separated into two groups based on thermal conditions: hot deserts and cold deserts. Species may have distributions in both hot and cold deserts or may be restricted to only one type of desert. A distribution dataset of over 1600 desert species has been compiled utilizing the Global Biodiversity Information Facility (GBIF), which was used to classify species presence/absence in each of the North American deserts. This dataset has been paired with a time-calibrated phylogeny of the North America flora to address the following questions: (1) how are desert species distributed across the phylogeny of North American vascular seed plants, (2) how many times have lineages evolved the ability to live in desert conditions, (3) how soon after the deserts formed did different lineages evolve desert adaptations, and (4) do transitions from non-desert to hot desert occur via an intermediary transition into cool desert conditions? We expect to find that relatively few lineages have evolved the requisite physiological adaptations necessary to survive the harsh conditions of the deserts. Rather, we expect high rates of in situ speciation within deserts occurring in those lineages that have successfully invaded and established therein. Given that freezing conditions are severely limiting, we expect these patterns to be more pronounced in the cold deserts.

Hybrid Evolution in Swordtails: How mate choice affects the direction of hybridization along a thermal gradient

Ms Rebecca Mangold

Hybridization plays an important role in evolution because the genetic exchange that occurs between reproductively compatible species can facilitate an increase in phenotypic diversity and generate new evolutionary lineages. In recent years, there has been in increased interest in how mate choice interacts with hybridization to influence the direction of the genetic exchange dynamics within the hybrid zones. The hybrid zones of X. birchmanni-malinche that are found in Mexico's Sierra Madre Oriental represent an ideal study zone for tracking evolutionary changes and determining the factors that drive that change. The hybrid zones are located within several distinct stream reaches that are set along a thermal and elevation gradient with X. birchmanni occupying lower elevations and X. malinche at higher elevations. As part of a Long Term Research in Environmental Biology (LTREB) project, the Rosenthal lab has constructed mesocosms seeded with F1 hybrids at low (STL), intermediate (STM), and high (STM) elevations. Morphological and genetic data of each replicate population are collected biannually along with temperature data to determine how mate choice affects ecological adaptation, ornament evolution population structures. Using the data collected from January 2017 to May 2020, the hybrid index (HI) of individuals in each study population was plotted as a function of time and as a function of several morphological traits. Plotting HI across time reveals there is a slight trend towards birchmanni ancestry at STL and a slight trend towards malinche ancestry at STH. There are also correlations between HI and some traits at STL.

Trypanosoma cruzi Longevity

Ms Kaitlyn Marie Perez

The longevity of Trypanosoma Cruzi is essential underlying knowledge for much of the research regarding Chagas Disease and implementation of preventative measures. Understanding the circumstances under which T. Cruzi can survive is imperative, especially when management is concerned. The objective of this experiment was to determine the longevity of survival of T. Cruzi inside of dead Triatoma Gerstaeckeri for three periods of time, in order to determine the point at which the parasite is no longer pathogenic.

In six trials, nine Triatoma Gerstaeckeri nymphs were experimentally infected using blood spiked with the protozoan parasite, T. Cruzi. Following a positive PCR test for T. Cruzi, the bugs were entered into the trial and subsequently decapitated. Group one, containing three bugs, was used immediately to inoculate cultures with fecal samples and a portion of gut material. The remainder of bugs in groups two and three were left out for twenty-four or forty-eight hours before being inoculated into culture.

There have been positive cultures that indicate T. Cruzi can survive in a dead triatomine for up to forty-eight hours. Data suggests that the death of T. Cruzi inside the gut material of a deceased bug occurs at some time point after forty-eight hours. Further trials will explore time points beyond forty-eight hours to see if a determination can be made regarding when T. cruzi is no longer viable.

Detectability of Hybridization Across Varying Timescales in a Phylogenetic

Ms Alix Garcia

The detection of hybridization events and the resulting introgression, have become increasingly crucial in the analysis of phylogenetic relationships. Through various techniques, hybridization has been observed not only in currently hybridizing species, as seen in the African Great Lakes cichlids, but have also been successful with studying hybridization events that occurred in "ancient" populations, such as in Neanderthals and humans. Studies that involve analyses of ancient hybridization often define it in the context of the taxa under study and currently there is no universal definition. This begs the question however, on how far into the past these hybridization events can be detected and under what parameters it would be possible. Here, our intention is to look at the decay rate of these hybrid events and analyze the degree of detectability given our current technological status in a population genetics framework. Through the use of an evolutionary simulation software known as SLiM, a general model will be built in order to address these questions and simulations will be run using generated genomic sequences to evaluate detectability.

Poster #92_ Ecology & Evolution (1) – Undergraduate

Jamming avoidance in Perimyotis subflavus

Ms Elle Lim

Research studying jamming avoidance in Perimyotis subflavus (tri-colored bat). Includes acoustic analysis of bat echolocation calls.

Discrimination of texture via Echolocation in bats

Mr Thomas Edward Croft

Surface texture is an integral cue used by echolocating mammals for characterizing and forming a mental representation of an ensonified target. Bats need to be able to recognize and discriminate between different target surface textures.¬†¬†Previous work showed that bats rely on spectral cues embedded in echoes to resolve textures, but the resolution limits for this behavior are unknown. Mexican free-tailed bats (Tadarida brasiliensis) are fast, high-flying insectivorous bats that emit broadband FM multi-harmonic sonar pulses.¬†¬†We trained 3 bats to perform a two-alternative forced-choice assay in which they compared and selected the coarser of two sandpaper samples of different grit size.¬†¬†Commercial sandpaper grits decrease in mean particle size following an exponential function. We tested the bats ability to discriminate between 10 different grit sizes varying from 40-240 grit, corresponding to mean particles diameters varying from 425 to 50 microns. Bats discriminated all grits from a smooth plexiglass control and almost all grits from each other up to 180 vs 220 grit (82 vs 68 microns) but not 220 vs 240 (68 vs 54 microns), indicating an extraordinary minimum difference threshold of about 14 microns, which rivals human performance using tactile active sensing by finger touch.

Poster #94_ Agriculture - Undergraduate & Graduate

Behavioral analysis of euthanasia strategies for neonatal male layer chicks

Ms Allison Milby

Maceration (instantaneous mechanical destruction) is an effective and humane way to euthanize neonatal chicks, however, it is not well perceived by the public. It was hypothesized that gas asphyxiation and low atmospheric pressure stunning are humane and feasible methods for euthanasia. The objective of this experiment was to evaluate the effects of euthanasia methods on behavioral responses of newly hatched male layer chicks. A randomized design was applied to study four methods on a commercial scale, including compressed breathing air followed by decapitation (control), carbon dioxide (CO_2), nitrogen (N2), and a commercial low atmospheric pressure stunning system (LAPS,Ñ¢). A total of 480 day-of-hatch chicks were randomly assigned to 16 replicates with 30 chicks/replicate and four replicates/treatment. Ataxia, loss of posture, convulsive behavior, cessation of vocalization and movement were evaluated. Chicks in the N2 treatment took a longer time to initiate and terminate all behaviors compared to CO_2 and LAPS,Ñ¢ treatments ($p < 0.001$). The LAPS,Ñ¢ treatment was statistically similar to the CO_2 group when comparing time to initiate and terminate ataxia, loss of posture, and terminate movement, but took longer to start convulsions and stop vocalizations ($p < 0.001$). Overall, the data suggests that CO_2 inhalation and the low atmospheric pressure stunning system can humanely euthanize neonatal chicks. The N2 treatment, which took the longest to achieve lethal concentration, could benefit from an increased fill rate of N2 into the chamber to reduce the time to achieve euthanasia and alleviate animal distress.

Using recombinant inbred lines of sorghum for studying genetic control of inter-specific hybridization between Sorghum bicolor and S. halepense

Mrs Usha Rani Pedireddi

Recombinant Inbred Lines (RILs) serve as powerful tools for genetic mapping of traits of interest. An experiment is being conducted at Texas A&M University, College Station, to understand chromosomal regions that influence outcrossing potential between sorghum (Sorghum bicolor) and johnsongrass (S. halepense). In this study, RIL lines developed from crosses between sorghum inbreds with high (Tx623) and low (Tx378) outcrossing potential with johnsongrass were investigated. A total of 192 RIL lines were planted in a field naturally infested with johnsongrass, in a completely randomized design with three replications. Sorghum was the female parent, and to prevent self-pollination the male gametocide agent trifluoromethanesulfonamide (TFMSA) was applied to foliar tissue at 3 to 10 days prior to flag leaf emergence. At seed maturity, 15 panicles were harvested individually within each plot. Preliminary results showed substantial variation in seed set among the RIL lines evaluated. To understand the chromosomal locations affecting gametic factors in sorghum, a genotyping by sequencing (GBS) analysis will be conducted and the genetic data will be compared with the phenotypic data. Results are expected to provide novel insights on the genetic control of outcrossing between sorghum and johnsongrass.

The Effect of Spent Coffee Grounds on Germination and Growth of Container Grown Specialty Crops

Ms Amanda Birnbaum, Grace Bodine, Morgan Holland

Sphagnum peat moss is the main ingredient of commercial potting mixes and is not an environmentally friendly product. Harvesting peat moss releases carbon dioxide into the atmosphere and destroys sensitive habitats. To increase the sustainability of the horticulture industry, organic wastes such as spent coffee grounds (SCG) could serve as a partial replacement for sphagnum peat moss in potting mix. We mixed composted and non-composted SCG with a commercial potting mix at ratios ranging from 10% to 90% SCG to determine the germination and growth of different container grown specialty crops. Results varied depending on plant species and between composted and non-composted SCG. Our study shows composted SCG have the potential to be used as a partial replacement for particular specialty crop species.

Adopt, what? Describing Louisiana wheat producers' level of adoption of soil health management practices

Ms Maureen Victoria

Soil conservation and management require producers to make informed decisions using evidence-based information. The purpose of our qualitative study was to investigate Louisiana wheat producer's level of adoption of soil health management practices (SHMPs) using Rogers' (2003) five adopter categories. We interviewed six of the 39 Louisiana wheat producers using a semi-structured interview protocol and transcribed the interviews for data analysis using the five adopter categories within Rogers' diffusion of innovation theory as the framework. We followed initial data analysis with secondary data analysis to confirm the analysis. Our findings indicated that most participants in our study are willing to adopt soil health management practices given the appropriate information, climate, soil conditions, and timing of implementation. These parameters are essential for the appropriate dissemination of scientific information to producers. Innovators in our study posed exceptional views of technology in the field and were highly interested in receiving the most current information about practices and equipment. In alignment with Rogers' characteristics of early adopters being discreet in their adoption of innovations, early adopters adopted SHMPs despite conventional practices being used on neighboring farms for soil nutrient and erosion control. Participants who intensively and continuously monitor their soil and crops to make SHMP decisions are considered early majority adopters. Late majority adopters in our study adopt innovations given the guarantee of finance and yield increases. Dissimilar to laggards, participants that aligned with late majority were not suspicious of innovations but lacked the necessary scientific information to adopt SHMPs. These findings reveal the need for region-specific scientific information to be appropriately disseminated to wheat producers. Adoption of SHMPs could improve data-driven information delivered through Extension-hosted trainings.

Reduced tillage and cover crop use does not alter macroaggregate stability in a South-Central Texas row cropping system

Ms Grace Michiko Bodine

Managing for soil health is key to unlocking sustainable agriculture. Wet aggregate stability (WAS) is an important soil heath indicator that measures how resistant soil is to disassociation in water. WAS influences crop yields as it plays a role in important soil functions and characteristics such as infiltration, water/chemical transportation, and organic carbon content. Macroaggregates (>250 ¬µm) are especially sensitive to soil use and management practices. This on-farm study assesses the impacts of select agricultural practices on WAS within 5 years of implementation. We quantified the WAS changes of macroaggregates in an annual wheat cropping system managed with conventional tillage and no-till systems and three summer cropping types (fallow, grain sorghum [Sorghum bicolor], and 7-species mixed cover crop) at two locations in Texas. Soil samples were manually wet sieved for WAS. No significant influence of tillage differences was found on WAS. However, there was a significant effect of the summer cropping treatments. The grain sorghum double-crop had the highest WAS compared to the fallow and mixed cover crop treatments, suggesting that the benefits of conservation cropping systems may not occur within the short-term nature of this study. Future work will track changes in WAS over multiple years in order to identify how long it takes for sustainable soil health management to enhance WAS in these Texas soil types.

Exploring the Impact of Pesticide Use on Cucumber Seedlings Under Herbivore Stress

Ms Taylor Paige Swoboda

Cotton aphids, Aphis gossypii, are a major threat to agricultural and horticultural crops due to their high reproductive rate and disease transmission to plants. Thus, crop protection is essential in both agricultural and horticultural settings due to aphid stress and damage. Synthetic and organic pesticides are often used to manage aphids in these settings. The increase of pesticide usage raises the concerns of pesticide resistance and environmental contamination. While both organic and synthetic pesticides are effective in reducing the negative implications of insect pests, there is the potential for adverse pesticide impact on the environment and non target organisms. We are exploring the difference between synthetic and organic pesticides at different dilution levels. By diluting the pesticides the concentration of the active ingredient is minimized. We examined the impact of pesticide levels on cucumber plants, Cucumis sativis under cotton aphid herbivory conditions. Plant stress and aphid population were assessed by quantifying the aphid population and analyzing below ground root data.

Attributes Empowering Women in the Sub-Saharan Agricultural Industry: Utilizing a Quantitative Content Analysis to Assess the UN's Sustainable Development Goals

Mr Garrett S Brogan

This study analyzed the attributes that empower women in Sub-Saharan Africa in the agricultural industry. The Social Change Model was used as the theoretical framework to define individual, group, and societal values found within these attributes that empower women. A content analysis was used to find common themes found in the literature. The United Nations Sustainable Development goals were used as a foundational base to search for keywords such as "women empowerment," "gender equality," "Sub-Saharan Africa," and "sustainable agriculture." The analysis found four common themes among the literature that empower women involved in agriculture. They are land (ownership of land or other assets), cooperative/membership groups, education (training or education that give women information critical to their production), and technology. Technology was found in the other three themes as a critical factor towards empowering smallholder women farmers. We recommend that current organizations currently operating in Sub-Saharan Africa that offer services to smallholder women farmers partner with larger institutions such as US-based land grant universities, USAID, or the European Union. These larger institutions offer valuable resources to technology and training that these organizations can use to empower smallholder women farmers. Future research should focus on using a quasi-experimental design that includes a minimum of three villages where women are a part of a cooperative or farming organization. Researchers should then use a minimum of three different technology platforms in each village to conduct training for farmers and evaluate which platform or combination of platforms enabled smallholder women and farmers to be more empowered.

Resveratrol is a Nuclear Receptor 4A1 (NR4A1) Ligand the Antagonizes NR4A1-Regulated Prooncogenic Pathways in Lung Cancers

Ms Lei Zhang

Resveratrol (3,5,4'-trihydroxystilbene) is a polyphenolic phytochemical found in fruits, nuts, and vegetables and there is evidence that this compound offers protection from several human diseases including cancer. In cancer cell lines, resveratrol inhibits cell growth, survival, migration/invasion and genes/pathways associated with these anticancer activities. Many of the same anticancer activities reported for resveratrol have previously been observed in this laboratory using bis-indole derived nuclear receptor 4A1 (NR4A1) ligands that antagonize of NR4A1-regulated pro-oncogenic pathways. Treatment of A549, H460, H1299 lung cancer cells with 50-125 ¬μM resveratrol for 24, 48, 72 hours inhibited cell growth and IC50 values for growth inhibition decreased with time. In addition, resveratrol inhibited the mTOR signaling pathway and other responses in lung cancer cells as previously observed for NR4A1 antagonists in the same cell lines. Therefore, we investigated the interactions of resveratrol with the ligand binding domain of NR4A1 in an assay that measures fluorescent quenching of a tryptophan residue in the NR4A1 ligand binding pocket. Resveratrol bound NR4A1 and the KD value was 1.4 ¬μM. H460 and H1299 lung cancer cells were transfected with the yeast Gal4-NR4A1 fusion construct and UAS-luciferase which contains tandem Gal4 response elements, and treatment with 125+150 ¬μM resveratrol decreased transactivation. Thus, resveratrol directly bound NR4A1, inhibited NR4A1-dependent transactivation, inhibited cell growth and mTOR signaling, and the role of NR4A1 in mediating the responses induced by resveratrol is currently being investigated.

Poster #101_ Molecular Biology (3) – Graduate

A Case of Extracranial Giant Cell Arteritis with Normal Inflammatory Markers

Ms Emily Newstrom

Giant Cell Arteritis (GCA) is the most common primary systemic vasculitis of the Western world. Symptoms typically begin abruptly during the 8th decade of life, including new-onset headache, jaw claudication, fever, fatigue, and vision loss. Presence of these symptoms prompts lab orders for inflammatory markers like erythrocyte sedimentation rate (ESR) or C-reactive protein (CRP) as well as a temporal artery ultrasound and biopsy for diagnosis. Non-elevated ESR and CRP is uncommon, with only 31 pre-existing case reports or case series and an incidence varying from 1.4% to 22.5% in retrospective studies. It is even more uncommon, however, for these patients to present asymptomatically and without intracranial arterial involvement. We present a case of biopsy proven GCA aortitis with negative inflammatory markers in an asymptomatic patient. Given that this patient's GCA was incidentally diagnosed via surgical biopsy taken during aortic aneurysm repair in the context of mitral valve repair, it is important to discuss in order to understand the full scope of GCA presentation. It is especially critical to discuss this patient's presentation given that it has been shown that GCA patients with low inflammatory response are at increased risk for irreversible vascular complications. Existing data about isolated extracranial GCA, particularly in asymptomatic, ESR/CRP negative patients, is extremely limited, therefore this patient can serve as an example for the unique diagnostic steps that may need to be taken in such cases.

Muscle Weakness and Altered Fiber Type in Sheep Hypophosphatasia is Associated with Diminished Activity and Compromised Kinematics

Mr Joshua Bertels

Hypophosphatasia (HPP) is a rare inherited disorder of mineral metabolism resulting from inactivation of the tissue-nonspecific alkaline phosphatase (ALP) gene (ALPL). HPP is characterized by decreased mineralization and profound muscle weakness. Based upon a novel compound heterozygous HPP patient, (exon 5: c.346G>A, p.A116T; exon 10: c.1077C>G, p.I359M) the Isoleucine -> Methionine (c.1077 C>G) mutation of ALPL was introduced into the Rambouillet sheep genome. To characterize the muscle defects observed in HPP sheep, gluteus medius (GM) fiber type was determined in 6-month old F1 sheep expressing the wild-type (n = 5), heterozygous (n = 3), and homozygous (n = 3) genotypes for the ALPL mutation by immunofluorescence. The percentage of myosin heavy chain (MyHC) Type 1 and 2a fibers was greater in Hom compared to WT sheep at the expense of MyHC Type 2x fibers. At 1 yr of age, GM samples from the same sheep were analyzed for mitochondrial characteristics. GM mitochondrial area and number were quantified using transmission electron microscopy, revealing that HPP mutant muscle had smaller mitochondria ($P<0.05$) than the wildtype, without a change in mitochondrial number. Similarly, decreased citrate synthase activity (mitochondrial biogenesis) in HPP sheep was significantly correlated with decreased serum ALP activity in 6-month old HPP males. Motion capture kinematics revealed a marked spinal sway and slower stride velocity in HPP sheep that worsened with age. Compromised mitochondrial energetics and altered muscle fiber types culminating in altered gait kinematics in HPP sheep provide mechanistic insight into the muscle weakness phenotype in HPP patients.

Poster #103_ Molecular Biology (3) – Graduate

The copper ionophore elesclomol elevates cellular iron content by delivering copper to iron import machinery

Ms Natalie M Garza

Copper and iron are redox active metals that act as cofactors for many critical cellular enzymes. Disruption in the intracellular homeostasis of either of these metals often results in debilitating and frequently fatal human disorders. Recently we reported that a copper ionophore, elesclomol (ES), can deliver copper to mitochondrial copper-containing enzymes and serve as a potential therapeutic agent for disorders of copper deficiency. Here, we sought to determine the specificity and efficacy of ES and ES pre-loaded with copper (ES-Cu) in cellular metal homeostasis. Using yeast, Saccharomyces cerevisiae, as a model organism we demonstrated that ES-Cu is more efficient at increasing cellular and mitochondrial copper content than ES alone. Surprisingly, treatment with either ES or ES-Cu also led to an increase in cellular iron content. In order to decipher the mechanism by which ES elevated cellular iron content, we employed yeast mutants of copper and iron transporters and discovered that ES-mediated increase in iron requires iron- but not copper- importers. Further investigations revealed that ES-mediated increase in cellular iron content is dependent on copper transport to Golgi, where Fet3, a critical component of iron import machinery receives copper. Our results demonstrates that copper brought into the cells by ES can be trafficked to the Golgi apparatus and inserted into cuproenzymes, including those required for cellular iron import. This study, thus, provides a basis for possible future applications of ES for the treatment of disorders of both copper and iron homeostasis.

Competitive exclusion of Intra-Genus Salmonella in Neonatal Broilers

Ms Megan Pineda

Salmonellosis is a zoonotic infection caused by Salmonella enterica serotypes contracted from contaminated products. We hypothesized that competitive exclusion between Salmonella serotypes in neonatal broilers would reduce colonization and affect the host immune response. Day of hatch broilers were randomly allocated to one of six treatment groups: (1) control, which received saline, (2) Salmonella Kentucky (SK) only on day 1 (D1), (3) Salmonella Typhimurium (ST) or Salmonella Enteritidis (SE) only on D1, (4) SK on D1 then ST or SE on day 2 (D2), (5) ST or SE on D1 then SK on D2, and (6) SK and ST or SE concurrently on D1. Salmonella gut colonization and incidence were measured from cecal contents. Livers and spleens were combined and macerated to determine systemic translocation. Relative mRNA levels of interleukin−1√ü (IL−1√ü), IL−6, IL−10, IL−18, and gamma interferon (IFN−?) were measured in cecal tonsils and liver to investigate local and systemic immune responses. When a serotype was administered first, it was able to significantly reduce colonization of the following serotype. Significant changes were found in mRNA expression of cytokines. These results suggest competitive exclusion by Salmonella enterica serotypes affect local and systemic immune responses.

Comparison of Antibacterial Properties of Bulk (free) and Nanoencapsulated Essential Oils against Food Pathogens Listeria monocytogenes and Escherichia coli O157:H7

Mrs Helen Hashemi, Mehdi Hashemi

The consumer trend of using plant bioactive constituents are driving some changes in food industries using more naturally occurring compounds to improve the human health as antibacterial and antioxidant agents. The present work has demonstrated the effect of selected plant essential oils (EOs) loaded polymer nanoparticle compounds including Basil (Ocimum basilicum), Anise Star (Illicium verum), Citronella (Cymbopogon nardus), Cinnamon Cassia (Cinnamomum cassia), Clove Bud (Syzygium aromaticum), Peppermint (Mentha piperita), Eucalyptus (Eucalyptus globulus), Clove Leaf (Syzygium aromaticum), Tea Tree (Melaleuca alternifolia) on the inhibitory of bacteria growth. The size and drug release of nine EO nanoparticles were then characterized. The sizes were ranged from 27.4¬±0.46- 41.4¬±0.04 nm optimizing concentration of polymer Pluronic¬ÆF127 and nine selected EOs with the polydispersity index (PDI) values of 0.12¬±0.01- 0.24¬±0.03. Antibacterial properties of encapsulated NPs and unencapsulated were also investigated on Gram positive (Listeria monocytogenes) and negative bacteria (Ecoli O157:H7) with treatments of bulk (free) and nanoencapsulated EOs at the concentrations of 2.5 mg/mL, 5 mg/mL, 7.5 mg/mL, 10 mg/mL, 12.5 mg/mL, and 15 mg/mL. Nanoencapsulated samples exhibited a higher inhibitory effect on the tested bacterial strains at the concentration of 2.5-15 mg/mL. The results indicated that by increasing the concentration of EO either in unencapsulated or encapsulated treatments, the antibacterial effect of the EOs against both Gram-negative and Gram-positive has elevated. However, the Gram-positive bacterium was more susceptible to the treatments compared to the Gram-negative bacterium. In addition, the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) was assessed for all the nanoencapsulated and unencapsulated EOs against L. monocytogenes and E. coli O157:H7 using the microdilution method. Among EOs, anise star, peppermint, and eucalyptus in free (pure) and encapsulated forms needed >15 mg/mL concentration to exhibit minimum inhibitory effect against E. coli O157:H7 and in addition to those three, MIC for citronella was more than 15 mg/mL against L. monocytogenes. Overall, EOs loaded nanoparticles were more effective against the bacteria growth throughout the study compared to the unencapsulated samples.

Time Following Initial Acquisition is Sufficient to Make Signaled Active Avoidance Dependent on the Retrosplenial Cortex

Ms Mia Rayne Kreitlow

Signaled active avoidance (SAA) behavior involves a multistage learning process supported by a shifting neural substrate. While recent work has begun to explore the circuitry by which the avoidance response is initially acquired and expressed, less is known about the mechanisms underlying the long-term maintenance of the response. In particular, it is unknown whether these mechanisms are brought online by continued training following acquisition, or whether time alone is sufficient to recruit them, suggesting a role for a systems consolidation-like process. Because it plays a known role in the long-term maintenance of aversive memory, we hypothesized that the retrosplenial cortex (RSC) is necessary for the expression of avoidance after substantial training. In an initial experiment, rats received intra-retrosplenial infusions of an AAV containing the gene construct for either the inhibitory hM4Di DREADD or GFP on a CamKII promoter to ensure expression in pyramidal neurons. Following recovery, subjects received training in an SAA paradigm in which they learned to shuttle across a divided chamber during a tone in order to avoid a foot shock. To compare the effects of retrosplenial inactivation across different phases of SAA maintenance, four days of initial acquisition were followed by two sessions of SAA preceded by CNO or vehicle in a counterbalanced order. Subjects then underwent two additional days of SAA training without drug treatment prior to two final sessions that were again preceded by counterbalanced administration of CNO or vehicle. While CNO inactivation of the retrosplenial cortex had no effect on the avoidance response following the initial four days of training, a robust decrement was observed at the latter time point, after subjects had undergone at least eight daily sessions of SAA. Then, in a subsequent experiment, we set out to determine if RSC is recruited by the passage of time or by continued training following initial acquisition. Rats expressing hM4Di in RSC pyramidal neurons received four days of SAA training followed either by two test sessions identical to those described above or by four days of time off in the homecage prior to two test sessions. CNO inactivation of RSC following the time off period caused a significant decrement in the avoidance response, while inactivation immediately following the initial four days of training had no effect. Thus, our data confirm that RSC plays a role in the long-term maintenance of the avoidance response, and that RSC is recruited to SAA by a systems consolidation mechanism and not by continued training following initial acquisition of the response.

Environmental Effects Triggering Antibiotic Resistance in Bacteria

Ms Brooke Smith

The world is currently in an antibiotic crisis due to the development of antibiotic resistance in bacteria. Antibiotic resistance poses a threat in many institutions such as hospitals, meat processing facilities and other agricultural and occupational entities. The goal of this research is to uncover how bacteria react to certain environmental conditions, and delineate the factors that may trigger the expression of antibiotic resistance genes (ARGs) in Escherichia coli (E. coli) MG 1655. These conditions include temperature, relative humidity, the absence or presence of light, airflow and duration of aerosolization. The fresh mid-log phase bacterial suspensions were aerosolized using the 6-jet Collison atomizer for 5, 10, 15, 30 and 45 minute periods into a 27 L sterile box at a constant airflow of 80 L/min and collected using the 100 L/min wetted wall cyclone bioaerosol collector that maintains the culturability of the collected bacteria. Each sample was analyzed and compared based on its response to each environmental factor by susceptibility testing and polymerase chain reaction (PCR) using specific primers to target different ARGs (marR, and rfaC). The Kirby Bauer susceptibility test results indicated the strongest resistance response to cephalothin, gentamicin, and ciprofloxacin, which are cell wall or DNA replication inhibitors respectively. There was approximately 100% more resistance detected in E. coli aerosolized for 5 minutes versus 45 minutes, however, similar resistance was detected in the 5 minute and 30 minute aerosolizations which indicated that 45 minutes caused an increased amount of stress that the bacteria couldn't alleviate. Interestingly, no resistance was detected in bacteria aerosolized for 10 minutes, maybe due to a transient response of the cells to compensate for the osmotic and other stresses during aerosolization. However, high susceptibility was maintained to imipenem and cefoperazone, both cell wall synthesis inhibitors, in all nebulization durations. This information may help mitigate antibiotic resistance in aerosolized bacteria by optimizing environmental conditions to prevent the development of ARGs.

Exercise modulates androgen control of lipolysis in white adipose tissue of male and female pigs

Mr Matthew Joseph Grizzaffi

Current knowledge regarding androgen control of lipolysis in white adipose tissue (WAT) derives from experiments conducted on subcutaneous (sc) WAT in males. However, visceral (v) WAT has a higher endogenous lipolytic rate than scWAT and androgens are interconverted in WAT. Moreover, while exercise is known to increase lipolytic rate in WAT, how androgens interact with exercise to control lipolysis has not been explored. We hypothesized that, irrespective of exercise status, dihydrotestosterone (DHT) would increase lipolysis in scWAT and vWAT in males but only increase lipolysis in vWAT in females. This hypothesis was based on the premise that scWAT from females readily conducts androgen inactivation. Female (n=7) and male Yucatan pigs (n=3) were exercised or sedentary for 14 weeks, after which they were euthanized, blood was collected for estradiol, progesterone, and testosterone and scWAT and vWAT were collected for lipolysis experiments. WAT explants were incubated in 0 nM or 10 nM isoproterenol + or - 1 nM DHT and steroid receptor antagonists in X Vivo media. After 2 hours of incubation, media was frozen for subsequent glycerol analysis (Sigma Aldrich Glycerol Assay Kit) and explants were weighed. DHT had minimal effects on glycerol release in vWAT of sedentary males or females. However, DHT caused significantly increased release of glycerol from both vWAT and scWAT from exercised males. Intriguingly, DHT also caused significantly increased release of glycerol from vWAT from exercised females. Our data suggests that exercise modulates sensitivity of WAT to lipolytic effects of DHT, particularly with respect to vWAT.

Telomeres and PAE: can telomere length be a viable marker for FASD?

Mr Jordan T. Kuhlman

Telomeres are repetitive hexamer sequences (TTAGGG) that protect the ends of chromosomes during replication. Telomere shortening occurs regularly during aging and has been used as a biomarker for certain cancers and cardiovascular disease. Fetal Alcohol Spectrum Disorders (FASD) include a range of negative effects caused by prenatal alcohol exposure (PAE). Defining the mechanisms of damage in FASD is difficult because of varying windows and degrees of exposure during pregnancy. Measuring differences in telomere length (TL) may be a viable strategy to quantify the stress that results from PAE on certain tissues, such as the liver and spleen. To do this, qRT-PCR will be used to measure the differences in TL between control and PAE rats. Liver and spleen tissues were taken from postnatal day 3 (PND3), 6 month, and 12 month old rats of control and PAE groups. To account for the known differences in TL between males and females, both sexes were used. qRT-PCR targeting telomeres and a single copy gene (Interferon beta) for normalization was used to determine relative TL length. A pilot study on control males and females revealed decreased TL in older animals. Going forward, relative TL is expected to be shorter in the ethanol-exposed group for both sexes when compared to the control. If ethanol-induced stress in these tissues has caused a decrease in TL, TL may be used to determine if other organs are similarly impacted by PAE and as a potential biomarker in conjunction with existing diagnostics to better help individuals with FASD.

Poster #112_ Molecular Biology (2) – Undergraduate

Effects of developmental restriction on neural progenitor cell differentiation in vitro

Mr Joseph Chen

Neural progenitor cell (NPC) transplantation is a promising therapeutic strategy following spinal cord injury (SCI). In mouse transplantation studies, spinal cord NPCs isolated at embryonic day 12.5 (E12.5) have long been regarded as the 'golden standard'. However, spinal cord neurogenesis normally occurs over E9.5-E13.5, with distinct neural progenitor classes exhibiting different birthdates. Therefore, we hypothesized that varying the timepoint of NPC isolation would result in distinct cell phenotypes upon maturation. To test this, mouse spinal cord NPCs were isolated on days E11.5, E12.5, and E13.5, and cultured for 7 days. Then, the cells were fixed and characterized using molecular markers of distinct cell populations (including neurons, astrocytes, and oligodendrocytes), and quantified. Our results show that NPC proliferative capacity decreased over time, with earlier cultures producing more cells than later cultures. We also found that the proportion of neurons and oligodendrocytes decreased steadily from E11.5 to E13.5. The proportion of astrocytes was the highest in E11.5 cultures, with similar numbers at E12.5 and E13.5. Surprisingly, E12.5 cultures produced the lowest proportion of motor neurons. Collectively, these results indicate that developmental stage plays a significant role in NPC cell fate in vitro. Furthermore, this has important implications for experimental models, pointing to temporal restriction as an understudied approach to manipulating graft composition in vivo. We are testing this in ongoing studies by grafting developmentally-restricted NPCs into sites of SCI. Altogether, findings from this work will update guidelines for engineering new and effective cell sources for SCI clinical trials.

Evaluating Alcohol-Sensitive Proteins of Extracellular Vesicles Produced by Neural Stem Cells

Mr Khang Le

Prenatal alcohol exposure (PAE) is the leading cause of neurodevelopment disability worldwide that can result in craniofacial deformities and growth deficiency. Neural stem cells (NSCs) are most vulnerable during the late first to second trimester, when they are most extensively involved in neurogenesis, the process where neurons are produced. Extracellular vesicles (EV) are sub-200nm intercellular complexes found amid the rich microenvironment of NSCs, facilitating the transportation of proteins, lipids, and RNA between cells.

Using cortical neuroepithelium derived from fetal mice, cultured non-adherent neurospheres where grown ex-vivo. We found there to be a significant increase in EV-miRNA content (miR-140-3p), associated with abnormal astroglial lineage maturation. To further examine ethanol's (EtOH) impact on NSC-derived EVs, quantitative proteomics was used to investigate protein expression on 18 EV samples and their 18 parent NSC samples.

Mass-spectrometric analysis identified proteins necessary for eukaryotic translation initiation, suggesting that EVs have the capacity to translate chaperoned mRNAs. The analysis of statistical and pathway overrepresentation indicates that moderate (~26mM) EtOH exposure facilitates a significant protein increase in the Nonsense-Mediated Decay (NMD) EV pathway, a surveillance pathway that prevents gene expression error by eliminating premature stop codon-containing mRNA transcripts. Thus, NMD proteins isolated in EV's are hypothesized to traffic neuroprotection to cells with depleted error-correcting protein translation. Furthermore, severe (~70mM) EtOH exposure results in EV overexpression of mitochondrial proteins constituting a Danger-Associated Molecular Pattern (mito-DAMP) pathway. Knowing that eukaryotic cells under stress discharge mitochondrial proteins, activating pattern recognition receptors, and pro-inflammatory responses in target cells, mitoDAMP's in EVs from ethanol-exposed NSCs are anticipated to spread inflammation between NSCs, jeopardizing development and differentiation.

These studies suggest that EVs are a unique means of communicating stress between cells in an ethanol-induced fetal NSC niche. Ongoing studies are focused on validating ethanol-induced alterations in EV's using western immunoblot assays.

Inequality of Sex Chromosome to Autosome Fusions

Ms Kayla Wilhoit

Chromosomal fusions play an integral role in the remodeling of genomes and in karyotype evolution. Fusions that join a sex chromosome to an autosome are particularly abundant across the tree of life, but previous models on the establishment of such fusions have not accounted for the physical structure of the chromosomes. Our preliminary analysis predicts that a fusion joining an autosome to the pseudoautosomal region (PAR) of a sex chromosome will not remain stable, and the fusion will switch from the X to the Y chromosome each generation due to recombination. We have produced a forward time population genetic simulation to explore the outcomes of fusions to both the pseudoautosomal and non-recombining regions of sex chromosomes. The model can simulate the fusion of an autosome containing a sexually antagonistic locus to either the PAR or non-PAR end of a sex chromosome. This model is diploid, two-locus and biallelic, and is able to run thousands of simulations under a variety of conditions.

The effect of moderate and heavy alcohol exposure on fetal neural cell-derived extracellular vesicles

Ms Natalie Collins

Prenatal alcohol exposure (PAE) is the leading cause of neurodevelopmental disabilities worldwide, commonly resulting in neurobehavioral and growth deficits. Neural stem cells (NSCs) may be targeted by ethanol during the late first through second trimester, the peak period of fetal neurogenesis. The NSC microenvironment is rich in extracellular vesicles (EVs) that transport proteins, lipids, and RNAs between NSCs and their progeny. EVs may amplify PAE's temporal and spatial effects in the NSC niche, resulting in an overall decline in neurogenic capacity. For this study, we further investigated the impact of ethanol on the proteome of NSC-EVs by employing quantitative mass-spectrometry to profile the protein expression across alcohol-treated control NSCs.

Ethanol-exposed NSCs significantly altered the profile of proteins packaged within EVs. Compared to controls, of the 3,617 expressed EV proteins, moderate ethanol exposure (26mM) differentially regulated 65 proteins, with >95% being upregulated, while heavy ethanol exposure (70mM) differentially regulated 108 proteins, with ~65% being upregulated (Paired t-test, p<0.05; effect size, Cohen's d>0.5, a=5%, 1-√ü=0.8). For cells, out of 4,698 expressed proteins, moderate ethanol exposure differentially regulated 492 proteins compared to controls, with >92% being downregulated, while heavy ethanol exposure differentially regulated 750 proteins, with >95% being downregulated. For moderate and heavy ethanol exposures, the majority of affected proteins were upregulated in EVs but downregulated in cells. Therefore, ethanol exposure results in increased loading of specific proteins into EVs, at the expense of their intracellular levels in NSCs.

The distribution of inhibitory interneurons across the primary auditory cortex of Mexican free-tailed bats

Ms Olivia Butaud

In the mammalian primary auditory cortex (A1), interactions between inhibitory interneurons (INs) and excitatory pyramidal cells (PCs) lead to the processing of acoustic information. This allows the mammal to decode and understand complex sounds, such as language and pitch. It is known that INs mediate inhibition in this process. However, the exact role that these INs play in mediating inhibition is not currently known. In order to understand the mechanism behind this sensory processing, it is first necessary to determine the distribution of these INs across the six layers of the A1. This research focusses on three subtypes of INs, characterized by non-overlapping protein markers Parvalbumin (PV), Somatostatin (Som), and Calretinin (Cal). Using FIJI (ImageJ2), the distribution of each of these cell types across the A1 at 0.1 mm increments has been determined. After further data analysis, we plan to use this information in conjunction with electrophysiology studies to determine the mechanism behind the processing of acoustic information.

A Potential Role of Serine-aspartate dipeptide repeat protein E (SdrE) in Immune Evasion of Staphylococcus aureus

Ms Radhika Barve

Staphylococcus aureus, a gram-positive, sphere-shaped (coccal) bacteria, is one of the most dangerous bacteria which causes skin infections, pneumonia, heart valve infections, and bone infections. Staphylococcus aureus surface proteins such as cell wall-anchored (CWA) proteins have been characterized as important virulence factors and have important roles in adhesion to host tissues, immune evasion and biofilm formation in hosts. MSCRAMM (microbial surface components recognizing adhesive matrix molecules) proteins are members of the CWA family, which has serine-aspartate di-peptide repeats (Sdr). SdrE, a member of the MSCRAMM sub-family, is known to have an important role in S. aureus pathogenesis by inhibiting complement activation. However, the exact mechanism is unknown. In this study, we have characterized the interacting partner of the Sdr domain of SdrE by phage display and ELISA-based tools. We have characterized that SdrE binds to Complement component C5 in a dose-dependent manner, suggesting a potential role in immune evasion.

Interactions between Borrelial Fbp proteins and the classical pathway of the complement cascade

Mr Joshua Fernandez de la Vega

Successful evasion of a host's innate immune system is necessary for pathogen persistence. The complement cascade is of particular concern for pathogens establishing persistence within a human host. In Borrelia burgdorferi, the causative agent of Lyme disease, the surface-exposed lipoprotein BBK32 is understood to bind and inhibit C1r, the initiating protease of the classical pathway of the complement cascade. B. miyamotoi, a tick-borne relapsing fever Borrelia species, carries orthologues of the BBK32 protein known as FbpA and FbpB. FbpA is thought to interact similarly to BBK32 with C1r, supported by biochemical analyses measuring complement activation, while FbpB binds, but does not inhibit C1r activation. Genetic knock-in constructs of these fbp genes in a serum-sensitive Borrelia strain will be used to examine the serum resistance conferred by fbp proteins on the borrelial surface, and thus a potential for their protective activity during infection. Knock-out constructs of fbp genes in B. miyamotoi will be used to isolate the phenotype that loss of these proteins has on serum resistance of borrelial cells in an in vivo mouse model. Knock-in constructs of fbp proteins in serum-sensitive Borrelia strains are expected to confer some serum resistance in vitro, whereas fbp knock-out strains are expected to display increased serum sensitivity compared to their wild-type counterparts in vivo.

Effects of calcium mishandling in astrocytic mitochondria: the unexplored powerhouse

Ms Belen Torres, Megan Huang Frazier

Astrocytes are the most populous cell type in the central nervous system (CNS) and are vital in neuron development, regulating blood flow, and maintaining communication between neurons. Astrocytic control on the CNS is due in part to their complex morphology, consisting of a circular soma extending into primary branches that further divide into smaller branchlets and leaflets. The morphology of astrocytes allows calcium (Ca^{2+}) to function as their main communicator, much like electrical signals in neurons. Increased Ca^{2+} in astrocytes causes gliotransmitter release, leading to regulation of synaptic transmission in neurons. The majority of Ca^{2+} signals in astrocytes originate in mitochondria, even within the nanometer sized branchlets and leaflets. Recent studies show Ca^{2+} mishandling in neuronal mitochondria leads to dysfunction and is associated with early neurodegeneration in Alzheimer's and Parkinson's disease. However, effects of Ca^{2+} mishandling in astrocytic mitochondria are less understood. Considering this, we will disrupt Ca^{2+} signaling specifically in astrocytic mitochondria using an adeno-associated virus (AAV) overexpressing neuronal calcium sensor 1 (NCS1), a ubiquitous Ca^{2+} buffering protein. Under normal conditions, NCS1 functions in neurotransmitter release, cell growth and survival. However, NCS1 is upregulated in schizophrenia, bipolar disorder, and autism as well as Parkinson's disease. In order to verify disruption of Ca^{2+} signaling via NCS1, our construct will first be assessed in the astrocytoma cell line, SMA-560. By assessing changes in morphology and respiration, as a result of Ca^{2+} mishandling, we hope to progress our understanding of the role this unexplored powerhouse plays in neurodegenerative diseases.

Analyzing the natural analogs of the antifungal compound occidiofungin

Mr Noah McNally

Background: Fungal resistance to current medical treatments has been an emerging problem. Amidst this, a bacterial product called occidiofungin has been shown to have antifungal activity through a novel mechanism as compared to azole-based treatments and other drugs on the market. This compound is a glycolipopeptide that is naturally produced by the MS14 strain of Burkholderia contaminans.
Objective: This study focuses on characterizing further analogs and variants of occidiofungin in order to understand the full diversity of this molecule.

Methods: High pressure liquid chromatography was used to isolate and purify occidiofungin for analysis. A combination of mass spectroscopy and nuclear magnetic resonance imaging was then used to characterize the structure of individual analogs of occidiofungin.

Results: Through analyses of these data, natural variants of occidiofungin were identified which differ from previously characterized variants.

Conclusion: This finding contributes to our understanding of the existing analogs of occidiofungin. It also increases occidiofungin's potential for study in clinical trials, as a full characterization of the molecule is necessary for its assessment as a medical treatment.

Effects of Oryzalin and Latrunculin-B on Arabidopsis Calcium Wave Production and the Improvement of Treatment Uptake via Adjuvants

Mr Jackson Samuel Mechem

The purpose of this experiment was to find if there was a relationship between the smooth endoplasmic reticulum and the cytoskeleton. The cytoskeleton supports and somewhat determines the structure of the smooth endoplasmic reticulum, so it may affect its function as well. One function the smooth ER has is creating a calcium wave after a chloroplast is photostimulated. This function was used for this testing because the data can be quantified and easily compared between different treatments. Oryzalin (depolymerizes microtubules) and latrunculin-b (depolymerizes actin) were used to see how the calcium wave was affected. No significant differences were found. This was unexpected, but it was suspected that the treatments weren't being sufficiently absorbed by the plant, so a new way to get more consistent absorption was needed to be found. Adigor (an adjuvant: an oily solution commonly used in agriculture to improve the efficacy of herbicides) was used first, but it was difficult to work with and had inconsistent results. Then Tween-20 (another adjuvant with a different chemical structure; same purpose) was used, which worked much more effectively and was much more consistent. Over the rest of the semester, the tests involving oryzalin and latrunculin-b will be redone to see if this more effective method of solution uptake will produce different results.

The Effect of Mutations at R266 in Lysinibacillus sphaericus NSAR/OSBS

Ms Rebecca Skouby

Catalytic promiscuity is the ability of an enzyme to catalyze non-biological reactions in the same active site as its native biological reactions. Catalytic promiscuity plays a central role in the evolution of new enzyme functions. Studying the evolution of catalytically promiscuous enzymes can reveal mechanisms by which new functions evolve. This study focuses on various catalytically promiscuous enzymes from the N-succinylamino acid racemase/o-succinylbenzoate synthase (NSAR/OSBS) subfamily. The NSAR/OSBS subfamily is the branch of the OSBS family in which NSAR activity evolved, and to understand how this occurred we looked for amino acid substitutions that were present in the NSAR/OSBS subfamily but absent in the branches of the OSBS family that lack NSAR activity. Previously, we identified a conserved arginine in all the NSAR/OSBS enzymes. At the homologous position in non-promiscuous OSBS subfamilies there is usually a hydrophobic residue. Further studies showed that R266 was important in the evolution of NSAR activity in the promiscuous Amycolatopsis sp. T-1-60 NSAR/OSBS (AmyNSAR/OSBS). The R266Q mutation in AmyNSAR/OSBS profoundly reduces NSAR activity with only a moderate effect on OSBS activity. However, in Lysinibacillus varians NSAR/OSBS, another member of the NSAR/OSBS subfamily, which shares 48% sequence identity to AmyNSAR/OSBS, the R266Q mutation had much less significant effects on NSAR and OSBS activities. Therefore, R266 was mutated to all other amino acids to observe the effect of those mutations on NSAR and OSBS activities. Mutations that decrease NSAR activity with a minimal effect on OSBS activity will be selected for further mechanistic studies.

Circadian Clock Control of tRNA Synthetases

Ms Emily Chapa

About half of proteins synthesized in eukaryotic cells under control of the endogenous circadian clock arise from mRNAs that are not rhythmic, supporting a role for clock control of posttranscriptional mechanisms. Our lab discovered that the circadian clock in Neurospora crassa controls rhythmic mRNA translation through the regulation of the eIF2a kinase CPC-3, which phosphorylates and inactivates eIF2a. We showed that clock control of CPC-3 activity requires the rhythmic accumulation of the valyl-tRNA synthetase (ValRS). I hypothesized that clock control of RS's drives rhythmic mRNA translation, as well as rhythmic growth and development in N. crassa. Because one long-term goal is to understand how the human clock regulates rhythmic gene expression, I selected three RS's, AspRS, GluRS, and PheRS, which are clock-controlled in both fungi and mammals at the level of mRNA abundance, for further study. To test if the levels of the RS proteins cycle in N. crassa, I am constructing luciferase translational fusions to the RS's and examining rhythmic luciferase activity in WT and arrhythmic clock mutant cells. If confirmed to be clock-controlled, the rhythmic expression of each RS will be abolished to determine how loss of rhythmicity alters rhythmic translation, growth, and development. These findings will provide key insights into the mechanism of protein production by the circadian clock. Because RS's have roles outside of mRNA translation, these data may also provide a rationale to connect clock control of protein synthesis to other clock regulated cellular processes, including nutrient metabolism, immune responses, and cell division.

Meta-Analysis of the Effectiveness of Screening History and Physical vs ECG in Detecting Conditions Associated with Sudden Cardiac Death in Young Athletes Over the Past 5 Years

Mr Nicolas King Goff

Sudden cardiac death (SCD) in young athletes is a devastating event that may be preventable with effective screening. Currently, there is no universal method for the pre-participation screening of athletes. Current American Heart Association guidelines recommend screening with a history and physical exam (H&P) alone, while European guidelines recommend a 12-lead ECG as well as H&P. Recent studies suggest that the ECG may be a more effective screening tool. We performed a meta-analysis to compare the effectiveness of H&P to that of a physician-read ECG in detecting conditions associated with SCD. We conducted a search of MEDLINE, PubMed, and EMBASE for studies published from 2015 to 2020 with patients between 10 and 35 years of age. For each study, the associations of new diagnoses of cardiac disease with ECG and H&P were quantified as odds ratios. Meta-analysis of log odds ratios was conducted using a random-effects model. Nine studies were included overall, with a combined sample size of 28,011 patients screened and 127 new diagnoses. For the association of new diagnoses with ECG, a statistically significant ($p<0.001$) odds ratio of 60 (95% confidence limits: 28 to 130) was obtained. The odds ratio for the association of new diagnoses with H&P was 3.4 (95% confidence limits: 0.92-12; $p=0.066$). The odds of detecting cardiac disease with ECG are much greater than the odds of detecting it with H&P when screening for conditions associated with SCD in young athletes.

Novel EEG Analysis Toolbox for Drug Discovery

Ms Allison Stephens, Grant Barkelew

A traumatic brain injury (TBI) is the common result of an accident involving an impact to the head and can lead to a variety of cognitive deficits and behavioral abnormalities, including post-traumatic epilepsy (PTE). Many people who experience TBIs suffer from sleep disturbances, which develop in parallel with PTE can exacerbate symptoms of anxiety, fatigue, and depression. In this study, we developed a MATLAB-based electroencephalogram (EEG) signal analysis toolbox that provides evidence toward the effects of pharmaceutical compounds on sleep in mice with PTE through intracranial EEG recordings. By applying various signal processing techniques (band power, shannon entropy, and hilbert transformations) of each EEG frequency band (delta, theta, alpha, beta, gamma), a supervised machine learning model was used for sleeping and waking EEG signal detection of TBI and control animal groups. We also implemented the concept of a cepstrum and cepstral filter banks that allow us to see exactly which EEG frequency bands are being stimulated by computing their energies during these PTE events. Through this method of analysis, we're able to see different physiological trends during periods of wakefulness/sleep and how high-frequency activity changes during these states. The results gathered can be used by researchers and physicians for drug discovery that prevents or reduces seizure incidence in patients diagnosed with PTE.

Development of an Algebraic Formula to Compare Mechanical Properties Responsible for Differences in Acute and Chronic Ejection Fraction

Ms Francesca Scalise, Rebecca Borchers, Xiaocheng Wang

Left ventricular ejection fraction (EF), the fraction of blood expelled during contraction, is used clinically to evaluate cardiac function. Interpreting the value of EF is difficult because it can depend on properties of the right ventricle and pulmonary vasculature. Because it is not possible to experimentally alter mechanical properties of the cardiovascular system independently, investigators have used mathematical modeling to derive a standard formula, $EF=1/(1+Ea/Ees)$, where Ea is the effective arterial elastance and Ees is the end-systolic elastance. However, this standard formula does not incorporate regulation of mean arterial pressure, a fundamental homeostatic mechanism. Therefore, the purpose of the present work is to develop alternative algebraic equations that incorporate acute and chronic pressure regulation. First, we assumed the minimal closed-loop model consisting of two ventricles, systemic and pulmonary resistances, and arterial and venous compartments. To characterize pressure regulation, systemic arterial pressure was treated as a constant parameter. Formulas for EF in acute and chronic conditions were then derived assuming that either systemic resistance or blood volume were variables, respectively. The derivation of the standard formula neglects the pulmonary vasculature and right ventricle, yet it still adequately approximates our model for EF assuming chronic pressure regulation. However, the standard formula deviates significantly from our model assuming acute pressure regulation. Considering that EF is impacted by different factors when measured during either acute perturbation or at rest, our new formulas for EF provide novel insights for clinical investigators to better interpret measured changes in EF.

Deriving Algebraic Solutions to Characterize the Stages of Physiological Responses to Hypovolemia

Mr Nathan L. Cranston, Annette A. Demartinos-Barker, Alec J. Monhollen, Julissa Vigil

The physiological response to hypovolemia is conventionally characterized in terms of clinical symptoms rather than fundamental homeostatic mechanisms. It is well understood how complex changes in the mechanical properties of the ventricles and the vasculature are coordinated to regulate arterial pressure and cardiac output. However, these mechanical properties in animal models are difficult to measure and control. Although complex mathematical models of the cardiovascular system have been developed to predict how changes in mechanical properties affect hemodynamic variables, solutions require assumption of a specific set of parameter values to characterize each subject. Unlike complex mathematical models, however, equations characterizing simple closed-loop cardiovascular models can be solved algebraically, providing general algebraic formulas applicable to any mammal in both health and disease. Therefore, the purpose of the present work is to utilize the minimal closed-loop model to develop algebraic formulas to characterize the response to progressive hypovolemia in terms of the mechanical properties of the cardiovascular system. First, the standard minimal closed-loop model was assumed, consisting of four vascular compartments, two ventricles, and two peripheral resistances. Second, to solve the set of eight model equations algebraically, the ventricular end-diastolic pressure-volume relationships were linearized. Third, three physiological stages were assumed: regulation of both arterial pressure and cardiac output, regulation of mean arterial pressure only, and loss of regulation. By assuming these regulated variables are constant parameters, three sets of algebraic solutions were derived, providing a novel tool for clinical investigators to interpret clinical symptoms and develop interventions to maintain cardiovascular homeostasis with hypovolemia.

Preload Recruitable Stroke Work May Not Be a Valid Index of Cardiac Contractility

Mr Sihyeong (Justin) Park, Yvette T. Chang, Jennifer L. Duran, Carson B. Shults, Katelyn Sullivan

Preload recruitable stroke work (PRSW), the relationship between ventricular stroke work and end diastolic volume, has been proposed as a load-independent index of cardiac contractility. Indeed, it has been shown that PRSW increases when contractility is stimulated by inotropes but remains relatively constant with changes in systemic resistance. However, it has not been possible to experimentally verify that PRSW is only impacted by contractility because the mechanical properties affecting blood pressure and flow are difficult to measure and control. Therefore, the purpose of the present work is to develop an algebraic formula for PRSW in terms of parameters characterizing the critical mechanical properties of the left ventricle and the systemic vasculature. First, the end-systolic pressure-volume relationship was assumed to be linear. Second, the end-systolic pressure was approximated by mean arterial pressure. Finally, the end-diastolic pressure-volume relationship was assumed to be nonlinear. The case when mean arterial pressure is regulated by the baroreflex was addressed by treating pressure as a constant and systemic resistance as a variable. The case when mean arterial pressure is not regulated was addressed by treating mean arterial pressure as a variable and systemic resistance as a constant. In the first case, PRSW was found to be predominantly determined by mean arterial pressure. In the second case, PRSW was found to be affected by preload, systemic resistance, and heart rate, in addition to contractility. The present work thus challenges the concept that PRSW is a valid load-independent index of cardiac contractility.

The Effect of Common Cleaning Products on Presumptive Blood Testing Kits

Ms Heather Kavaloski

Blood is one of the most important, if not the most important, forms of evidence at a violent crime scene. As forensic science has grown in mainstream popularity, criminals have realized the importance of attempting to clean up valuable evidence. Cleaning products can result in false-positive, false-negative or inconclusive results on different types of presumptive blood tests. In this study, Phenolphthalein (PT), Leucocrystal Violet (LC) and Tetramethylbenzidine (TB) presumptive testing kits, and Hydrogen Peroxide (H2O2) were used on tiles cleaned with common cleaning products: Method¬Æ glass cleaner; Dawn Essentials ¬Æ dish soap; Wet Ones ¬Æ disinfecting wipes; Citrasolve ¬Æ cleaner and degreaser; HDX ¬Æ citrus degreaser; and Mean Green ¬Æ degreaser and cleaner. The simple Hydrogen Peroxide (H2O2) test did not yield any results. The three presumptive test kits yielded mostly accurate results and were able to detect blood through most of the cleaning products. PT was not affected by any of the cleaning products while LC and TB were unable to detect blood on tiles cleaned with degreasing products.

Developmental restriction alters the composition of neural progenitor grafts after spinal cord injury

Ms Aleena Lukose

Neural progenitor cell (NPC) transplantation has shown high therapeutic potential following spinal cord injury (SCI). However, there is limited understanding of how distinct subtypes of graft neurons can support the reestablishment of specific spinal circuitry. We have previously reported that NPCs from restricted regions of the embryonic rodent spinal cord differ in their dorsal/ventral neuronal identities upon maturation. We now show that the developmental stage of donor NPCs also significantly influences the neuronal subtypes populating mature grafts. In this study, donor NPCs were isolated from mouse embryonic spinal cords at E11.5, E12.5, and E13.5 and transplanted into sites of SCI (C4 dorsal column lesion). Four weeks post-transplantation, tissue was collected, sectioned, and analyzed using various neuronal cell type markers. We found that earlier-stage grafts were enriched for ventral/motor-like neurons. Conversely, later-stage grafts were enriched for dorsal/sensory-like neurons. Interestingly, this temporal effect on graft phenotype closely mirrors neurogenic 'peaks' differentially exhibited by distinct neural progenitor subtypes during normal spinal cord development. Overall, our findings suggest that developmental restriction could be a useful approach to engineering optimized grafts for the restoration of specific functions (i.e. motor vs sensory) following injury to the spinal cord.

The Effect of Substance P on Hemorrhage and Secondary Injury after SCI

Ms Billie Nguyen

Spinal cord injury (SCI) is a life-altering event that can have lasting effects on one's life. While the initial injury has devastating consequences for the individual, SCI is often accompanied by further injuries that not only engage nociceptive fibers, but also can lead to the development of chronic pain and locomotor deficits, among other detrimental effects. Previous work has shown that pain input after SCI has an adverse effect recovery due to increased hemorrhage and secondary injury. Substance P (SP) is a neuropeptide that acts as a messenger of injury and pain, and its effects on secondary injury and recovery after SCI are largely unknown. The present study sought to determine the effects of SP after SCI and whether the administration of SP is linked to the induction of hemorrhage. Previous studies hint at a mixed effect of SP, as there is considerable evidence for both an anti-nociceptive effect and an adverse effect. Male Sprague-Dawley rats were given a moderate spinal cord injury at the lower thoracic spinal cord and allowed to recover for twenty-four hours. Substance P, or its vehicle, was then applied to the spinal cord through an intrathecal catheter. Locomotor recovery and blood pressure were assessed at hourly intervals for 3 hours. Animals were then euthanized with pentobarbital and the injured region of the spinal cord tissue was collected. Hemorrhage was assessed by measuring light absorbance at the wavelength associated with hemoglobin (420 nm), the Drabkin's assay, and Western blotting.

Poster #133_ Medicine (1) – Undergraduate

Effect of Neuron Loss After Cervical SCI On The Development Of Neuropathic Pain

Ms Katelyn Knox

With individuals who undergo spinal cord injury (SCI), there is a large percentage that develops chronic neuropathic pain. However, despite the number of individuals affected, the underlying anatomical basis for the development of SCI-associate neuropathic pain is insufficiently understood. Observing previous work, the development of sensory dysfunctions in rodent SCI models is not able to be sufficiently be identified through analysis of spinal cord lesion size and white matter sparing. Therefore, more detailed analyses are necessary to understand the development of pain from SCI on an anatomical basis.

The goal of this study is to better facilitate our understanding of how the loss of dorsal spinal cord neuron subpopulations may influence the loss of sensory information. We hypothesize that the lesion size, and the loss or sparing of dorsal horn neurons will correlate to the development of sensory dysfunction in a subset of animals after SCI. To test this hypothesis, we have adopted a mouse model of cervical (C5/6) hemicontusion SCI using an Infinite Horizon spinal impactor device; this model has been shown to result in the development of sensory hypersensitivity of the ipsilateral forepaw in approximately 40% of subjects. At this point in our analysis, we have found that animals which develop sensitivity have on average more remaining neurons than non-sensitivity animals. Additionally, we have found that there is no significant difference between the development of sensitivity and the displacement value of spinal cord during surgery. We are currently quantifying CGRP sprouting in the dorsal horn and total lesion size to continue refining the anatomical basis for the development of pain-associated behaviors.

Using a General Mathematical Model to Quantify the Fontan Paradox of Elevated Central Venous Pressure and Diminished Cardiac Output

Ms Eunhye Jeon, Rebecca S. Philip, Cayla M. Jenkins, Gracelyn I. King, Spencer A. Keith

Numerous complications associated with Fontan procedure are related to elevated central venous pressure (CVP) and diminished cardiac output (CO). This "Fontan Paradox" is a fundamental challenge because interventions benefit one variable at the cost of another. However, the mechanical properties affecting CVP and CO are difficult to control in animal models. Although complex mathematical models have provided missing insights, the need to solve model equations numerically requires all parameter values to be known, reducing generality of results. In contrast, equations of simpler models can be solved algebraically, which provides universal insights. Therefore, the purpose of the present work is to derive algebraic formulas for CVP and CO to address the Fontan Paradox. First, we modified a minimal closed-loop model to include a single ventricle, arterial and venous vascular compartments, and systemic and pulmonary resistances. The ventricular end-diastolic pressure-volume relationship was linearized, and mean arterial pressure was assumed to be regulated by renal control of blood volume. Equations were solved algebraically for CVP, CO, and venous pressures. Consistent with current understanding, the only properties that are easily manipulated clinically, blood volume and systemic resistance, require a choice to be made of whether to rectify either CVP or CO. However, treating high CVP has a lesser impact on CO in patients with diastolic dysfunction or high pulmonary resistance. The present work thus provides a novel tool for clinical investigators to explore the mechanical basis of the Fontan Paradox and insights into varying impacts of treatments on different patient populations.

Using mathematical modeling to identify the primary mechanical factors affecting regression of the ductus arteriosus

Ms Lauren Alysse Sorrells, Ms Lauren Alysse Sorrells, Grace A Hess, Dillon W Byerley, Eric M LeBlanc, Katie L Costa

The ductus arteriosus (DA), connecting the pulmonary artery and the aorta, spontaneously regresses shortly after birth in most infants. Although there is a general consensus that DA diameter is the best predictor of regression, observational studies have identified a number of other factors. The need for surgical intervention to treat a patent DA is difficult to assess because the primary mechanical stimulus leading to regression has not been identified. It is established that blood vessels regress when exposed to low endothelial shear stress and therefore we hypothesized that low shear stress also causes DA regression. Although investigators have used mathematical models to predict how the DA impacts blood flow through the cardiovascular system, such models have not been used to predict how the mechanical properties of the cardiovascular system impact DA endothelial shear stress. Therefore, the purpose of the present work is to use a mathematical model to identify the conditions that lead to decreased shear stress and thus DA regression. First, we added the DA to the standard minimal closed-loop cardiovascular model consisting of four vascular compartments, two ventricles, and two peripheral resistances. Second, we assumed that the DA radius acts similar to vessels and adapts to endothelial shear stress. Third, we assumed that that systemic arterial pressure is regulated. The model predicts a critical radius above which the DA is predicted to remain patent. This simple model identifies the cardiovascular properties that impact the critical radius requiring surgical intervention.

Temporoparietal Fascia Grafts in Rhinoplasty

Ms Emily Newstrom, Megha Chandna

Temporoparietal fascia (TPF) is a versatile tissue that can be utilized in many functional and cosmetic facial reconstructive procedures. Its rich vascularity, pliability, and regenerative properties make it a strong candidate for facial contouring as a free graft, particularly in areas of thin skin or visibly altered osseocartilaginous framework. Compared to allografts, TPF has been shown to better limit both host inflammatory response and graft resorption while having a well-hidden donor-site scar. Despite these advantages, information regarding the use of TPF grafts in rhinoplasty and corresponding outcome data is limited. The current case series describes a single surgeon's experience with the use of TPF grafts in the context of rhinoplasty for a wide variety of indications, including dorsal augmentation, radix augmentation, support of thin skin, camouflage of underlying cartilage, nasal contouring, and repair of saddle nose deformity. Review of these indications, surgical technique for adequate placement, and patient outcomes are discussed.

Clostridium perfringens causing spontaneous pelvic inflammatory disease, peritonitis, and toxic shock syndrome in a previously healthy young female

Ms Brianna Danielle Covin

Background: Toxic shock syndrome due to a Clostridium perfringens (C. perfringens) gynecological infection is rare and has a high mortality rate. This can occur in pregnant, and less commonly, non-pregnant women of reproductive age.

Case Presentation: A 22-year-old female presented to the emergency room with right lower abdominal pain. A computerized tomography scan found potential appendicitis and perforation. She had no relevant past medical or surgical history, and she last had vaginal sex 4 years prior to admission. During surgery, turbid fluid, secondary inflammatory changes, and dilated, fluid-filled fallopian tubes pointed to a diagnosis of pelvic inflammatory disease, so she was started on azithromycin, metronidazole, and piperacillin/tazobactam. The following day, she continued to have abdominal pain and developed tachycardia, hypotension, a marked leukemoid response, hemoconcentration, third-space fluid accumulation, and acidosis. As a result, she was further diagnosed with Clostridium perfringens pelvic inflammatory disease with peritonitis and toxic shock syndrome; cultures later confirmed the diagnosis. Her antibiotics were changed to meropenem and clindamycin, and she slowly made a full recovery.

Conclusion: Clostridium perfringens can cause pelvic inflammatory disease, peritonitis, and toxic shock syndrome. Toxic shock syndrome from C. perfringens is rapidly progressive and highly fatal; it should be promptly treated with antibiotics and supportive care.

MicroRNA363-3p treatment after ischemic stroke protects the cortex in reproductively senescent female rats

Mr Rithvik Gunda

Aims/Objectives: Prior studies have shown that treatment with mir363-3p, a small non-coding RNA, in rats subjected to ischemic stroke reduced infarct volume in the acute phase and prevented cognitive impairment in the chronic phase. A primary objective of this study is to determine if cognitive impairment on the Barnes maze task, which is a spatial memory task, is associated with volumetric changes in the hippocampus and cortex.

Study Design/Methods: Female rats, aged 10-12 months, were subjected to an ischemic stroke on the left hemisphere through an injection of a vasoconstrictor endothelin-1, in the territory of Middle Cerebral Artery (MCAo). Four hours after ET1 injection, rats were injected (iv) with mir363-3p or a scrambled oligo at 7mg/ BWT. A separate group of sham (non-stroke) rats was also prepared. Rats were tested on cognitive tasks 3-6 months after stroke and terminated thereafter. Rats were perfused transcardially with saline followed by 4% paraformaldehyde. Brains were removed and processed for histological analysis of the Weil myelin stain. Stained sections were imaged with the Leica microscope 6DM (microscopy core, Integrated Life Science Building (ILSB), Texas A&M University). The dorsal hippocampus at coordinates -02.4 mm antero-posterior (AP) to -04.2 mm AP), spanning 5-6 sections per brain, was quantified (Paxinos and Watsons rat atlas, 5th edition). Quantification of the cortical volume was also performed at the same level as that of the hippocampus. Volume quantification was performed with FIJI (For Image J2) software and the ratio of the cortical and hippocampal volume was derived.

Results: No significant group differences were observed in hippocampal and cortical volume. Further analysis showed a significant reduction in the ratio of the cortex/ hippocampal volume in the ischemic hemisphere in the scrambled-treated stroke group, as compared to the sham group. Remarkably, the ratio of the cortex/ hippocampus in the ischemic hemisphere of the mir363-3p treated stroke group was no different from the sham group. In contrast no group differences were seen in the ratio of cortex/ hippocampus in the non-ischemic hemisphere, indicating this was a consequence of ischemia.

Conclusion: Our published data shows that mir363-3p is neuroprotective in the acute phase after stroke and the current data suggests that mir363-3p may also prevent secondary neurodegeneration in the forebrain and is consistent with our findings that mir363-3p treatment preserves the volume of the white matter tracts.

Effects of Arginine and Interferon Tau on Obesity and Non-alcoholic Fatty Liver Disease

Ms Ashton Corporon, Cristina Caldera Garza

Obesity, diabetes, and non-alcoholic fatty liver disease are afflictions that are increasing as leading causes of death in the United States. This project aimed to determine whether arginine (Arg), interferon tau (IFNT), or the combination of Arg and IFNT was effective as an oral therapeutic treatment for obesity and non-alcoholic fatty liver disease using Zucker Diabetic Fatty (ZDF) rats. Rats were assigned randomly to 1of 4 treatment groups: Control (2.55% Alanine); Arg only (1.51% Arg); IFNT only (8¬μg IFNT/kg body weight/day); or Arg and IFNT combination (1.51% Arg and 8¬μg INFT/kg body weight/day). Given in the drinking water with daily consumption of water recorded. After 9 weeks, the rats were euthanized and organs were collected for analyses. Livers were examined histologically and RNA isolated for qPCR analysis of selected candidate genes. Treatment with Arg alone, IFNT alone, and Arg plus IFNT decreased ($P<0.05$) total body weight when compared to control rats, with the greatest decrease in rats receiving both ARG and IFNT. Additionally, expression of fatty acid transport protein 2 (FATP2), FATP5, and peroxisome proliferator-activated receptor alpha (PPARA) mRNAs was greater ($P<0.05$) for livers of rats treated with Arg alone, IFNT alone, and Arg plus IFNT in combination when compared to the control rats. These striking results suggest that treatment with Arg and/or IFNT may be useful as therapeutics for the treatment of obesity and non-alcoholic fatty liver disease. This study was funded by a T3 grant from Texas A&M University.

The influence of genetic background on neurological responses to viral infection

Ms Madilyn Lorraine Feik, Douglas Le

Host genetic background contributes to variable neurological disease outcomes following viral infection. Theiler's murine encephalomyelitis virus (TMEV) infection elicits a wide range of neurological conditions in mice with diverse genetic backgrounds, suggesting that the genetic background of the individual influences the neurological disease characteristics observed. TMEV induces neurological symptoms in mice similar to human neurological disease outcomes of Parkinson's disease, multiple sclerosis (MS), and epilepsy. We are investigating the impact of genetic background on viral infection by developing comprehensive histological and phenotypic profiles for mice with different genetic backgrounds. The Collaborative Cross (CC) model is the result of the organized crossbreeding of eight founder mouse strains to maximize genetic recombination. CC mice are used to model the neurological effects resulting from genetic diversity similar to what is found in humans. CC mice are infected with TMEV and phenotypic outcomes are recorded throughout the infection. Tissue samples from the brain, spinal cord, heart, and spleen are collected after the infection period for histological analysis and RNA sequencing. We have found that CC mouse strain genetic diversity results in variable central nervous system (CNS) lesions, phenotypic outcomes, and cytokine levels following TMEV infection. Common phenotypic outcomes associated with infection include reflex deficiencies, seizures, and hindlimb paralysis. In addition to differences in cytokine levels, histological samples indicate variable CNS lesion locations and frequencies in distinct CC mouse strains. By continuing to refine phenotypic and histological profiling of CC mice, we aim to better characterize TMEV disease mechanisms and improve human neurological disease models.

Exercise and androgens interact to control fatty acid uptake via androgen and estrogen receptors in white adipose tissue of female pigs

Ms Laura Chau

Polycystic ovary syndrome (PCOS), the most common reproductive endocrine disorder in reproductive-age women, is characterized by increased visceral (v) white adipose tissue (WAT) and hyperandrogenemia predominantly due to testosterone. While testosterone is converted into androgen and estrogen metabolites in WAT, dihydrotestosterone (DHT), a potent androgen, is minimally converted into metabolites in this tissue. Therefore, DHT may provide better insight into the direct effects of androgens on WAT fatty acid uptake (FAU). We hypothesized that DHT would have no effect on insulin-stimulated FAU in sedentary pigs but would suppress insulin-stimulated FAU via AR in exercised pigs. Female Yucatan pigs (n=7-8/group) were exercised or sedentary for 14 weeks, after which they were euthanized, blood was collected and subcutaneous (sc) WAT and vWAT were collected for FAU experiments. WAT explants were incubated in 0nM or 10 nM insulin ¬± 1 nM DHT and steroid receptor antagonists in X Vivo media containing a fluorescently-labeled fatty acid. Explants were then fixed and FAU per explant was assessed via fluorescent microscopy. In sedentary females, DHT increased basal FAU in subcutaneous WAT (scWAT), but increased insulin-stimulated FAU in vWAT via AR and ERalpha. In exercised females, DHT coupled with antagonists of AR and ERalpha increased FAU in vWAT. This intriguing finding suggests that in exercised females DHT may stimulate FAU via ERbeta. In conclusion, DHT stimulates FAU in scWAT and vWAT of females via both AR and ERalpha. Our data suggests that exercise modulates this effect and that DHT may also control WAT FAU via ERbeta.

Transcriptomic analysis to determine the impact of HEamiRNAs and prenatal alcohol exposure on the placenta and fetal growth restriction

Ms Karen Chung

Prenatal Alcohol Exposure (PAE) can disrupt the formation of the placenta, leading to future complications in pregnancy and in fetal development, such as fetal growth restriction, (FGR). Previous work in the lab identified 11 miRNAs (HEamiRNAs) as being elevated in pregnancies with heavy ethanol exposure and the child being born with characteristics of Fetal Alcohol Spectrum Disorders. While these HEamiRNAs have been linked to negative pregnancy outcomes, their direct effect on placenta development remains unclear. To determine the direct effect of these HEamiRNAs on the placenta, pregnant mouse dams were injected through tail vein with pooled HEamiRNAs or control scrambled miRNAs. As a comparison, a second study focused on the direct effects of PAE on the placenta. In this study, pregnant mice were exposed to ethanol or normal air in a vapor chamber. Bulk RNAseq was performed to assess the effects of HEamiRNAs and PAE on the transcriptome of placentas from exposed and control litters. Looking at genes associated with different cell cycle phases, we saw no change in either exposure group relative to controls. We also observed no change in cell populations of the placenta as determined by transcript expression patterns. Continuing research will focus on identifying which differentially expressed genes may be targeted by the HEamiRNAs. Identifying mechanism by which HEamiRNAs and ethanol mediate the effects of FGR, will facilitate identifying potential targets therapeutic interventions in pregnancies with PAE.

Barriers and Facilitators of Disaster Preparedness for Healthcare Workers: A Systematic Review of the Literature

Ms Yeka Wusa Nmadu, Wisdom Osisioma

Background:

Disasters present a major challenge to healthcare workers as they happen quickly and without prior warning requiring dynamic approaches. This systematic review focuses on the willingness of healthcare workers to respond to disasters by examining the barriers and facilitators of disaster preparedness which can provide the necessary knowledge for disaster preparedness planning and implementation.

Methods:

Databases searched included Medline, Embase, CINAHL, Academic Search, and PsychInfo. The following concepts were searched: (emergency responders or physicians or nurses) and (disaster planning or disaster preparedness). Studies were included if they focused on: 1) disaster preparedness for licensed or certified healthcare workers, 2) had at least one barrier, facilitator or both. The barriers and/or facilitators were stratified based on the socioecological framework. Two investigators independently screened the abstracts and full text with disagreements addressed until consensus was reached.

Results:

Initial screening comprised of 913 articles with 104 duplicates removed yielding 809 articles subjected to abstract review. After review, 94 articles were retained for further review and 42 were selected for inclusion. Most studies investigated barriers and facilitators in nurses with the personal level of the socioecological framework being the most prominent factors identified. Factors like concern for safety of self, children and family members were prominent as barriers and adequate disaster training and skill being a significant facilitator.

Conclusions:

The response of healthcare workers to a disaster situation can be significantly influenced by varying barriers and/or facilitators, making them important considerations to bear in mind in the planning and implementation of disaster response.

Poster #143_ Public Health (2) – Graduate

Preparing for a Man-Made or Naturally-Occurring Infectious Disease Outbreak on the Korean Peninsula: An Analysis of US Biosecurity Interests Abroad

Ms Danyale C. Kellogg

This project assesses current joint preparations between the United States and the Republic of Korea for an infectious disease outbreak on the Korean Peninsula. Given ongoing tensions with the DPRK, this locations presents a unique challenge to regional and global stability. This is especially true given the North's biological weapons stockpiles and the degree of plausible deniability these weapons afford users, meaning that it is important to plan for their use on the Peninsula. Furthermore, as the COVID-19 pandemic demonstrates, naturally-occurring outbreaks also present challenges to stability in this region. This paper examines impacts of larger geopolitical happenings on this planning (including the cessation of joint military exercises between the US and South Korea to appease the North), explores a couple of hypothetical scenarios, and offers recommendations for improving existing planning.

The Texas Teleforensic Remote Assistance Center (Tex-TRAC): A Trauma-Informed Model

Ms Diane Arriaga, Alison Geason

Sexual Assault Nurse Examiners is a forensic nurse specialty trained in the expert care of victims of sexual assualt and trauma experienced by the victim. Many Texas, rural and underserved communities, have limited access to SANEs or are experiencing low numbers of certified SANEs relative to the need at hand. The Texas Teleforensic Remote Assistance Center (Tex-TRAC) was established with federal grant funding from the Office for Victims of Crime (OVC) to plan, develop and pilot test a statewide sexual assault nurse examiner (SANE) telehealth program to serve rural and underserved communities in Texas. Tex-TRAC will increase access to high-quality, patient- centered, trauma-informed sexual assault medical forensic exams for patients in rural and underserved areas.

Spatial description of COVID-19 in a Brazos Valley, a 7-county region of Central Texas

Ms Alyssa McNulty, Tykeara Mims

As of January 31, 2021, a total of 26,962 COVID-19 cases have been reported across the seven Brazos Valley (BV) counties, with 420 deaths attributed to COVID-19. The COVID-19 pandemic has been reported as having an inequitable impact on minority populations across the United States. Here, we take a myopic look at COVID-19 in BV across demographic and economic indicators strata. Data from the 2019 U.S. Census and COVID-19 case report data through January 31, 2021, from the John Hopkins Github Repository. Using STATA 16.1, we used Pearson Correlation to assess the relationship between measures of disease (attack rate, mortality rate, and case fatality rate (CFR)) and sociodemographic indicators (race, ethnicity, urban vs rural, income, and education level). Higher attack rates were positively correlated with education (percent of population with at least highschool-level education) and with race (percent of residents identifying as White Non-Hispanic and Native Hawaiian/Pacific Islander). Case fatality rates correlated with older age, higher education level, greater percentage of uninsured residents, higher income, and race. We aim to assess whether older populations and minority racial groups are disproportionately affected by COVID-19 in BV, in terms of more frequent disease and more fatal outcomes. These findings would align with existing literature on racial inequities in COVID-19 morbidity and mortality and highlight education and income as other important risk factors Additional analysis are ongoing and include further linear regression and spatial analysis using ArcMap 10.7.1.

Behavioral Health Integration

Ms Alexa Gutierrez

Background: Substance use disorder (SUD) is a behavioral health disorder with negative impacts on both mental and physical health. Inadequate mental health education and treatment is correlated with increased substance use. Behavioral health integration (BHI) into primary care that incorporates SUD services can increase access to care. Texas is ranked 49th in the United States for mental health providers per individual, with rural Golden Crescent counties having some of the lowest provider per population rates in the state. Throughout the region, primary care facilities lack the required resources for physicians and nurses to provide the appropriate care needed for patients with mental health conditions. Our research team received grant funding from the U.S. Health Resources and Services Administration Rural Communities Opioid Response Program (1G26RH400940100 and 1GA1RH396070100) to address opioid use disorder (OUD) and SUD in rural Texas Golden Crescent counties (Calhoun, DeWitt, Gonzales, Goliad, Jackson, Lavaca). A major objective is to develop primary care BHI to increase screening, treatment, and recovery for persons with SUD.

Methods: To identify level of current BHI and/or readiness of primary care providers in the Texas Golden Crescent to adopt or increase current BHI level, our research team will conduct a telephone and/or electronic survey using the Integrated Practice Assessment Tool (IPAT). IPAT is a validated tool to identify which of 6 levels of BHI a primary care facility is currently providing. The 6 levels include: 1) minimal collaboration, 2) basic collaboration at a distance, 3) basic collaboration onsite, 4) close collaboration onsite with some systems integration, 5) close collaboration approaching integrated practice, and 6) full collaboration in a transformed integrated practice). We will provide each participating health care facility a BHI Assessment Summary and offer tools them with increasing and/or maintaining their current level of BHI.

Results: To be reported.

Conclusion: Increasing the resources available within primary healthcare facilities, healthcare providers will have the ability to better identify and treat patients with SUD.

Exposure to Bacterial Aerosols with Antimicrobial Resistance Around Residential Septic Systems

Ms Gabriela Ramos

The aim of this study is to understand the role of aerosolization on the potential spread of antimicrobial resistant bacteria and genes (ARB/ARGs) from wastewater effluents. During the spraying process aerosolized ARB/ARGs can spread far from septic tank system into houses, degrading indoor air quality and posing risks to residents. Bioaerosols from common wastewater treatment plants can be found 10 km downwind of the plant boundaries. However, a septic tank system is required to be only 5 ft away from the house. It is critical to evaluate the aerosolization of ARB/ARGs from septic tank effluents to evaluate their potential contamination of the indoor air quality in nearby residences. The system in this study consists of four tanks connected by a filtration system. Aerosol samples at each tank were collected in the winter and summer with open and closed lids to observe the effect they may have on the emission of bioaerosols. The water inside each septic tank was also sampled to compare the bacteria concentration to the bioaerosol samples. The results of culturing, Kirby-Bauer antimicrobial testing, quantitative real-time polymerase chain reaction and microbiome analysis showed lower concentrations of bacteria in the aerosols compared to the water samples. Aerosolized bacteria showed resistance to less than 50% of the antibiotics tested, lower in comparison to the 87.5% resistance in the water samples. Seasonality has also affected the antimicrobial resistance of the aerosolized bacteria. In the winter season, higher levels of resistance were detected mostly against beta-lactam antibiotics, while the summer season displayed lower levels of resistance. Operational conditions, discharge methods, humidity, temperature, airflow and quorum sensing may all have an affect the composition of the microbiome. After further analysis of septic tank effluents to surrounding outdoor and indoor air, mitigation methods of ARB/ARGs exposure will be applied and tested.

Viable Virus Transport in Ventilation Airflow

Ms Tatiana Anabelle Baig

Currently little is known on how SARS-CoV-2 spreads indoors and its infectability. The objective of this study is to gain more knowledge on the effect of environmental factors on the spread and infectivity of virus aerosols in the built environment. Understanding how the virus transmits indoors would allow for early detection of viral particles in room sized spaces. Bovine coronavirus (BCoV), was used as virus simulant in laboratory experiments conducted in a controlled humidity cabinet at Biosafety Level 2. An air-jet nebulizer was used to disseminate known numbers of BCoV. Particle tracking velocimetry with shadowgraphy techniques was used to monitor the effect of environmental conditions (temperature and relative humidity) on the size distribution and velocity of the virus particles. After aerosolization, the surface in the cabinet was sampled at regular time intervals to assess the number of particles impacted. The samples were quantified using quantitative polymerase chain reaction (qPCR). The virus aerosols that remained suspended in the air were collected using the portable viable bioaerosol collector (VBAC) with a reference air sampler and quantitated by qPCR. To monitor the effect of the ventilation on the virus movement, BCoV aerosols were also disseminated in a ¬æ scale ventilated hospital model chamber equipped with several VBAC units operated at 100 L/min. After plating and counting the plaques, the highest concentration of viral particles was measured during the experiments was 1333 PFU/L at the sampler closet to the entrance of the chamber. Other high concentration locations were near the foot of the patient's bed. From these results it was determined that with the current airflow set up, the virus particles concentrate at the entrance of the chamber and over the lower part of the patient. Based on air property measurements, aerosol collections and the mechanical blueprint of the model chamber, a computational flow model was created to visualize the entrainment and movement of the virus in the ventilation airflow. The models showed that at 15 ACH there were more particles present in the air in the chamber than at 6 ACH. Hospitals are currently using an air exchange rate of 15 ACH due to COVID-19, but reverting the air exchange rate back to 6 ACH would mitigate the number of particles in the hospital room.

Epidemiological Trends in Hospitalizations for Methicillin-Resistant Staphylococcus aureus (MRSA) and other Beta-lactamase Resistant Microbial Infections in Texas from 2006-2018.

Mr Wisdom Osisioma

Background: Methicillin-Resistant Staphylococcus aureus (MRSA) is a cause of Staphylococcus Infection that is difficult to treat due to resistance to antibiotics, MRSA has been linked to serious infections leading to sepsis and death (Parrilo JE et al. 1990). According to the CDC's Antibiotic Resistance Threat Report (AR 2019), MRSA was listed as a Serious Threat to human health, accounting for 323,700 estimated hospitalization cases, and was attributed to $1.7billion estimated healthcare costs in 2017. Despite existing research on MRSA, there is limited information on the epidemiology of MRSA hospitalizations in Texas. This paper presents data on hospital stays for Methicillin Resistant Staphylococcus aureus (MRSA) diagnosis as well as other beta-lactamase resistant microbial infections resistant.

Methods: Data for all MRSA-related hospitalizations were obtained from the Texas In-Patient Public Use Data File. Data included all hospital discharge records for MRSA related diagnosis coded according to the International Classification of Diseases (ICD-9 and 10) for 2006(Q1) to 2018(Q2). Hospital stays were characterized based on; Age, sex, race, ethnicity, geographic location, and risk mortality. Data extraction and analyses was done using R-software, analysis characterized hospital stays for different MRSA diagnosis, namely: Sepsis due to MRSA; MRSA infection of unspecified site; MRSA infection as the cause of diseases classified elsewhere; Pneumonia due to MRSA; Carrier or suspected carrier of MRSA (MRSA colonization); Infection resistant to penicillin.

Results: MRSA prevalence varied across different age group; MRSA-sepsis, MRSA-pneumonia, and Penicillin resistant were mostly prevalent in older adults while infants and newborns were mainly MRSA-carriers. Males had higher hospitalization as well as higher occurrence of MRSA-sepsis. Conversely, differences in total hospitalizations for MRSA among Hispanics and non-Hispanics was insignificant, although Penicillin resistant occurrence was higher for Hispanics. Asian-American and Pacific Islanders had the least cases when compared to other races, while Blacks and Whites had the most prevalence, with similar pattern of occurrence for the various MRSA types.
Conclusion:
MRSA hospitalizations prevalence can be significantly influenced by categorical variables such as age, ethnicity, race, and geographical locations. Findings from this study is therefore imperative in policy making and equitable distribution of resources in the fight against antimicrobial resistance.

Battling the Challenges of Drug Disposal in Rural Texas

Ms Elizabeth M. Kappil

Introduction: The Texas A&M University College of Nursing is lead on three (3) Health Resources and Services Administration (HRSA) Rural Community Opioid Response Program (RCORP) projects directed towards the prevention of opioid use disorder (OUD)'s impact on vulnerable populations by establishing a community consortium in rural communities near the Texas Gulf Coast. A needs assessment collected data and developed an action plan to reduce opioid mortality and morbidity. Significant findings point to numerous challenges in providing and accessing any services for substance use disorder (SUD). A project goal is to address challenges in delivering drug disposal methods in underserved and rural communities.

Objective:The presentation purpose is to highlight and explore the significant challenges of safe drug disposal methods found in the voices of the community while considering best practices from literature.

Approach: In fall 2019, focus group interviews were conducted with over 100 community stakeholders in the Golden Crescent community using a semi-structured interview guide to identify the scope of OUD, available treatment and recovery services, and critical resource and workforce gaps. Interviews were recorded and professionally transcribed. Thematic analysis was conducted. The project was designated non-human subjects research by the Texas A&M Institutional Review Board.

Results:Of interest was the theme around the lack of drug disposal systems within the community. Current literature with community-driven solutions identified to build capacity through existing community strengths and shared knowledge and communication of resources. Traditional drug disposal methods and innovative strategies are in consideration for a community-focused solution.

Poster #152_ Public Health (1) – Undergraduate

Medicolegal Death Investigator Workplace Safety Hazards: A Scoping Review of the Literature

Ms Caitlyn Alexa Thoene

Medicolegal Death Investigators (MLDIs), due to the nature of their job and exposure to danger from death scene investigations, face safety risks and occupational hazards similar to those experienced by other first responders. To better understand occupational safety and health risks among MLDI, a scoping review was conducted.

The used the framework proposed by Arksey and O'Malley1 and the Joanna Briggs Institute2 was used to guide the scoping review. The question addressed was "What are the prevalent occupational safety risks and health-related conditions contributing to MLDI injury, disability, and death?" The research team set a criterion for extraction to include research design and methodology, commonly occurring safety risks, reports dealing with physical and mental effects, and considered strategies for prevention to increase safety.
The pilot results from Medline Complete (Ebsco) retrieved over 6,000 articles. Two independent researchers used Covidence software to identify relevant study citations by screening the title and abstract, excluding studies that dealt exclusively with occupational safety issues exclusive to law enforcement, firefighters or emergency medical technicians. Full review of the 43 articles resulted in seven (7) meeting the inclusion criteria. Of the 7, 5 (71.4%) utilized survey design, 1 (14.3%) was a systematic review, and 1 (14.3%) was a quasi-experimental. Of the seven (7) articles, four (4) (57.7%) addressed the emotional or mental health well-being of medical examiner and coroner office employees which included MLDIs. Three (3) articles addressed occupational safety due to infectious disease, with two (2) (28.6%) specifically addressing the forensic pathologist role, and one (1)(14.3%) infectious disease safety among 'death workers' in general.

The findings of this pilot scoping review support the need to fill a gap in the literature addressing occupational safety of MLDIs. These results serve as an initial step toward a more intensive investigation of workplace safety for MLDIs.

The Use of Holistic Remedies versus Over-the-Counter (OTC) Medicines in Freshmen Students

Mr Benjamin Cao Nguyen, Abby Grant, Macie Kolb, Christabel Anand

College often presents new challenges that can lead to inadequate stress-management and poor exercise, eating, and sleeping habits (2,3,4). Research has shown that there is a relationship between these factors and the development of illnesses (3,4). These ailments can be addressed via over-the-counter (OTC) medications or holistic remedies, which aims to heal the body as a whole (1). However, there is not much data specifying the relationship between freshman undergraduates and their use of holistic medicine. The purpose of this study is to understand the overall approaches and resources first year undergraduate students use for their health and wellness. To address this, we administered a quantitative survey via email to all Texas A&M freshmen students. We used STATA to yield preliminary findings of our responses, (n)48. While our results are impacted by COVID-19 adaptations, the preliminary data collected indicates that the extent of holistic health practiced by all students regardless of residential location tends to be dependent on accessibility. However, on campus students are more heavily impacted by COVID-19 in regards to accessibility to resources regarding holistic health. More data will be taken in the future to increase our statistical power in analyses. Informational tools will be created to increase access to holistic medicine alternatives and to help students establish healthy habits early in their undergraduate careers.

Analyzing Nutritional Disparities in High School Students

Mr Mason Herbert, Antonia Swenson, Abigail Castillo, Hillena Mulat, Monica Aybar

Nutrition disparities are the uneven distribution of nutritional intake or nutrition knowledge among varying populations. The inequity of nutritional disparities are prevalent in minority groups and those of lower socioeconomic status [1-3]. Despite knowledge of nutritional disparities within society, there is minimal understanding on the direct and long term effects that nutritional disparities have within the under 18 population. There is also a lack of resources that show the breadth of these disparities within varying populations[4,5]. This study seeks to further understand how nutrition disparities affect post pubescent children, specifically high schoolers aged 14-18 years old. The research seeks to evaluate disparities in students' nutrition based racial or socioeconomic standing in two neighboring cities that are known to often differ in culture and socioeconomic standing. The goal of the study is to determine the effects that nutrition disparities can have on two groups of people living different lifestyles within the same metropolitan area. We will administer a district-wide student survey to two school districts. The research team will also lead a post-survey educational demonstration. Once the data has been analyzed, the team will determine the predominant needs of the students in regards to nutrition and prepare the educational presentation to encompass nutrition concepts and emphasizing the importance of nutrition. These results can be used to emphasize the need for improved nutrition education programs in schools and as motivation to establish better nutrition infrastructure in lower income communities.

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The Developmental Origins of Health and Disease Theory and Fetal Alcohol Spectrum Disorders: A Closer Look Into the Outcomes of Prenatal Alcohol Exposure

Ms Chiara Scopice

The Developmental Origins of Health and Disease (DOHaD) theory focuses on insults and factors in utero or early life which can lead to adverse outcomes later in life. The alterations in genetic programming and the impact of environmental factors create anomalies which have life-long consequences. The DOHaD theory has been applied to explain increased susceptibility to diseases such as stroke, cardiovascular disease, and neurodegenerative disorders. Fetal Alcohol Spectrum Disorders (FASDs) is caused by prenatal alcohol exposure (PAE) in utero and has a wide spectrum of developmental abnormalities. It ranges from Alcohol-Related Neurodevelopmental Disorder, which is characterized by cognitive and behavioral abnormalities, to Fetal Alcohol Syndrome, which is additionally characterized by craniofacial dysmorphologies. The life-long effects of PAE are initiated by alterations in cellular programming, some of which increase cellular maturation and could result in an early aging phenotype, such as shortened telomere length. The cascade of genetic modifications and cellular anomalies which occur in these individuals creates a vulnerable population to secondary disorders, such as cardiovascular, metabolic, and neurodegenerative diseases. The DOHaD theory can be applied to FASD to help identify possible key factors which can be used to advance the understanding of the disorder. As research and medicine have progressed to better aid those individuals with FASD, the life expectancy of these individuals has increased, with more living longer into adulthood and facing previously unknown challenges. This has created a need for more research into the underlying origins and causes of these challenges individuals with FASD face in adulthood.

Obstructing Factors Affecting Access to Healthcare in Rural South Texas Colonias- Culturally, Economically, and Physically

Mr David Elliott, Kathering Hosler, Marissa Johnson, Mikayla Monk, Rebecca Reese, Ryan Steir

Along the border of southern Texas and Mexico, there are a series of unincorporated communities called colonias. These communities have documented structural issues that prevent the community members from adequate access to healthcare (Background on OCI. 2014). The underdeveloped conditions in colonias raise health concerns in the communities, such as a higher risk of developing disease and diabetes, exposure to toxic pesticides, and lack of access to healthy food and healthcare services (Cantu-Pawlik 2018). Although the current research has been able to identify the structural issues and the underdeveloped conditions of the colonias, it has failed to recognize other factors such as financial and cultural barriers. Also, there is a lack of research on how these factors impact the colonias' resident's ability to access healthcare. Thus through this research, we plan to identify what are the major factors inhibiting care (geography, culture, finances, quality of care, etc.) and what other factors are affected by this lack of healthcare (employment, families, community, education, etc.). To collect this data, an anonymous survey will be distributed to the people living in Colonias electronically. The survey will consist of questions on general health, proximity to healthcare facilities, cultural self-identification, personal finances, and health services in their community. Using the gathered data, future research can be conducted to determine the most beneficial community intervention to alleviate these issues (mini-hospitals, primary care clinics, etc.)

Nurses` energy expenditure and physical activity level measurement: a state-of-the-art literature review

Ms Savannah Schwienteck

The understanding of the physical activity (PA) levels of nurses are essential because of the negative health issues apparent in nurses and the influence on patient care. This understanding will allow for the development of workplace interventions to target nurses' health through reducing job demands or increasing sedentary time, and thereby the quality of nursing. This study aims at understanding nurses' PA levels, energy expenditure during shifts, and determining the PA patterns across a shift. Further objectives include comparing PA levels of nurses working in different units, and comparing day/night shift as well as shift work/non-shift work. We conduct a systematic search using keywords in online databases including PubMed, Scopus, Web of Science, Science Direct, and IEEE Xplore to accomplish these objectives. Results show that the most common PA during a shift is standing. For day shifts, the level of job demands (walking, standing, and dynamic standing) remains high, while the recovery level (sitting and lying) is low. Shift workers are less sedentary and more physically active than non-shift workers, however, this difference decreases with an increase in night shifts. Leisure-time PA is similar between shift workers and non-shift workers. The average energy expenditure for nurses is 1521 kcal/shift for a 12-hr shift. To conclude, most nurses expend sufficient energy on a working day to maintain a healthy weight, under the assumption that caloric consumption does not exceed recommended levels. Also, prolonged periods of standing can cause fatigue in nurses, and recovery is encouraged by alternating between sitting and standing.

Improving Preventative Health Education Among College Students

Ms Kathy Nguyen, Cydney Ayala, Lynae Baskin, Jenny Tran, Moses Perez

With a large number of commitments relating to organizations and studies, college students will likely not seek medical attention even when necessary. 2013 research has found that compared to the rest of the United States population, college students experience a disproportionate number of health problems in relation to small fevers, body aches, and the common cold that could have been avoided with preventative health practices. Previous research fails to provide a specific reason as to why college students neglect engaging in preventative health measures. Effective preventative health education may aid in helping college students recognize, minimize, and respond effectively to potential health problems. The purpose of this research is to investigate what the biggest barriers are for students who avoid seeking preventative healthcare. Our research question stands to be: What are the biggest constraints that contribute to how university students are seeking preventative medical resources during the school year? In order to determine how different constraints affect the preventative health and wellness measures taken by Texas A&M University students, we use mixed methodology in the form of survey and interview data collection. We will use descriptive data and thematic analysis to highlight the factors of school-life balance associated with practicing preventative health and barriers to such care. The practical implications of this research is aimed at providing accessible preventive health and resource information in the form of a mobile application to university students to their overall health.

Mental Healthcare in Syrian Refugee Populations: Stigma, Treatment, and Cultural Competency

Ms Bridget Higgins, Christine Abreo, Janah Dia, Mya Phelps, Vanessa Ismael

Cultural competency in crisis intervention and mental healthcare, specific to the Syrian refugee crisis, is severely lacking. Mental health, in regards to refugees, is jeopardized by backgrounds of the stigmatization of mental health, human trafficking, language barriers, and social conflict, in addition to an overall distrust for the healthcare system based upon experience and overall insensitivity toward cultural and religious beliefs. The purpose of this research is to identify the Syrian refugee community's perceptions of the U.S. individualized mental health care network interactions and consider the barriers, social norms, and stigma to formulate culturally adequate recommendations to aid mental health care providers.

Syrian Refugees have endured a plethora of traumatic experiences resulting in alarming rates of PTSD, anxiety, and depression with some samples reporting as large as 59% presenting with PTSD. The current U.S. infrastructure fails to meet these clear areas of need and offers little mental health aid to the extent that one in four refugees with PTSD receive treatment.

A sample of Syrian Refugees will be selected to participate in a survey. Following the survey, an interview will be immediately conducted and will serve as the primary basis of analysis investigating more thoroughly these identified areas of interest.

Through hosting a conference at Texas A&M University, research findings can be presented and novel policy can be developed for the benefit of Syrian refugees and other comparable vulnerable populations. Given the limitations of this study being isolated to Texas, future studies ought to explore a global-scale.

Implicit Causality and Racially-associated Names

Mr Austin Biehle, Nafiseh Faghihi, Omar Garcia

Social interaction is facilitated by words and sentences that carry substantial implicit and explicit information. In prior research, verbs' type and valence have been shown to signify implicit attributions of causality to either the subject or object of a sentence. The way individuals perceive causality was also shown to be affected by factors such as the perceived social status of the subject and object. As a result, those perceived to possess greater social status are more likely to be attributed causality. The purpose of the present study was to investigate whether participants perceive particular racial groups as equally able to cause outcomes in social interactions. In the experiment, participants reflected on a series of sentences that involved assigning causality to either the subject or object. The verb type and valence as well as the race of the subjects and objects (White vs. Hispanic) varied in order to assess perceptions of causality. We hypothesized that individuals with Hispanic names described as acting or feeling in mixed-race pairs would be perceived as less causal than those with White names. The findings provide insight into underlying attitudes towards particular racial groups.

Responses to Racial Violence: Unequal Expectations of Black Forgiveness

Ms Catherine Claire Crimmins, Genevieve Bernard, Katheleen Chavez, Michael Perez, Noah Reed

Previous research in communication and religious studies has discussed the societal consequences of forgiveness for racism within the United States. Specifically, this research argues that when White people commit acts of racial violence against Black people, there is often an encouraged and normative expectancy of Black people to forgive these actions whenever they happen. This expectation has primarily been explored through the analysis of forgiveness rhetoric; however, it has not been investigated through experimentation. The purpose of the present research is to empirically test this notion of expected Black forgiveness. We used a 2 X 2 between subjects factorial design in order to test this construct and collected participants from a student subject pool (N = 283). In this study, participants read a hypothetical news story that contained a violent, racist event targeted at a victim that was either White or Black. Furthermore, in response to the event, the victim either publicly forgave or did not forgive his transgressor. Based upon previous research we hypothesize that individuals who forgive racism will be perceived more positively, and specifically, Black people who forgive racism will be viewed more positively than Black people who do not. A factorial ANOVA will be conducted to analyze whether there are significant differences in positive perceptions of the victim who forgave the transgression compared to the victim that did not. Implications of these findings for our understanding of the Black forgiveness expectation as well as qualitative information on participants' opinions of the victims will be included and discussed.

Language Barriers and Emergency Medicine

Ms Courtney Gore, Hope Love, Rachel Hauschel, Shelby McGrath, Ysela Rodriguez

In emergency situations involving language-discordant communication, clinicians must judge a patient's pain and psychological state to determine whether there is sufficient time to obtain interpretive services or whether to act on the patient's behalf without informed consent (1). Interpreters and other translation tools are not always available in the Emergency Room (ER), forcing clinicians to use social cues, physical attributes, psychological state, and cultural values to determine the treatment to pursue (2, 3). Our goal is to determine a mechanism to improve the healthcare experience of the population in Houston, Texas who only speak Cantonese, Vietnamese, or Mandarin. We seek to explore how we can foster better understanding between patients and clinicians when faced with language-discordant communication. Our research question investigates the healthcare experiences of ESL speakers, and asks what impact do these experiences have on the lives of those who speak a different language other than English. For methodological development, an online survey was distributed to ESL students at Texas A&M University to investigate the ESL patient's experience and barriers with physician interaction. We hope to gain insight from the student body about frequently recurring problems with language-discordant communication in order to appropriately address our target population. The data will be utilized to construct a secondary survey targeted at the Chinese and Vietnamese population of Houston, Texas.

Awareness-driven behavior response and fatigue effects in disease spread dynamics

Mrs Daniel Guerson Gil

The spread of COVID-19 has elevated the importance of epidemiological models as a means to understand and forecast both near- and long-term spread, in order to determine how to use the limited resources effectively. COVID-19 outbreak shows that behavioral changes are the driving factor in the trajectory of emerging infectious diseases. Thus, simple epidemiological models that do not account for such behavior changes can fail in capturing reality leading to systematic errors in forecasting. Here, we propose a compartmental epidemiological model in which individuals reduce their contacts based on the disease prevalence. The behavior change is subject to fatigue representing the population response getting numb to disease prevalence over time. After analyzing the effects of fatigue on disease trajectory, we suggest ways to counteract the fatigue effects.

The Black Forgiveness Expectation: Predictors of Positive Perceptions of Black Forgiveness

Ms Genevieve Bernard, Catherine Crimmins, Kathleen Chavez, Michael Perez, Noah Reed

In 2019, the murder of Botham Jean, a black man shot by a police officer in his own home, posed the question of whether it is beneficial or harmful to the Black community as a whole to forgive racism. Previous research suggests that within America's racial context, individuals interpret forgiveness as an extenuation of historical transgressions as opposed to an opportunity to learn, move forward and prevent future acts of racism. However, little research in psychology has investigated forgiveness within the context of race and racism broadly or, specifically, the expectation of Black forgiveness in response to racist events perpetuated by White people. Therefore, the present research analyzes potential individual difference factors that predict positive perceptions of Black people forgiving White people for past transgressions. In order to examine this question, we used a multiple regression design with a series of relevant predictors (i.e., national identity, racial attitudes, religiosity). The dependent variable was endorsement of Black forgiveness by White people and participants were collected from a student subject pool. Our primary hypothesis is that participants that highly identify with the U.S. will be more likely to endorse the Black community forgiving transgressions committed against them by White people. However, additional predictors utilized in previous research, such as religiosity and racial attitudes, will also be included in our model. Implications of these findings for our understanding of Black forgiveness narratives as well as qualitative information on participants' opinions of Black forgiveness will be included and discussed.

The Impact of Sexual Assault on Street Harassment and Occupational Well-being

Ms Brittney Feaster

This research project focuses on women's experiences of street harassment (i.e., sexually charged, verbal and nonverbal acts in public from men aimed at women). We test two general hypotheses. First, we hypothesize that street harassment negatively affects occupational well-being such as work fatigue and job satisfaction. Second, we hypothesize that women who have experienced sexual assault will have an increased negative relationship between street harassment and occupational well-being (i.e., sexual assault history moderates the effect of street harassment on occupational well-being). To test these hypotheses, we recruited women from Amazon Mechanical Turk who live in large, urban areas, and commute to and from work at least three times a week. These women were asked about their street harassment experiences on their commutes to and from work, their occupational wellbeing, and their previous experiences of sexual assault. We will then test our hypothesis using moderated regression analysis using PROCESS (Hayes, 2018). If our hypotheses are supported, then our findings will further contribute to research on the negative and gendered experiences of women and how these experiences affect their work lives.

Safety Dashboard Design for the Offshore Oil and Gas Industry

Mr Blake Andrew Ratliff, Edward Robledo

Employee health condition and fatigue are heavy factors when it comes to productivity and safety in the offshore oil industry. Furthermore, multiple incidents in the offshore oil and gas industry have been associated with poor safety culture.¬†This study is part of a larger project (named EMPOWER) that aims to design a dashboard to display safety culture and worker fatigue data to be used in offshore drilling industry. Such dashboard can present crew safety and fatigue information that can potentially help rig supervisors make critical decisions and improve safety. In previous stages, sample data to be presented in the dashboard was collected in a longitudinal study by the team from an offshore oil rig.

The focus of the current study is to understand the contextual and stakeholder requirements of the EMPOWER dashboard, and develop prototypes via a user-centered approach. Market research was conducted to collect information regarding existing dashboard products that are being used by the major companies. Literature review was also conducted to understand the existing research about dashboard design. A 20-minute participatory design session embedded in a workshop will be held to collect insights from industry workers and volunteers on expectations, needs, and ideas for the dashboard design. After collecting sufficient design requirements, interactive prototypes will be designed and evaluated with cognitive walkthroughs.

Conducting Virtual Research with Businesses during COVID-19

Mr Ganesh Jagannath, Brooke McAllister, Taylor Sweeney

COVID-19 has increased the need to include businesses in hazards research given its severe economic impact and small businesses, in particular, have been hard hit by the pandemic. The COVID-19 pandemic has required a shift to virtual research methods for human subjects research, however small businesses also tend to have low response rates. This has provided a paradox where the most needed respondents are less likely to participate. This poster discusses research methods for conducting research with small businesses during a hazard event. It will discuss the group's experience with online searches for business samples, phone and email recruitment methods, and response rates.

Poster #168_ Sociology – Undergraduate

Does Disaster Assistance Promote Resilience?

Ms Franchesca Brianna Huerta, Mykayla Marek, Kim Tran

Flood vulnerability has increased as development and urbanization grows in flood-hazard areas. The U.S. Small Business Administration (SBA) Disaster Loan Program is the largest source of disaster assistance to homes and businesses impacted by disasters. Despite its importance, little research has examined if recovery programs influence mobility after a disaster, particularly across different segments of the population and community. To address this research gap, this study proposes to identify patterns in human mobility by examining business and residential decision-making in hazardous areas after receiving Federal disaster assistance. Our methods include a postcard survey to the population of homes and businesses receiving a loan after Hurricanes Ike and Harvey in Galveston County, TX. This poster will present preliminary findings from the surveys, comparing whether funds were used to mitigate against a future disaster and the factors that influence mobility decisions across businesses and households, demographic factors, and other variables of interest.

Fatigue of Additively Manufactured Inconel 718

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There are several additive manufacturing techniques for metals: powder bed fusion (PBF), direct energy deposition, binder jetting, and wire arc additive manufacturing. Since PBF provides better dimensional precision and surface finish, it has been utilized for fabrication of super alloy components in demanding applications such as in nuclear, energy, aerospace, and machinery applications. Even though a wide variety of metallic powders are available commercially, majority of the published literature covers research studies for popular alloys: Ti-6Al-4V, Inconel 718 (IN718), austenitic and martensitic stainless steels, and Al-10Si-Mg. The super alloy IN718 is widely used for manufacture of components subjected to high stress and elevated temperature due to its high strength and stiffness to weight ratios, excellent high temperature performance including creep, fatigue, oxidation /corrosion resistance.

Selective Laser Melting (SLM), one of the PBF techniques, uses a high-power density laser to selectively melt metal powder particles and systematically join layers to form a complex shape component. As seen with all additive manufacturing (AM) processes for metals, the SLM'ed IN718 components would contain one or more defects such as rough surface, porosity, shrinkage cavity, lack of bonding between layers, microcracks, thermal-induced deformation, balling effect, residual stresses, anisotropy, and partially melted metal powder on the outer surface of the components. Brittle particles in a ductile matrix also shorten fatigue and creep lives of AM metallic components.

To be accepted for replacing components fabricated by traditional techniques - such as machining or casting -the SLM'ed component must show favorable static and dynamic properties compared to those from traditional approaches. The objectives of this research presentation are to:

1. Demonstrate a new method to quickly obtain the fatigue properties.

2. Explain the new machine designed and show its operation.