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Adela de la Torre President, San Diego State University

#### Video Message



#### Hala Madanat

Hala Mandanat, Interim Vice President of Research and Innovation

Video Message



#### SRS WELCOME CENTER - Friday and Saturday (9-5pm)

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#### ORAL Session 1 - Saturday, March 20, 2021

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#### ORAL Session 3 - Saturday, March 20, 2021

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# Abstracts of Presentations

# **Oral Sessions 1**

ABCDEFGHIJKLMNO



#### **Session A1**

Oral Behavioral and Social Sciences Friday, March 19, 2021, 9:00 AM

#### 100 9:05 AM

"They want to pull all your teeth...to get dentures. They want to pull the good teeth". A Qualitative Study Exploring Perceived Trust towards the Dental Care System Among Older Adults Aachal Devi (Doctoral)

This study qualitatively examines older adults' experiences with dental care through the sociological lens of trust. Two focus groups (15-16 participants/group) were conducted at a Senior Wellness Center in 2015. Sessions were audio-recorded and transcribed. Thematic analysis was done using MAXQDA qualitative software and guided by Hall's conceptual model of trust in healthcare settings. Trust among older adults at both interpersonal (individual-dentist) and institutional (individual-institution) levels were explored. Results: Participants' mean age was 68±7 years. Half (52%) were male, 61% were low-income (<\$10,000/annually), 52% had some college education, 63% had dentures, and 52% had a past-year dental visit. Analyses revealed three themes related to trust from Hall's conceptual model of trust in medical settings: fidelity (advocating for patient's best interests), competence (perceived quality of care), and honesty (telling the truth). Many older adults perceived dental providers/institutions as not putting their interests first. One participant stated "They [dental providers] want to pull all your teeth...to get dentures. They want to pull the good teeth." Others perceived dentists/institutions to be incompetent at addressing their needs by sharing experiences of their treatment preferences not being heard. On the interpersonal level, one participant noted providers "make you feel like it's an assembly line," and drill then move on quickly. Older adults perceived that dental providers/institutions had personal and financial conflicts of interest, which led to perceived dishonesty of providers. In conclusion, older adults described their distrust in the dental care system as an important factor and barrier in accessing dental services that affected their oral health outcome and satisfaction with care received.

#### 101 9:15 AM

Effects of Semantic Meaning Attachment, Supportiveness of Sentential Context, and Word Class on Word Recognition in Adus

#### Ashlie Pankonin (Doctoral)

Word learning involves creating, storing, and accessing an incrementally-built, many- featured lexical representation of a new word. The ability to recognize a word is indicative of the robustness of the word's lexical representation, and, thus, evidence of some degree of word learning. There is conflicting evidence regarding whether or not attaching semantic meaning to a new word's phonological form supports recognition, particularly when the semantic meaning for the new word form must be inferred from the sentential context the word form is presented in.

Additionally, recognition of a new word form may vary based on its word class, specifically whether the word is a noun or verb. Because verbs and nouns' semantic organization differs-- with verbs organized within an abstract, distantly-connected matrix and nouns within closely- connected but clear-cut, hierarchical categories--word class likely influences the storage and access of new word forms.

This study investigated how semantic meaning attachment to a new word form, the supportiveness of semantic meaning attachment of the sentential context the new word form was presented in, and the word class of the new word form interact in an incidental semantic learning task, as well as explored the effect of each of those factors on subsequent explicit recognition of the new word form in a word recognition task in 55 adults (Noun: n = 31; Verb: n = 24).

Analyses revealed that participants attached semantic meaning to more verbs than nouns when presented in a sentential context unsupportive of semantic meaning attachment, but to equal amounts of verbs and nouns when presented in a supportive sentential context. In addition, participants only appropriately used sentential context to attach semantic meaning (or not) to nouns, over-attaching semantic meaning to verbs. Furthermore, neither previous semantic meaning attachment, the supportiveness of sentential context during semantic meaning attachment, nor word class had any faciliatory effect on recognition. Participants could not reliably recognize familiar word forms from novel ones in all cases.

#### 102 9:25 AM

Proposed Methods for Validation of a Revised Kim Alliance Scale to Measure Therapeutic Alliance in Patients with Chronic Musculoskeletal Pain in Physical Therapy **Patricia Dionicio (Doctoral)** 

#### Chelsea Chapman

Emerging evidence suggests therapeutic alliance has the potential to improve pain outcomes, adherence to treatment, and patient-provider communication in physical therapy settings. While there are a multitude of validated measures for therapeutic alliance, the Kim Alliance Scale (KAS-R) assesses components of therapeutic alliance applicable to physical therapy, considers patient empowerment, and evaluates alliance from the patients' perspective. However, due to the presence of inaccessible language for low-literacy populations and issues with translation of terminology, a revised scale (KAS-R2) was developed. The purpose of this study is to describe methods for conducting cognitive interviews, and testing convergent and divergent validity of the revised scale (KAS-R2) in patients with chronic musculoskeletal pain undergoing physical therapy. We hypothesize that the KAS-R2 will show adequate construct, convergent, and divergent validity for clinical applications in chronic pain management. A purposive sample of patients (N=10), aged 18 years and older with chronic musculoskeletal pain and undergoing physical therapy, will be invited to complete a semi-structured cognitive interview. Participants will be asked guestions about the readability, comprehensibility, and structure of KAS-R2 survey questions. The Agnew Relationship Measure (ARM) and KAS-R will be administered to test convergent validity of KAS-R2; divergent validity will be tested using the Multidimensional Health Locus of Control (MHLC). Cognitive interviews will be conducted virtually and audio will be digitally recorded. Automatic transcriptions of digital audio files will be generated using NVivo R1. Analytic memos based on digital recordings and transcriptions will be organized into categories based on any issues or misunderstandings patients identify with KAS-R2 survey items. Bivariate correlations will be used to assess the convergent and divergent validity of the adapted KAS-R2 with ARM and MHLC, respectively. Item analysis will be conducted between the KAS-R and refined KAS-R2 to further explore associations. This study will contribute to the limited research on validated measures of therapeutic alliance that are accessible to patients with chronic musculoskeletal pain undergoing physical therapy. Validating the revised scale will make available a measure for therapeutic alliance that is accessible and translatable so that it can be more widely used for a diverse patient population.

#### 103 9:35 AM

Investigating Word Representation, Processing, and Awareness in Adult Bilinguals with a History of Developmental Language Disorder Jonathan J.D. Robinson Anthony (Doctoral) Dafne Demos-Farias Ruiz Sanchez

**Christy Gross** 

Vocabulary development is negatively impacted for individuals with a history of Developmental Language Disorder (DLD). Monolingual adults with a history of DLD acquire smaller vocabularies over time than their typically developing peers (Rice & Hoffman, 2015). However, it is unclear how this vocabulary gap associated with DLD will manifest in bilinguals. Typical bilingual adults have the advantage of crosslinguistic interactions at the lexical level (e.g., Marian & Shook, 2013), as translation equivalents that share similar form (cognates; e.g., English-Spanish pear-pera) are recognized more accurately and quickly than ones that share little to no form (noncognates; e.g., apple-manzana). Most of the research on DLD in bilingual populations is focused on childhood. We extend this literature by focusing on the impact of DLD in bilingual adults. The present study seeks to illustrate the intersection of crosslinguistic influence and language disorder on word comprehension in Spanish-English bilingual adults by targeting word comprehension accuracy and speed, and metalinguistic awareness of crosslinguistic cognate word overlap. The 18-21 year old Spanish-English participants were characterized by their language experience and background, as well as core language and literacy skills. Participants completed offline as well as online visual world picture-word identification tasks to measure accuracy and speed of comprehending cognate and noncognate words. Participants also completed a word comprehension task with an accompanying interview to measure metalinguistic awareness of crosslinguistic cognate word overlap. Data were coded using a grounded approach in identifying within-language and crosslinguistic themes (e.g., Yu, 2013). Preliminary results focus on sensitivity to cognate status across typical and DLD groups, reflected in accuracy, latency of eye-movements to targets and response selection, as well as in metalinguistic interviews. Results are discussed within a dynamic bilingual word comprehension model. Further predictions are made regarding the influence of bilingual language experience on language disorder.

#### 104 9:45 AM

### Integrating evidence-based intervention and telepractice: Caregiver surveys as a measure of acceptability **Abby John (Doctoral)**

#### Sophie Levi

Teletherapy speech and language services promote positive treatment outcomes and are comparable in efficacy to traditional service delivery models (Grogan-Johnson et al., 2013; McCullough, 2000). However, there is limited available research examining the validity of specific evidence-based interventions, including complexity-based phonological treatment, delivered through telepractice. Caregiver perceptions and acceptability of speech and language services are key components of evidence-based practice (EBP) and can provide valuable information about the functional efficacy of delivering a traditionally in-person intervention method through telepractice. Assessment of the caregiver perspective has important implications for the successful transition of in-person intervention approaches to telepractice, and more research is needed to understand the influence of caregiver engagement on overall treatment outcomes. In the present study, two children participated in a 6-week telepractice intervention addressing phonological disorders. The intervention ran for a total of 18 sessions, approximately three sessions per week, for a duration of 35-45 minutes each. A treatment target was selected using a complexity-based phonological approach and elicited a minimum of 96 trials per session. At the conclusion of treatment, we delivered a 13-item postintervention telepractice acceptability questionnaire to caregivers. Questionnaire responses were self-reported and recorded using a 7-point Likert scale (1 = strongly disagree to 7 = strongly agree) and designed to assess caregivers' acceptability and perception of their experience with the telepractice intervention. Results revealed high caregiver acceptability ratings across all items. Caregivers reported feeling supported by the teletherapy intervention and therapist in spite of the distance, confident in addressing issues related to their child, as well as inclined to recommend teletherapy intervention to other families. The lowest average rating (4 = neither agree nor disagree) was related to the helpfulness of weekly teletherapy sessions to the caregiver. Assessing caregivers' perceptions provides valuable information about the validity of transitioning an established, evidence-based treatment to an alternative service delivery model such as teletherapy. Data gained from the present study was consistent with prior research that demonstrated high caregiver acceptability of telepractice services (Little et al., 2018), indicating that telepractice is an ecologically valid service delivery model.

#### 105 10:05 AM

# Travel Distance and Cancer Care Among Rural Cancer Patients in the US/Mexico Border Region

#### Harrison Yang (Master's)

In recent years, addressing and eliminating health care disparities in minority populations is a growing focus of research in public health. In general, geographic barriers to cancer diagnosis and treatment are largely exacerbated by travel distance and neighborhood socioeconomic status (SES). In view of this, the study aims to use the intake data to examine the effects of travel distance and neighborhood socioeconomic status on cancer diagnosis and cancer treatment, respectively among the rural cancer patients living in Imperial County, located in Southern California adjacent to the U.S.- Mexico border. The data for this study was collected as part of the intake assessment for new cancer patients who registered for the services at the non-profit cancer organization in Imperial County. From 2006 to 2019, a total of 2123 patients' intake information was used for data analysis. The majority of the participants were female (60.15%) and average age was 55. With respect to the ethnicity, Latino/Hispanic (85.09%) representing the majority, followed by Caucasian (12.08%). Regarding cancer types, breast cancer (30.49%) accounts for the majority, followed by prostate cancer (9.14%). Cancer stage was found to be varied by age group. Over 50% of the patients who are age 41 and older and 70% of the patients who are age 17 and less were diagnosed with stage 3 or 4. Furthermore, compared with the U.S. data, breast and prostate cancer patients in Imperial County were diagnosed with stage 2 or later for both Hispanic (74% for female breast cancer and 72% for prostate cancer) and White (80% for female breast cancer and 77% for prostate cancer) groups. This study also found that the average travel distance between patients' address and the locations of medical institution decreases with the increase of age of the patients. For example, regarding the average street network distance, 196.3 kilometers for patients under 17 years old and 42.6 kilometers for patients over 65.

#### **Session B1**

# Oral Behavioral and Social Sciences Friday, March 19, 2021, 10:00 AM

#### 106 10:15 AM

#### Nongovernmental Organizations in Mexico: Impacts on Food Policy Paola Diaz de Regules (Master's)

In Mexico, hunger, obesity, malnourishment, and other diet-related diseases threaten the population's wellbeing. To address limitations in current food policies and to improve quality of life, nongovernmental organizations (NGOs) in Mexico advocate for change and influence public policy related to food. The purpose of this research is to analyze how Mexican food-related NGOs have engaged in advocacy and managed to change policies. The study also seeks to understand the connections and relationships among relevant actors. Finally, this research aims to examine how NGOs have incorporated feminist perspectives that can empower women in the nation. The research design was inductive and qualitative. Eighteen semi-structured interviews were conducted with administrators from eighteen organizations. Mexican food-related NGOs have won important policy battles, but their advocacy work continues as there are other policies that need their attention. This research found that (a) food-related NGOs in Mexico have won policy battles on behalf of their constituents by utilizing a variety of advocacy strategies; (b) NGOs have tight networks of cooperation and have an adversarial relationship with the private sector; and (c) several organizations work with a gender perspective, but do not consider themselves feminists. With this research, I attempt to fill the gap in literature regarding Mexican food-related NGOs, specifically focusing on advocacy strategies and relationships to other actors. This study seeks to make a contribution to our understanding of the role of NGOs in the Mexican public policy arena.

#### 107 10:25 AM

# Healthcare Coverage and Vaccination Uptake Rates Natalie Buchbinder (Master's)

Influenza is a highly infectious, serious and costly illness; however, several vaccines exist to protect against influenza infection. Vaccination uptake rates remain low and result in a great societal burden each year, with 36 million symptomatic infections, 490 thousand hospitalizations and 34 thousand deaths recorded in the 2018-2019 influenza season alone. This study examined the role of the determinants of health, specifically health insurance coverage as a proxy for access, in relation to influenza vaccine uptake in California. Publicly available data from the Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System's (BRFSS) 2019 administration were used to understand the relationship between influenza immunization and health insurance coverage, source of coverage, gender, race and general health status. Results show that all identified variables were significant. Those with healthcare coverage experienced the highest rates of influenza vaccination – 47 percent with healthcare coverage were vaccinated for influenza in the study year, as compared with only 19 percent of those without coverage. Enrollees in publicly-funded healthcare plans experienced the highest rate of vaccination (51 percent) as compared with 45 percent for those with private insurance. These findings illustrate that barriers beyond access may likely exist, considering that less than half of adults with healthcare coverage accepted a vaccination known for safety and effectiveness. Improving influenza vaccination uptake is essential to the American healthcare system, especially in light of the Covid-19 pandemic. Further research must be conducted to understand the intricacies of barriers to immunization, a cost-effective and simple way to prevent the spread of disease.

#### 108 10:35 AM

# "Being in Alignment with One Mission": A Qualitative Analysis of the Officers' Perspectives about their Relationship with the Communities They Serve Kiana Kikuchi (Master's)

# The American people have challenged law enforcement agencies to hold their officers accountable for their actions on duty and connect with the community to proactively protect the community. For many officers, this is considered a feat that goes above and beyond their call to duty. However, community oriented policing puts officers in a position of leadership where they are responsible for educating the public and creating stronger ties with community members and stakeholders. This qualitative study investigates how community relation officers describe the ways they navigate personal, institutional, and communal tensions, while moderating conflicting groups? The results reveal that by engaging in community-oriented policing, officers rely on interpersonal communication, identity management, and management of emotional labor to effectively execute positive interactions with the community. Positive interactions open the door to opportunities for civil discourse with community members to promote the mission of safety in their neighborhoods.

#### 109 10:45 AM

#### "You Sort of Fit Together Like a Puzzle": Across-Agency Partnership Attributes for Combating Food Insecurity in San Diego County

#### Lani Morales (Master's)

Food insecurity is when consistent access to affordable, nutritious food for an active, healthy life is inadequate. Food insecurity affects 10.5% of households in the U.S. and 14.3% of households in San Diego, with certain racial/ethnic groups at a higher risk (e.g., Hispanics/Latinx). Reducing food insecurity, a social determinant of health, is fundamental for mitigating health inequities, especially in San Diego County where Hispanic/Latinx households disproportionally (42%) experience food insecurity. Capacity-oriented approaches have the potential to reduce food insecurity and improve diet and health in low-resource settings, but local data are needed to develop capacity-oriented approaches specific to San Diego County. The overarching goal of this study was to identify multi-level sources of existing capital (assets) in San Diego County to inform an integrated approach to reducing food insecurity and improving dietary intake. Guided by the Socioecological Model, we conducted one-on-one semi-structured interviews with key informants at stakeholder agencies (n=10) providing food and nutrition services to low-income households across San Diego County. Interview audio recordings were transcribed, checked, and discussed among the team (the primary investigator and student researchers). The student researchers iteratively coded transcripts. The team discussed coding in biweekly meetings. As part of the analytical process, the team referenced the literature to identify theories or frameworks that helped explain what they were observing. All analyses were conducted in NVivo 12. Preliminary findings demonstrated that across-agency partnerships may be influential sources of existing capital for addressing food insecurity. The Parent and Harvey model was identified as a framework to better understand agency partnerships, as it outlined partnership attributes in the context of partnership outputs. In San Diego County, across-agency partnership attributes that appeared to make partnerships successful included communication (e.g., regular communication, information sharing), coordination (e.g., referrals), trust, and mutuality (e.g., common vision/mission). For example, partnerships enabled a centralized referral process for clients needing access to a variety of services across multiple agencies. In San Diego County, across-agency partnerships may be uniquely influential to addressing food insecurity. Future research should consider how to continue to leverage these partnership capacities to reduce food insecurity.

#### **Session C1**

Oral Behavioral and Social Sciences Friday, March 19, 2021, 11:00 AM

#### 110 11:05 AM

Learning For Dignity: Findings from a Service Learning Project on Homelessness Adriana Rios (Undergraduate) Rebekah Alvarado

This presentation will share findings and lessons learned from a service-learning project on homelessness. San Diego faces a notable number of homeless who are without basic necessities. Currently, there are 8,100 homeless individuals in San Diego and over half are unsheltered. The importance of non-profit organizations' interventions within the homeless population ultimately assists in providing a healthier community. Think Dignity is a local organization whose mission is to bring basic dignity to those who are homeless. One of the programs offered by Think Dignity is their Fresh Start mobile shower program. The purpose of this study was to analyze client intake forms to understand who Think Dignity is serving, in particular, client demographics such as education, race, gender, employment status, and veteran status. The study also analyzed other vital factors such as contributors to becoming homeless, access to sanitation and hygiene, and other services needed. Findings highlight the need for additional resources devoted to basic hygiene, sanitation, and health services for people experiencing homelessness. In 2019, 71.3% of Think Dignity's shower clients reported that they did not have regular access to a shower, only 40% of clients reported having regular access to a bathroom, and 60% of clients disclosed that they had to use an area not meant as a bathroom due to desperation. The data paints a picture of high health risk in our community, not only to homeless San Diegans but to the general public as well. Our presentation will discuss some of the implications of these findings, as well as share our experiences participating in this service-learning project. It is not simply data but stories of individuals who are in need of assistance from their community. The process has ultimately instilled in us the selfless nature that non-profit organizations exude. In our presentation, we will illustrate the value of sanitation and hygiene for the homeless population and how providing these services can change their overall outlook on life.

#### 111 11:15 AM

# Black Lives Experiencing Homelessness Matter: Perspectives on Policing From African Americans Experiencing Homelessness in San Diego **Nicolas Gutierrez III (Master's)**

Research on anti-homeless laws shows that enforcement of "quality of life" regulations prohibiting behaviors such as illegal lodging, blocking sidewalks, sleeping or sitting in public, and the like do not deter these behaviors, but rather create a context of "pervasive penalty" in which people experiencing homelessness have frequent interactions with public officials that cause material and emotional harm (Herring, Yarbrough, & Alatorre, 2020). This study theorizes the racialized lived experiences of people experiencing homelessness, using data collected in the summer of 2020 (survey n=244, interview n=62) that explored individuals' survival strategies during the COVID-19 pandemic. We oversampled for Black and Latinx respondents, whose views are often under-represented in homelessness research despite high rates of homelessness. In contrast to past data collected from this population, respondents in this study frequently framed their experiences through the lens of the Black Lives Matter movement, with even white respondents articulating an awareness of racialized bias in police scrutiny of people experiencing homelessness. Preliminary findings show that the majority of interview participants felt that their homelessness increased the frequency of their police encounters, and that both the frequency and nature of police encounters were shaped by race. Black respondents in particular described an explicitly racialized assumption of criminality by police officers due to their homelessness. When asked to rate their recent encounters with police, a majority of participants characterized their encounters as negative and described specific interactions as justification. Participants who did not have recent encounters with police expressed negative generalizations of police, citing persistent violence by police against the Black community. The majority of participants, regardless of race or ethnicity, reported consciously avoiding police. This presentation will explore some of the implications of these findings through an intersectional lens.

#### 112 11:25 AM

# Young People Experiencing Homelessness: An Exploration of Substance Use and Risk factors among LGBQ Identifying Individuals

#### Ashley Weitensteiner (Master's)

Background: Young people experiencing homelessness is a public health issue associated with increased risk of substance use, HIV positivity, sexual abuse, and other issues. Despite an overrepresentation of LGBQ individuals among homeless young individuals, few studies explore the differences in substance use and related psychosocial risk factors between these individuals and their heterosexual counterparts, particularly in unsheltered populations. This study compares LGBQ and non-LGBQ persons on substance use and multiple associated risk factors including HIV status, sexual abuse, and chronic homelessness in a population of unsheltered young people experiencing homelessness. This study is a cross-sectional secondary data analysis of survey data collected from young people (ages 13-30) who were homeless in 2015 and 2016, as part of the Los Angeles Homeless Services Authority homeless count. In a sample of 2,080 people, LGBQ individuals (n = 321) were compared to their heterosexual counterparts (n = 1759). The sample was predominately African American (33.9%) and Hispanic (34.4%), and male (65.3%). This study examined differences in several mental and behavioral variables utilizing multiple regression analysis. In adjusted analyses, individuals who identify as LGBQ had 1.46 times higher odds of reporting substance use. Significant differences were observed across all other outcomes of interest between LGBQ individuals and their heterosexual counterparts. LGBQ individuals had higher odds of being a victim of assault by a relative or housemate (AOR = 1.89; CI = 1.45, 2.47), being HIV positive (AOR = 7.22; CI = 3.73, 14.0), having a serious mental illness (AOR = 1.77; 1.34, 2.32), severe depression AOR = 1.73; CI = 1.28, 2.32), or having PTSD (AOR=2.28; CI = 1.63, 3.18). Unsheltered LGBQ people also had 1.95 times the odds of being chronically homeless as compared to their heterosexual counterparts. Unsheltered LGBQ young people experiencing homelessness are at an increased risk for substance use and other psychosocial issues. This study highlights the need for targeted outreach, mental health support, and substance abuse treatment efforts for this population. Direct service staff, administrators, and mental health providers working with this population should evaluate their services to ensure they are addressing their unique needs.

#### 113 11:35 AM

Those with a Stake in the Conversation: How Marginalized Identities Impact the Interpretation of Crisis Communication Aaron Gyllenhaal (Master's)

The ability of an organization to communicate with each affected public is paramount to minimizing reputational damage during a crisis. However, the lack of diversity-focused research in the field of crisis communication complicates the creation of an effective crisis response when one of the affected publics is a marginalized identity. Employing situational crisis communication theory, this

study seeks to understand the impact that belonging to a marginalized identity has on crisis communication reception, specifically with the identity categories of race, sexuality, and gender. This will give public relations practitioners a deeper understanding of how communication and identity interact with each other and allows the ability to better tailor crisis communication efforts to their intended audience.

#### 114 11:45 AM

Juvenile Justice Stakeholders and their Perceptions of Faith-Based Organizations Engagement with At-Risk Youth

#### Sharoll Damron (Master's)

As of 2018, over 31 million youth remain under juvenile court jurisdiction and millions of dollars are spent each year to keep youth out of the juvenile justice system. Faith-based organizations (FBO) are just one type of community system that participate in this system and help youth at-risk of offending. However, little is known of how influential FBOs are in contributing to the reduction of juvenile crime and their exact role in the juvenile system. The purpose of this study is to explore FBO engagement with youth, communities, and the juvenile justice system. This study addresses stakeholders' views about the ways:1) FBOs and the juvenile system align or differ in their goals, 2) FBOs operate and interact with the community to deliver services to meet the needs of youth, and 3) FBOs' strengths and barriers in meeting these needs, including policies that affect them. Using qualitative in-depth interviews and thematic analysis, this study explored stakeholders' perceptions of FBO. We purposely sampled various types of stakeholders, including those working within the juvenile justice system in San Diego at direct, administrative or policy levels and who had experience in a public, private or faith-based setting. In-depth interviews, lasting approximately an hour, were conducted with each stakeholder (n=10). Major themes indicate:1) FBOs and the juvenile justice system align in helping youth 2) Referrals to FBOs are not common, unless a youth specifically requests it 3) FBOs utilize evidence-based interventions 4) FBOs rely on informal operating tactics because they are often volunteer-based, smaller and underfunded 5) FBOs face more barriers in providing services then community-based organizations because of conflicts of interest, funding requirements, lack of staff, and low visibility 6) FBOs are seen positively in communities and have benefited the juvenile justice system in the long-run. This study provides insight into the positive relationship between FBO and the juvenile justice system. As such, we begin to understand how FBOs engage youth and the juvenile justice system on the micro, mezzo and macro levels, highlighting the importance of partnerships between the government, FBOs and community-based organizations in order to support juvenile intervention and diversion in communities.

#### **Session D1**

Oral Behavioral and Social Sciences Friday, March 19, 2021, 12:00 PM

#### 115 12:05 PM

Neurocognitive and Dispositional Differences as a Function of Gender and History of Alcohol Use Disorder – A Dimension Reduction Approach Sophie Weeks (Master's) Rebecca Carvalho Yazmin Virgen

Alcohol Use Disorder (AUD) has been associated with a number of cognitive and emotional deficits, including executive function, emotion recognition, memory, attention, and visuospatial/motor skills, but the evidence on the impact of gender is lacking. Some previous research indicates females may be more susceptible to these effects of chronic alcohol exposure. However, with non-AUD women typically scoring higher than men on some executive function measures (e.g. verbal functioning and social perception), the dynamic of these deficits may be subtle and difficult to parse out. Further research was necessary to explore the creation of comprehensive neurocognitive/dispositional factors that can be used to test for these gender-based AUD differences. This project aimed to investigate AUD-related gender differences in mental faculties by creating such complete and extensive neurocognitive/ dispositional latent variables to efficiently test for gender/AUD group differences. Principal Components Analysis (PCA) was used to reduce dimensionality of these measures. Sixty (33 female, age =  $52.5 \pm 11.5$ ) abstinent individuals meeting AUD diagnostic criteria and 62 (29 female, age =  $50.4 \pm 13.6$ ) demographically matched controls completed an Eriksen Flanker Task, comprehensive neuropsychological assessment, and questionnaires surveying their drinking behaviors, mood, and personality. PCA with direct oblimin rotation was used to probe the underlying factor structure. It revealed that 69% of the variance was accounted for by 10 factors associated with: overall memory; visual/non-verbal memory; negative disposition; drinking behaviors/disinhibition; flanker reaction time; flanker accuracy; social perception; verbal executive function/positive affect; sensation seeking; and executive functioning.

Despite an absence of gender or AUD-group differences in Flanker task performance, Control participants showed higher factors scores on memory/intelligence factors than AUD participants (p=.020). AUD participants scored higher than their control counterparts on factors summarizing drinking behaviors and impulsivity (p<.001); and dispositional variables such as anger, depression, confusion, anxiety, and neuroticism (p=.006). Factors including social perception and verbal executive functioning/positive affect both showed females scoring significantly higher than males (p=.025 and p=.011), but no AUD group main effects. These results support findings that females outperform males in verbal/social executive functioning tasks. Furthermore, they confirm that individuals with AUD show significantly impaired memory/cognitive functioning.

#### 116 12:15 PM

#### The Effects of Prenatal Nicotine and THC e-Cigarette Exposure on Anxiety Jaclyn Hanson (Master's) Cristina Rodriguez

Prenatal tobacco exposure can lead to a variety of physiological and behavioral alterations that can persist throughout the lifespan. However, pregnant women are also increasing using cannabis, with many using cannabis and tobacco together. Although the literature on prenatal tobacco is quite extensive, little is known about the effects of cannabis, and, more importantly, how this combination affects fetal development. Since electronic cigarettes are a common form of consumption, the present study investigated the effects of prenatal nicotine, the psychoactive constituent of tobacco, as well as Δ-9-tetrahydrocannabinol (THC), the primary psychoactive constituent of cannabis, via e-cigarette on anxiety-like behaviors using an animal model. Pregnant Sprague-Dawley rat dams were exposed to nicotine (36 mg/mL), THC (100 mg/mL), or the combination daily from gestational days 5-20 through e-cigarette vapor inhalation. Vehicle controls were included. Anxiety-related behaviors were recorded in the offspring of the exposed dams during adolescence (postnatal day 40) using an elevated plus maze. The elevated plus maze is a raised plus-shaped apparatus with two closed and two open (exposed) arms, and the rodents' natural tendency to avoid open spaces is used to indicate anxiety level. The time spent and frequency of different arm-related behaviors and other exploratory behaviors were recorded. Subjects exposed to prenatal nicotine increased the frequency of entries and time spent in the open arms, indicating a reduction in anxiety and/or increase in risk-taking behavior. This effect remained even when accounting for overall increases in activity level associated with prenatal nicotine exposure. Prenatal THC exposure did not alter the effects of prenatal nicotine nor induce behavioral changes on its own. These results suggest that prenatal nicotine exposure reduces anxiety-related behaviors, indicating that pregnant women who consume nicotine via e-cigarette may be placing their child at risk for alterations in emotional development.

#### 117 12:25 PM

# The Effects of Combined Prenatal Nicotine and THC E-Cigarette Exposure on Motor Development **Samirah Hussain (Master's)**

In the United States, nicotine is the most commonly used drug by pregnant women. It has been well established that prenatal nicotine exposure can cross the placental barrier and alter behavioral development. Unfortunately, many pregnant women combine nicotine consumption with other drugs, such as cannabis. Little is known of the effects of maternal cannabis use on the developing fetus, alone or in combination with nicotine. Further, the use of electronic cigarettes (e-cigarette) is rising among pregnant women because they believe that it is safer compared to smoking a traditional cigarette. Thus, the present study used a rodent model to examine how e-cigarette exposure to prenatal nicotine, D-9-tetrahydrocannabinol (THC), and the combination impacts motor coordination in rodent offspring. A vapor inhalation system was used to administer 36 mg/mL nicotine, 100 mg/mL THC, the combination or vehicle via an e-cigarette. On gestational days 5-20, pregnant dams were placed in vapor chambers for 40 minutes and e-cigarettes were added into the airflow in 6-second puffs every 5 minutes. Motor function was tested in the offspring using a hindlimb and strength task from postnatal days (PD) 12-20 and a parallel bar motor task from PD 30-32. Only female subjects exposed to the combination of prenatal THC and nicotine exhibited delays in sensorimotor development. On the parallel bar task, which requires both balance and fine motor coordination, both nicotine and THC impaired performance, but the combination produced more severe deficits than either drug alone. These data suggest that prenatal exposure to either nicotine or THC, at clinically relevant levels, can impair motor development and long-term function. Moreover, the combination of THC and nicotine produced the most severe effects, suggesting that the developing fetus may be particularly vulnerable if a pregnant woman consumes these drugs concurrently.

#### 118 12:35 PM

#### Prenatal Exposure to Nicotine and THC via E-Cigarette: Effects on Working Memory in a Rodent Model **Cristina Rodriguez (Master's)**

Tobacco and cannabis are commonly used among pregnant women. However, prenatal exposure to these drugs may place the exposed child at risk for altered development, including cognitive impairments. Importantly, pregnant women often report using both nicotine and cannabis, particularly through the increasingly popular use of e-cigarettes, which allow these drugs to be consumed concurrently. Thus, the present study used a rodent model to investigate the effects of prenatal exposure to nicotine,  $\Delta$  -tetrahydrocannabinol (THC; the main psychoactive component in cannabis), and the combination via e-cigarette on working memory. During gestational days 5-20, pregnant rats were placed in a sealed vapor inhalation system with constant air flow. Nicotine (36 mg/mL), THC (100 mg/mL), a combination, or vehicle was delivered via e-cigarette, presented in 6-sec puffs every 5 minutes over a 40-min period. Behavior was measured among the offspring, using a 2 (Nicotine, Vehicle) x 2 (THC, Vehicle) x 2 (female offspring, male offspring) design with approximately10 subjects per treatment group. On postnatal day 55-60, offspring were tested on a working memory version of the Morris Water Maze visuospatial task, where subjects had to locate a hidden escape platform submerged in a water tank by using extramaze spatial cues. The platform location changed each session, taxing working memory. Prenatal exposure to nicotine, alone or in combination with THC, significantly impaired working memory, but only among male subjects. In contrast, prenatal exposure to THC, alone or in combination with nicotine, led to impaired accuracy in swim direction and increased thigmotaxis in females during both training and testing sessions. These data suggest that prenatal THC exposure may alter search strategy by increasing anxiety among females. Although the combination of drugs did not significantly exacerbate behavioral effects, our findings indicate that prenatal nicotine and THC exposure via e-cigarettes lead to unique and sex-dependent effects on cognitive and emotional behaviors. Importantly, these findings will aid in the development of public policy decisions and inform women about the risks associated with vaping nicotine and cannabis during pregnancy.

#### 119 12:45 PM

Alterations of White Matter Microstructure are Associated with Binge Drinking in Young Women Kevin Mikami (Master's) Austin Myers Denali Woodruff Rebecca Carvalho Sojung Youn Sophie Weeks

Binge drinking (BD) is a pattern of alcohol consumption characterized by instances of heavy drinking followed by intervals of low or no intake. BD is prevalent during young adulthood, a period of continued neuromaturation and heightened risk of developing alcohol dependence, but the evidence on the relation between BD and white matter integrity in young adults is scarce. Even less is known about the impact of gender on white matter as a function of BD. Studies of individuals with alcohol use disorder (AUD) have found lower fractional anisotropy (FA), which is commonly used as an index of white matter integrity. In the present study, diffusion-tensor imaging (DTI) data were acquired on a 3T scanner at SDSU (Prisma, Siemens) with a spin-echo echo planar sequence using diffusion encoding in 64 noncollinear directions. FA was examined across major white matter pathways as a function of BD behavior and gender in sixty-four healthy, young adult participants (M = 22.77±3.28) comprising the groups of BDs (14 men and 18 women) and light drinkers (LDs; 12 men and 20 women). Group x gender interactions were found in five major fiber tracts predominantly subserving the left frontal lobe. The interactions were primarily due to greater FA in women BDs compared to women LDs in the anterior corpus callosum, inferior fronto-occipital fasciculus, and superior longitudinal fasciculus. Greater FA in the inferior longitudinal fasciculus was associated with high-intensity drinking in the past six months possibly suggesting the effects of alcohol-induced neurotoxicity. These findings extend prior evidence of greater FA in young adult BDs by revealing that it primarily characterizes women BDs, which is consistent with their greater susceptibility to the effects of alcohol. While these results contradict the findings from studies on AUD, they could potentially reflect compensatory effects associated with early onset of BD behavior, or heightened connectivity in the regions of the brain related to disinhibition. It is also possible that increased FA may precede the onset of binge drinking, or could indicate an increased propensity of a subset of women to engage in hazardous drinking during young adulthood.

#### **Session E1**

Oral Behavioral and Social Sciences Friday, March 19, 2021, 1:00 PM

#### 120 1:05 PM

The Interface Between Gesture and Talk in Social Interaction: Cases when Gesture and Talk Apparently Misalign **Brenna Martinez (Undergraduate)** 

Brenna Martinez (Undergraduate

Over the years, it has become increasingly clear that communication is much more than that which is only verbalized. Participants in conversation, for example, can use gestures to enhance, clarify, or revise the meaning of their own talk or another participant's talk. Non-verbal components, such as gestures and bodily behavior, can be used in conjunction with speech to add a significant layer of meaning not otherwise conveyed by talk, and can even be used in ways that may appear to contradict the meaning of talk at the moment. This project focuses on how English native speakers mobilize gestures to accomplish such actions in social interaction. In this project we used ELAN, an annotation tool, for a corpus of approximately six hours of audio- and video-recorded conversation that Dr. R. J. Wu had acquired and furnished. These videos were naturally-occurring conversations collected in the US and UK between classmates, colleagues, and friends. Altogether, we collected a total of 1290 instances of gestures in four predetermined main categories for the examination of the interface between gesture and talk. These cases were then further broken down into many subcategories that we created after examining our data collection.

#### 121 1:15 PM

Psychology of Self-Service Analytics (SSA) Adoption Melarie Cardenas (Undergraduate) Lawson Hardrick Casiano Cabrera

This study applied the Needs-Affordances-Features (NAF) framework to study psychological motivations behind the use of self-service analytics (SSA) tools. These tools help especially when considering that the use of such tools is voluntary. Our findings suggest that psychological needs motivate the use of SSA tools that provide 13 affordances, which are properties of objects which show users the actions they can take. The affordances assist us to fulfill five psychological needs, which are autonomy, competence, relatedness, having a place, and self-realization. These affordances were identified through a review of six publicly available SSA tools. This study posits that five groups of affordances— co creation, exchange, integration, application, and assessment—explain the relationship between psychological needs and applications of SSA. This study generates important implications for SSA research by providing an overarching framework for the affordances of SSA tools as a whole and explaining the importance of psychological needs that motivate the use of SSA tools. The results also provide a new lens and common vocabulary for future studies and design of SSA tools.

#### 122 1:25 PM

Employee Experience Management during Digital Transformation How to Measure the Experiential Values of Digital Transformation **Zigurds Bekeris (Undergraduate)** 

Employees are at the forefront of digital transformation, from executing digital strategies to carrying out digitally-enabled processes. Hence, understanding how employees perceive and experience the value of digital initiatives is critical to the smooth implementation of the proposed changes. Embracing automation and transitioning to a virtual workspace are examples of such changes that require understanding and managing of employees' digital experiences. Therefore, it is increasingly important to model and measure how employees experience the values of digital tools and digitally supported processes. Organizational capability to systematically measure and understand employees' experiences can lead to a more fluid realization of any organizational changes enabled or facilitated by digital technologies. In this study, we discuss what 'employee experience' encompasses and accordingly propose a way to measure these values in the context of digital transformation. We define experiential values of work—supported by digital technologies, for example, in empowering employees, enabling data-driven decision-making, facilitating business processes, optimizing workload, redefining workspace, and connecting employees to each other beyond their business units. These values can be modeled after experience theories and in four dimensions: cognitive values, emotional values, social values, and behavioral values. Firstly, digital technologies help employees, beyond their routines, with searching for new ideas, learning about

new concepts, synthesizing knowledge, and problem-solving. Understanding these cognitive values better equips firms to encourage critical thinking and creative problem-solving by the means of digital technologies. Secondly, digital technologies may help address workspace emotional challenges from high stress and anxiety to lack of trust, joy, or triumph—for example, by decreasing complexity or improving transparency. The insights into these emotional values would allow employers to define more meaningful work routines as part of digital initiatives that effectively satisfy employees' intrinsic needs. Thirdly, social values are created by digital technologies that promote relations, communication, cooperation, and networking among all employees. Tracking social values of digital initiatives can enable organizations to co-govern digital initiatives, accelerate the implementation, improve adoption rate, and boost collaboration among the employees. Fourthly, behavioral values are related to the new activities afforded by new technologies--such as participating in innovation, experimenting with new solutions, voicing opinions, and working virtually. Recognizing behavioral values helps organizations to establish new work routines and re-engineer business processes around employee preferences. In sum, while organizations may be interested in the operational value of digital technologies, for employees, it is the experience that matters. Therefore, a key strategy to implement such initiatives is to provide compelling experiences aligned with organizational goals. If firms fail to create these compelling experiences, employees may limit their utilization and therefore hinder the success of digital initiatives.

#### 123 1:35 PM

# Resilience & Self-Care for Remote Workers Claire Dennis (Undergraduate)

During the 2020 COVID-19 pandemic employees all over the world were becoming remote workers for their safety. Businesses piled more work on their staff which created an intense workload for these at-home employees. With the growing number of remote workers, it is vital during this year that employees and businesses develop a concern for their worker's mental and physical well being. Self-care and resilience are popular topics amongst the discourses of remote workers in an attempt to ease their stress from their occupational projects from home. This study's premise is to look at the features of these two discourses: self-care and resilience. By doing so businesses and employees alike will gain knowledge on how to better care for themselves and become stronger, more resilient, in a time of increased remote work. In hopes to discover more about this discourse, this study uses the lens of the Communicative Theory of Resilience which discusses resilience as, "developed, sustained, and grown through discourse, interaction, and material considerations" (Buzzanell, 2010). In this sense, resilience is seen as something that involves how you see and speak to yourself, how you communicate with others, as well as the daily routine structure one puts on their own daily lives. Through the extrapolation of data from several self-care websites and applications, the study has found that these two discourses are commonly found to include tips on physical health (including exercise, sleep and food), along with assisting in resetting one's perception of themselves by accepting one's imperfections, and emphasis on having support systems. Though many other topics are still relevant to the discussions of self-care and resilience in the workplace, these three provided the most applicable information, while also being the most prominent knowledge available through the websites and applications investigated.

#### 124 1:45 PM

### Crossing Borders and Overcoming Barriers

#### Nona Saber (Undergraduate)

The process of resettlement presents many barriers for international migrants, including refugees and asylum seekers. Examples of these barriers include government policies and action, integration into the labor market, and public attitudes. The research consisted of data from various studies on the treatment of refugees. The findings are also produced from evidence from experiential field work at the International Rescue Committee (IRC) of El Cajon. All of these obstacles prove to create an unwelcoming nature for refugees going through resettlement. However, the findings from the research suggest that the greatest obstacle to overcome is the reaction of the natives of the host country. Being displaced from their homes, undergoing a long waiting period with protocols to be accepted into a host country, and finding a way to make a living is already difficult enough. Facing challenges like everyday instances of prejudice or even hate crimes inflicted by the natives of a host country only make the journey unnecessarily intolerable. Assimilation into a new society becomes all the more difficult when the society does not accept the refugee. By encouraging more positive attitudes toward refugee acceptance, resettlement and integration into the host country will become far less challenging.

#### **Session F1**

Oral Behavioral and Social Sciences Friday, March 19, 2021, 2:00 PM

#### 125 2:05 PM

Civil Society Contributions to the Women, Peace and Security Agenda: Femmes Africa Solidarité and UNSCR 1325 as a Conceptual Framework

#### Maria Voss (Undergraduate)

Passed in 2000, United Nations Security Council Resolution (UNSCR) 1325 on Women, Peace, and Security (WPS) calls for women's participation at all levels in decision-making institutions, the protection of women and girls from sexual and gender-based violence, the prevention of violence through the promotion of women's rights, accountability, and law enforcement, as well as gender mainstreaming in peace operations. To be effective, this international resolution must be adopted (e.g. through national action plans and regional action plans) and implemented by governments to improve women's participation in peacebuilding efforts and post-conflict reconstruction. Based on the scholarly literature on women's rights and international norms as well as the spirit of Resolution 1325 itself, the expectation is that it is important for governments to include women's civil society in the adoption and implementation of UNSCR 1325. Through case studies of the Great Lakes Region and four countries in that region (Rwanda, Burundi, the Democratic Republic of the Congo, and Uganda), two countries in West Africa (Nigeria and Senegal), and the Mano River Region, this study aims to illuminate what contributes to and hinders the adoption and implementation of UNSCR 1325 and whether governments have followed the spirit of Resolution 1325 by including and collaborating with women's civil society in the process of adoption and implementation of national and regional action plans. Interviews with key informants working on WPS as well as archival research at Femmes Africa Solidarité (FAS), a transnational feminist organization that works on UNSCR 1325, complement the secondary sources of data in this study.

#### 126 2:15 PM

The Effect of Gender and Criminal Motive on the Hireability of Applicants with a Criminal Record Adara Benz (Undergraduate) Niv Levi Casiano Cabrera Jessica Bursey

Job applicants with criminal records face many obstacles when re-entering the workforce. Prior studies explored how an applicant's criminal record can influence hiring decisions. This study examined how a job applicant's gender and motivation behind committing a previous crime affected the applicant's hireability. Participants (N = 69) consisted of males and females over the age of 18. They were virtually sent a randomly assigned vignette that described a job applicant. The applicant's gender and criminal record were given. The criminal record indicated the applicant's motivation for the crime. Applicants were depicted to be influenced by need or greed to steal \$60,000 from a bank. The greed motive was stealing the money to buy a luxury sports car. The need motive was stealing the money to pay for a life-saving surgery for a loved one. Participants were asked to picture themselves as the hiring manager, then asked to evaluate the given applicant on an applicant hireability scale. Results showed that applicants had significantly lower hireability scores than female applicants with a need motive. Surprisingly, they also had significantly lower hireability scores than male applicants with a greed motive. Future research can examine other variables that affect hireability, such as race and age, and how actual hiring managers judge the hireability of fictitious job applicants.

#### 127 2:25 PM

Dehumanization from the Lens of an Advocate: Amplifying the Experience of Immigrants Navigating the Southern California Healthcare System through Autoethnography **Olinca Reves-Gutierrez (Undergraduate)** 

This autoethnographical research presents how my role working with immigrants employed in San Diego health institutions affected me. I present the voices of employees working in positions unequal in the distribution of power who face microaggressions in the workplace, health disparities, and lack the opportunity for professional growth. This autoethnography's primary goal is to display my

perception of how power differentiation constantly polarizes our organizations and our country. In my ten years of experience working in healthcare as a Nutrition Services Director for the elderly, I have observed how the immigrant community is always marginalized by administrators, and managers in power. From my position as an insider and my function as a cultural interface between managers and immigrant employees, I was a first-hand witness of the economic and professional growth hardships immigrant workers and elderly patients undergo in our dysfunctional healthcare system. I identified institutional racism as the common denominator for the unresolved and weakened agenda-setting regarding healthcare we all are experiencing. I argue that cultural competence training, egalitarian policies, and language programs; could foster a more culturally diverse healthcare system. My expanded literature review helped me conclude that a critical conflict approach to institutional racism is an alternative paradigm for analysis, policy, and action to create an ethnically-just and a class-equitable, democratic society. These first-hand experiences have caused me to make career decisions that were life changing, such as pursuing a Communication (Applied) Bachelor's Degree. It ignited my curiosity and drive to articulate and write about the dehumanization of our healthcare system. The unequal distribution of power impacted my experiences with the healthcare system, from my own insecurities of being ascribed an interface role to the ways that administrators and healthcare providers interacted with elderly patients and staff members of diverse ethnical backgrounds. I plan to further expand this autoethnography by developing a narrative research project from a sojourner angle that details the many critical narratives of fellow immigrants in their many roles: workers, patients, and family members.

#### 128 2:35 PM

The Effects of Age, Education Level, Ethnicity, and Sex on Perceived Risk of Tobacco, e-Cigarettes, and Marijuana Nicole Isho (Undergraduate) Sarah Carrier Jessica Pugel

Smoking is the single most preventable death, yet millions of individuals in the United States suffer every year from smoke-related disease and mortality (Centers for Disease Control and Prevention, 2020). Smokers and non-smokers differ in their view of the harm associated with this activity. Risk perception is a subjective view of the potential health-related consequences regarding a certain hazard (Kaufman, Persoskie, Twesten, & Bromberg, 2020). This view heavily impacts an individual's choice to initiate, cease, or avoid behaviors that are deemed dangerous to one's health. The current study examines the influence of age, education, ethnicity, and sex on the perception of risk associated with tobacco, e-cigarettes, and marijuana (TEM) products. A sample of 69 adults were recruited with the help of community organizations. Participants were non-smokers with strict in-home smoking bans and identified primarily as female (91.3%), Latino/Hispanic (66.7%), and had at least some college education (49.3%). Mean age was 58 years (SD = 19). As part of a larger interview, TEM risk perception was assessed in three five-question Likert-type scales with scores ranging from 1 (not at all harmful) to 7 (very harmful). A series of independent samples t-tests and one-way ANOVAs were performed, with family-wise Bonferroni corrections to set the alpha level at .0167. Results indicated that education level was significantly associated with the perceived risk of tobacco, F(2, 68) = 5.56, p = .006, but not e-cigarettes, p = .29, or marijuana, p = .57. Post hoc comparisons indicated that participants with grade school level or less perceived tobacco as less harmful than those participants with some high school education or a GED, or those with at least some college education. However, there was no difference between those with some high school or a GED and those with at least some college. There was no significant association between perceived risk of TEM and sex, ethnicity, or age. These findings indicate that, even in a limited sample of people with smoke-free lifestyles, education levels are associated with perceived risk of tobacco. These results suggest the need for effective public health interventions targeting those with lower education.

#### 129 2:45 PM

# Using The Health Behavior Model to Explore DIY eJuice Mixing Behaviors Maxwell Groznik (Master's)

Vaping among young adults has steadily grown in popularity over the past decade, becoming a modern cultural phenomenon. Social media forums and increased regulatory uncertainty have contributed to a new trend in vape culture, called do-it-yourself ejuice mixing (DIY eJuice). DIY eJuice involves home-made mixing of fogging agents, nicotine salts, and flavor agents to create personalized vaping liquid. Although mixing is legal, there is potential for bodily harm in the untrained mixing of volatile chemicals and in the chemical make-up of the final liquid that is directly inhaled into lungs. To date, there is little research on mixing prevalence and no known research on motivations and risk management among mixers. The purpose of this study was to employ mixed methodological approaches to explore the communicative processes surrounding vape users' decisions to mix DIY eJuice. Guided by tenants of the health belief model and the theory of planned behavior, participants were recruited locally for focus group discussions via SONA (n = 4) and internationally to complete an online survey via Prolific (n = 217). Across data collection, questions explored experiences with the online DIY eJuice community, motivations for mixing, where mixers turn for information and tutorials to acquire knowledge of how to mix, flavor preferences, and perceived benefits to mixing compared to traditional pre-mixed juice from retailers. Results found that curiosity and cost motivate vapers to first experiment with mixing. Decisions on whether or not to continue mixing are motivated predominantly by convenience and cost. In addition, experimentation with mixing is typically first promoted offline in peer groups, but non-regulated online forums appear to be the largest source of mixing-related guidelines, suggestions, recipes, and practices. Finally, the ability to control nicotine levels is the most frequently cited motivator for mixing. These findings provide theoretical implications for the role of health communication constructs in understanding new trends in tobacco prevention behaviors. Findings also provide implications for parents, teachers, and mentors seeking to consult with children and young adults about vaping and mixing behaviors. As vaping trends change and grow, preventative research needs to be ready to provide evidence-based guidelines and practical support.

#### **Session G1**

**Oral Behavioral and Social Sciences** Friday, March 19, 2021, 3:00 PM

#### 130 3:05 PM

Forget Parenting Books, Just Create a Facebook Account: Analyzing the Accessibility of Hospital Maternity Support Services Bernadette Maria Castillo (Undergraduate)

With the increase in accessibility of social media, 81% of moms now use platforms such as Facebook, 66% look for parenting information, and 50% look for social and emotional support during their parenthood journey, according to Pew Research. The purpose of this research is to analyze the current support programs for moms offered by the "Best Maternity Hospitals of 2020," by Newsweek, to understand what the support standard for maternal health care currently is. The data for this research was collected from November 2020 to January 2021. The research questions are the following: (1) How many hospitals consider their maternity patients' concerns by providing a safe space for them to have community engagement? (2) What does the literature demonstrate about the importance of having a support group for mothers? First, a literature review was conducted with the following keywords: support, groups, mother, social media, and health care. Secondly, based on Newsweek's list in partnership with The Leapfrog Group, we coded the hospitals for the following variables: Support Group, Facebook Group, and Terminology for Maternity Services. The literature review showed the importance for moms to have an online support group. Preliminary results of the coding showed that the "Best Maternity Hospitals of 2020" do not offer support groups that allow for expecting moms to interact with other moms. Instead, the resources hospitals provided were pre-recorded classes that expecting mothers could watch on their own time. In some instances, they were offered on a different site and were not easily accessible. Another point of inaccessibility is that each hospital had their own terminology when referring to its maternity services. It would be beneficial for hospitals to sponsor their own online community platforms for moms with similar accessibility features like Facebook. Health professionals in the maternity field should monitor this online platform to avoid misinformation about parenting practices. By using the same terminology for maternity services and by providing a safe and accessible community space, health organizations would help alleviate the social and emotional stress from their maternity patients.

#### 131 3:15 PM

#### Intervention Suggestions to Improve Uptake of Breast, Cervical, and Colorectal Cancer Screening Among Patients Living with Serious Mental Illness

#### Aleigha Binda (Undergraduate)

Individuals living with serious mental illness (SMI) have a higher risk of dying from cancer and are less likely to engage in recommended cancer screening. This study examined the perspective of individuals living with SMI and their mental health care providers regarding the design of a cancer screening promotion intervention. This study used Intervention Mapping guided by the Social Ecological Model (SEM). Participants were recruited from an adult intensive outpatient program (AIOP) at a specialty psychiatric treatment hospital in San Diego, California. Purposeful sampling yielded 25 individuals with SMI (mean age: 71.4 years; 60% female) and 15 stakeholders (mean age: 45.3 years; 80% female), those who provide mental health services to people with SMI in San Diego, California. Participants completed semi-structured in-depth interviews to assess the needs and assets of a potential intervention to facilitate adherence to recommended breast, cervical, and colorectal cancer screening. Interviews were recorded, transcribed verbatim by research

staff, and imported into NVivo. Content analysis and the constant comparison method were used to analyze interview data. Many participants suggested various individual, interpersonal, and community-wide intervention strategies, including educating patients about screening and the importance of screening, providing a reassuring and comforting environment, and providing assistance for coping with exacerbation of mental health symptoms during screening. Participants most commonly recommended mental health providers, medical providers, family members, friends, and other caregivers to provide cancer screening information. Moreover, a wide range of places were suggested for the provision of the intervention, the most commonly suggested. In conclusion, cancer screening interventions should be delivered in a reassuring way to people living with SMI to facilitate coping with distress related to the screening experience. Study findings could be used to develop interventions that can potentially improve uptake of breast, cervical, and colorectal cancer screening among individuals living with SMI.

#### 132 3:25 PM

#### Searching for Myself in Higher Education: A Journey of Self-Reflexivity as a First-Generation Filipina Asian-American **Reychel Joy Robles (Undergraduate)**

This autoethnography questions what student support should look like both inside and outside the classroom through the undergraduate student perspective of a first-generation Filipina-American. My experiences with immigrant parents, mentorship, imposter syndrome, and navigating social spaces at home and within the university made me understand my positionality and what student support should look like. For each aspect/theme of this autoethnography, I will share a vignette of my life that will be supported by a review of the literature, followed by an analysis of that experience through self-reflexivity. These findings not only may represent other underrepresented groups but also help to close the research gap that exists about optimal ways to engage underrepresented students in higher education.

#### 133 3:35 PM

# BOLD Response During Attention Tasks in Fetal Alcohol Spectrum Disorders **Deva Reign (Undergraduate)**

Heavy prenatal alcohol exposure (PAE) can result in a scope of neurocognitive deficits, including functional and volumetric changes in brain regions (Ware et al. 2014). Prenatal alcohol exposure has been frequently linked to structural brain abnormalities and neurocognitive deficits in affected individuals. Functional neuroimaging (fMRI) studies have shown that alcohol-exposed individuals demonstrated altered patterns of blood oxygen level dependent (BOLD) response during cognitive task performance (Spadoni et al. 2009). Functional neuroimaging can be used to identify brain areas, understand the underlying processes affected by PAE as well as providing an association between neural activity and performing cognitive or behavioral tasks. Various methodologies have been utilized to investigate the functional changes within the brain and nervous system of individuals diagnosed with PAE, fetal alcohol syndrome (FAS) and fetal alcohol spectrum disorders (FASD) (Coles & Li, 2011). Studies of BOLD response have shown functional differences associated in brain regions during attention tasks in children and adults with alcohol effects (Spadoni et al. 2009). Studies suggest that increased BOLD response may represent neural compensation or decreased efficiency of brain networks (Spadoni et al. 2009). The aim of this project is to examine results from published studies of the BOLD during attention tasks among individuals with FASD, integrate these results in a systematic review, and draw conclusions regarding brain networks underlying attention deficits in FASD. Articles for this study will be identified by searching the databases PubMed and Google Scholar. Inclusion criteria include primary journal articles published between 2000 and 2020 in English. The search phrases used were "BOLD," "fMRI," "imaging," "attention," "prenatal," "fetal," "alcohol," "FAS," and "FASD." Review articles and duplicate listings will be excluded.

#### 134 3:45 PM

#### Living Autoethnography: The Ecology of Latinas in STEM Karla Giselle Alcaraz (Undergraduate) Paulina Arellano

Autoethnography is a research approach that combines qualitative research to examine one's cultural identities that affect their personal lived experiences. This collaborative study looks at how two Latina college students majoring in STEM navigate their experiences with mental health and gender roles in higher education. The authors reflect on their individual lives, starting from their childhood to the present day. The two authors participated in the Health Career Opportunity Program (HCOP) at San Diego State University during the summer of 2020. Subsequently, they participated in the Faculty-Student Mentoring Program (F-SMP), where

they continued their research. This presentation focuses on the methodology of autoethnography and how it highlights individual voices while also promoting a collective of shared lived experiences. The study explores two autoethnographic works in addition to the on-going writing process of creating and reviewing their autoethnographies. We read several scholarly articles about auto-ethnography, intersectionality, qualitative research, narrative study, and cross-cultural awareness to guide our narratives. Our research faculty mentors led through a series of biweekly meetings on Zoom, supporting us in the research process. We took part in self-inquiry and reflexivity to recognize who we are as Latinas and how we view ourselves in higher education. A literature review template was created in a google excel document to facilitate information gathering and sharing of resources found. In addition, we learned how to use N-Vivo as a tool to learn more insight from our qualitative data and be able clearly to articulate our findings. In this process, we found a research gap of Latinas in STEM, specifically how mental health, gender roles, and cultural barriers work together to affect their career and education prospects. We then conclude with ways higher education can help support Latinas on their pathways to STEM. One of the limitations that both authors faced was adding and revising their auto-ethnography as it is an on-going work-in-progress. Due to the COVID-19 pandemic, we could not access in-person resources to expand our research and fieldwork.

#### **Session H1**

# Oral Physical and Mathematical Sciences Friday, March 19, 2021, 4:00 PM

#### 135 4:05 PM

#### Investigating the Structure and Phase Behavior of Spider Silk Peptide Mimics Brittany Puzio (Undergraduate)

Spider silk is exceptionally strong, lightweight, and biocompatible making it an ideal biomaterial for countless applications in defense, space exploration, industrial, and medical fields. Dragline silk, the strongest silk spiders make, is assembled primarily from two large (300-350 kDa) intrinsically disordered proteins (IDPs) called spidroins (Sp) that are synthesized and stored within the major ampullate (Ma) glands dubbed MaSp1 and MaSp2. These proteins are highly repetitive and consist of alternating poly(Ala)n (n = 4-9) motifs interspersed by Gly-Gly-X regions where X can be Gln, Tyr, Ser, Arg, or Pro (Pro found only in MaSp2). It was discovered by our group that the proteins are not stored as single protein monomers but as hierarchical nano-assemblies that contain hundreds of MaSp protein monomers in a hierarchical superstructure that is 200-300 nm. Using MaSp1 and MaSp2-like peptides synthesized in-house with high efficiency solid phase peptide synthesis (HE-SPPS), we are investigating the structure and organization of these peptide mimics using protein synthesis, transmission electron microscopy (TEM), dynamic light scattering (DLS), UV-VIS, and nuclear magnetic resonance (NMR) spectroscopy. The transmission electron microscopy images of the peptide mimics show several micelle-like structures in the 50 nm range (see Figure). The DLS data for both synthesized spider silk peptide mimics show 50-1000 nm structures, indicative of micelle-like structures in the native spider silk dope. When phosphate is added, it results in a smaller particle size around 1 nm, corresponding to a single monomer peak. The UV-VIS data for the MaSp1-like peptide shows evidence of an upper critical solution temperature (UCST) phase transition. Together, we were able to show that peptide mimics inspired by the MaSp proteins can form these soft nanoparticle large micelle assemblies which we believe are fundamental for creating new materials that exhibit the extraordinary properties of spider silk.

#### 136 4:15 PM

# Targeting First-Row Transition Metal Water Oxidation Catalysts Using Computational Chemistry Jake Kerkhof (Undergraduate)

Water oxidation catalysis is a process that could be an important feature in the sustainable production of hydrogen fuel in the future, however the use of ruthenium and other rare metals in present day catalysts limits their use in industrial scale quantities. This study attempts to target a catalyst composed of more abundant materials by using B3LYP based DFT optimization and frequency calculations using a 6-31g(d,p), Lanl2dz split basis set to quantify theorized first-row transition metal analogs of a novel ruthenium-based WOC through various stages of oxygen evolution. Based upon structural and energetic values similar to that of ruthenium complex and a predicted low energy triplet state of the oxo-bound complex that also appears in the ruthenium WOC of basis, Fe(terpyridine)(1-10-phenanthraline-2-sulfonate) is a likely candidate for a novel catalyst with a first-row transition metal core.

#### 137 4:25 PM

# Characterizing Abnormal Fluid in Three-Dimensional Reconstruction of Cystic Fibrosis Lungs Amanda Lee (Undergraduate)

Cystic fibrosis (CF) is a genetic disorder that affects the body's mucus and sweat glands. The genetic defect causes mucoid impaction on the airways, leading to respiratory infections and early mortality. CF severity is currently accessed by a set of in-clinic lung function tests called spirometry; however, these tests are limited in that they give little information about the areas of the lung where airflow is restricted. Lung abnormalities accumulate in distinctive patterns across CF severities, but there is limited research relating the structural consequences of CF to spirometry outcomes. An MRI sequence developed at UC San Diego has demonstrated that regional abnormalities can be visualized in lung images. In this study, MRI lung images for CF subjects and healthy controls obtained from UC San Diego's database were compared through the creation and implementation of a novel image processing algorithm in MATLAB. The algorithm automatically detects lung abnormalities and performs three-dimensional reconstruction and segmentation of excess fluid in the lungs. By combining the results of this image analysis with statistical modeling, we successfully created a novel, robust metric for identifying the spatial distribution of abnormal fluid in various stages of CF. The results of this study yield an accurate, quantifiable, and reproducible system of classification for phenotyping abnormal lung fluid. This enhanced evaluation of spatial lung abnormalities will advance possibilities of personalized treatment plans for patients suffering from CF.

#### 138 4:35 PM

#### C4-Selective Minisci Addition on N-heterocycles Ernesto Millan Aceves (Undergraduate)

Heterocyclic compounds are one of the most relevant molecular scaffolds in modern medicinal chemistry and drug discovery, where 82% of the top 100 marketed small molecule pharmaceuticals and eight of the ten most marketed drugs contain at least one heterocycle. N-heterocyclic moieties are prevalent in medicinal chemistry, as they play an important role in controlling molecular properties such as electronic distribution, three dimensionality, and scaffold rigidity. Additionally, they can promote properties favorable to ADMET such as lipophilicity or polarity, which can determine molecular reactivity, metabolic stability, and toxicity. In the past decade, there has been a resurgence of Minisci-type additions allowing access to bigger libraries of N-heterocyles. With more diverse substrate and radical scopes while maintaining mild conditions, these additions have proven very useful to synthetic chemistry. Still, Minisci-type additions fall short when looking at the regio-control, giving this chemistry very little viability in medicinal syntheses. In this work we explored how the use of different Lewis and Bronsted acids affect the regioisomeric ratio of Minisci-type additions and developed a C4-selective addition at lower yields. While the yields were lower, the selectivity was achieved using cheap bulk reagents that can be used in excess.

#### 139 4:45 PM

# Utilizing Fluorescence Flow Cytometry Microfluidic Chips for the Determination of Local Immune Response

#### Madison Noroña (Undergraduate)

A widespread technique, fluorescence flow cytometry (FFC), is used in a multitude of biochemistry and biological laboratories to determine many physical and chemical properties of a variety of cells within a sample mixture. One or more fluorescent compounds (e.g. labeled antibodies, DNA dyes) are added to the sample, which bind to different cells based on specified physical or chemical features of the cell. Then, the sample runs through a flow cytometer, with each individual cell passing the detectors separately. Based on an individual cell's fluorescence signature, this technique can detect, count, and even sort cells in a sample. Although flow cytometers make it easy to differentiate between cells in a sample, these instruments can be rather costly. To increase accessibility and reduce expenses, we are exploring the novel fabrication of microfluidic chips for flow cytometry systems using 3D printing. 3D printing is an inexpensive and quick way to create templates for microfluidic chip systems. Polydimethylsiloxane (PDMS), a silicon based organic polymer, can be poured over the 3D-printed template, creating negative replicas of the channels when cured. This PDMS chip can then be removed from the template and bound to a flat, clear surface and be used for small scale flow cytometry with samples on the microliter scale. This oral presentation will discuss the beginnings of building a pressure-based microfluidic FFC system in order to count the number of leukocytes in a whole blood sample. The amount of leukocytes, or white blood cells (WBCs), indicate one's body's immune response. Using samples on the microliter scale, collected from capillary blood we will be able to determine local immune response in different areas of one's body. In a whole blood sample, the only cells containing DNA are WBCs. Therefore, when mixed with a DNA intercalating fluorophore, SYBR gold, the only cells that should fluoresce in a whole blood sample are WBCs, allowing them to selectively be counted.

#### **Session I1**

Oral Physical and Mathematical Sciences Saturday, March 20, 2021, 9:00 AM

#### 140 9:05 AM

Impacts of Global Warming on southern California's Winegrape climate suitability Corrie Monteverde (Doctoral)

Winegrowing regions in southern California have expanded in the past couple of decades and sales at wineries contribute millions to billions of dollars to regional economies and provide thousands of local jobs. It is therefore necessary to provide high-resolution future projections of climate suitability for this sector. Based on a physically-based regional climate model, evaluation of climate suitability for premium winegrape crop production reveals that regions transition into some of the warmest climate structures for viticultural purposes by 2050. In addition, this study showed that by 2050 there will be an approximate increase of  $1.2\pm0.1$  °C in mean temperature and monthly mean rainfall amounts could decrease  $11\pm1.0\%$ . By 2050, the overall extent of regions across all indices will reduce an average of 42% for the cool to warm climate suitability categories. The projected decline in viticulture suitability highlights the need for adaptive capacity within this sector to mitigate the impacts of global warming.

#### 141 9:15 AM

# Impact of Wildfire on Surface Energy Balance in Six California Case Studies **David Rother (Doctoral)**

We investigate the impact of wildfires on surface energy exchange through the assessment of six California wildfires that occurred in the last 20 years. A burned–unburned binary mask was generated from the MODIS approximate date of burn product and implemented into the Simplified Simple Biosphere model for a series of simulations. Model perfor- mance was evaluated against the North American Land Data Assimilation System and is found to simulate surface temperature and net radiation accurately. Simulations show a decrease in latent heat flux in every case study except the Rush fire, which occurred in Las- sen County in August 2012. Post-fire changes in net radiation and sensible heat followed similar trends, decreasing in each of the domains except for the Rush and Cedar fires. The greatest changes in temporally-averaged net radiation occurred in the Rim (– 41.7 W m–2), Basin Complex (– 31.6 W m–2), and Rush (26.5 W m–2) fires. Initial increases in sensible heat flux, caused by the decrease in albedo from ash deposition, are balanced by decreases in latent heat flux in the Zaca, Rim, and Basin Complex case studies. Results also indicate a relationship between decreases in average sensible heat flux and leaf-area-index change. Wildfires that burn in sparsely vegetated areas are associated with increases in sensible heat flux, an effect that is magnified by long ash-deposition periods (i.e., Rush fire), while wildfires that burn in densely vegetated areas are associated with large decreases in sensi- ble and latent heat flux (i.e., Rim, Basin Complex fires).

#### 142 9:25 AM

# Analyzing People's Perceptions on Amazon Rainforest Fire in 2019 Using Social Media Jian Xu (Doctoral)

The various social media platforms in the era of big data provides us the opportunity of quickly gathering data timely and conveniently. Due to the complexity and non-uniformity of social media data, how to use social media data to analyze social and natural problems has been very challenging. In this research, we explore the relationship between the attention of general users, media reports, and Amazon fire by studying thousands of collected tweets data from Twitter about the Amazon fire in August 2019. This research explores the feasibility of using Twitter data to observe and solve real problems. It developed an effective method for capturing cleaning and integrating social media data; and performing sentiment analysis and time series comparison on the data. There are three significant findings in this study. First, compared with the number of fires from earth observation data in previous years, the fire that sparked extensive discussions on Twitter in August 2019 is not the worst one. Second, the attention of general users on Twitter to this incident was greatly influenced by the media reports, and both of them are related to the fire size to a certain extent. Finally, the public's attention experienced a steep decline when people realized that the media's previous report was fake news.

#### 143 9:35 AM

# Agricultural Responses to Changing Water Supplies in Imperial Valley, California Gabriela Morales (Master's)

The Quantification Settlement Agreement of 2003 (QSA) was enacted to reduce California's dependence on imported water from the Colorado River and fit within its 4.4 million acre-feet allotment. Parties from federal, state, and local levels agreed to implement a series of agriculture-to-urban water transfers from the Imperial Irrigation District (IID) to San Diego County Water Authority (SDCWA), ultimately decreasing the amount of water received by the Imperial Valley (IV). To conserve the massive volumes of water for transfer to SDCWA, the QSA incentivized water-conserving fallowing and on-farm efficiency programs in the IID. In this study, we used a mixed-methods approach involving hydrologic and spatial analyses supported by semi-structured interviews to explore the Imperial Valley's response to a decreased water supply. Preliminary results show that despite reduced canal inflow to the Valley as well as an overall decrease in total consumptive water use, annual water productivity in the IV increased since the QSA took effect. Narratives from key informants collected in semi-structured interviews negate pre-conceived notions of water scarcity, and instead imply an increase in water use efficiency within the IV's agricultural systems. Ultimately, our research will provide stakeholders with regional insight into hydrologic, socioeconomic, and agricultural change, and furthermore, inform potential adaptations to changing water availability, especially in arid climates.

#### 144 9:45 AM

Strengthening Diversity and Deliberation in Climate Adaptation Planning: the case study of San Diego and Imperial County's SDSU Sustainable Development Goals Tracking Dashboard Harmit Chima (Master's)

Christian Mejia Dustin Harrison

For vulnerable populations in San Diego and Imperial County, including: children, low-income communities, persons with disabilities, migrants, pregnant women, and minorities; the health effects of climate change-related extreme weather events can be especially devastating during times of the coronavirus pandemic. Such populations may be more susceptible to disease, have pre-existing health conditions or live in areas that do not promote good health, well-being, access to services, resources, education, technologies, and infrastructure. To address these challenges we established a team of international interdisciplinary professionals from US, Italy, Ukraine, France, and Mexico to pioneer new frontiers for better solutions by establishing the SDSU Metabolism of Cities Living Lab (MOC-LLab) at the Center for Human Dynamics in the Mobile Age in the Department of Geography to "Strengthen Diversity and Deliberation in Climate Adaptation Planning," with the mission to view the city as a living organism and build on SDSU's Climate Action Plan through community engaged research, technology development, nature-based solutions, data analytics, and citizen science to track and monitor post-Covid-19 impacts to regional and local communities in Southern California while localizing the United Nations Sustainable Development Goals by 2030. The MOC-LLab provides a clear assessment of the current state of the environment in Southern California where the challenges we face can be measured and thus better managed. The assessment lays the foundation for continued socio-environmental assessments across relevant scales, with an integrated focus, enabling and informing societal transitions and tracking of Sustainable Development Goal targets, as well as, previously agreed environmental goals by tracking the top five lacking sustainable development goals in Southern California from 2009 to 2019, these include: "water", "affordable and clean energy", "industry, innovation, and infrastructure", "sustainable cities and communities", and "responsible consumption and production" through a dashboard to visualize and share knowledge to analyze past choices and forecast future trends. This will allow the community to demonstrate how to support, adopt and implement SDGs in governance, operations, and culture. The MOC-LLab, and collaborative processes, have worked to bridge the gap between science, civic engagement, and policy by turning the best available scientific knowledge into information relevant for decision makers.

#### **Session J1**

Oral Physical and Mathematical Sciences Saturday, March 20, 2021, 10:00 AM

#### 145 10:05 AM

A Search for Circumbinary Planets in Light Curves from NASA's TESS Mission **Zikun Lin (Master's)** 

A circumbinary planet is a planet that orbits both stars in a binary star system. These systems are relatively hard to detect, and currently there are only 17 known circumbinary systems. We conducted our own search for new circumbinary planets using data from NASA's Transiting Exoplanet Survey Satellite (TESS) mission. We looked at about 1,600,000 light curves and used machine learning

techniques to find eclipsing binaries. In particular, we used an unsupervised learning K-means cluster algorithm and a Convolutional Neural Network. Tests show these methods have about 91% accuracy in identifying eclipsing binaries. About 5000 eclipsing binaries were found, including one previously known circumbinary planet system. At this time, no new circumbinary systems were found. In the second part of this thesis we studied the previously known circumbinary planet system known as KIC 10753734. We analyzed all of the available Kepler data, ground-based optical observations, and new data from TESS to find a comprehensive model for the system. In this case, the analysis of this system is complicated by the presence of variability in the light curve caused by star spots on both stars. We developed a new technique to remove the effect of the star spots from the light curve. Updated values for the component masses and radii and updated values for the orbital elements are presented.

#### 146 10:15 AM

# Determination of the Internal Structure Constants from Eclipse Times using ELC Alexander Dimoff (Master's)

Apsidal motion is the precession of the line of apsides in an orbit due to general relativistic effects, tidal interactions, and intervention by other bodies. Observing this phenomenon allows investigation of complex orbital dynamics and the internal structure of stars. Historically, apsidal motion has been observed through the analysis of eclipse times to reveal changes in the interval between primary and secondary eclipses, and is visualized in an O-C diagram when compared to a calculated linear ephemeris. While successful in characterizing the whole system with the average value of the internal structure constants k2 obs, it fails to constrain the individual constants k21, k22 of the bodies themselves, and does not work well for binaries with mass ratios q > 1. Here we use the Eclipsing Light Curve program (ELC) to compute individual apsidal constants for a set of eclipsing binary systems, assuming a constant metallicity. Archival observations of times of minima are collected from the literature for the eclipsing systems with short periods of apsidal motion EM Car, DR Vul, CW Cep, Y Cyg, and V526 Sgr. New high-cadence photometric data from TESS was obtained from MAST, and eclipse times in the TESS data were determined. Given the apsidal constants k21 and k22 for each star along with the orbital elements, the ELC code can compute the times of eclipse. The optimal values for the apsidal constants and orbital elements are then determined for each system using an optimization code based on a Differential Evolution Monte Carlo Markov Chain technique. Using simulated data sets for each system, we explore the limitations of this technique. Provided observed eclipse times are available for most of an apsidal cycle, we show this analysis provides an accurate value of individual constants, which is a marked improvement over the previous technique which can only yield the average value of the two stars.

#### 147 10:25 AM

# Modeling Superdense Matter and its Implications on Neutron Stars and Twin Stars Kara Whitaker (Undergraduate)

Neutron stars, which are exceptionally dense objects that result from supernova explosions, range in mass from approximately 1 to 2 solar masses with diameters of around 20 km. The incredibly high densities in the cores of these stars are several times higher than that of atomic nuclei. As a result of this, a spoonful of neutron core material would have the mass of a billion tons. At these incredible densities, atomic structures collapse and nuclei are squeezed so tightly together that the neutrons and protons begin to dissolve into their constituents, the quarks, and/or transform into other types of particles such as hyperons. This project models neutron stars of different particle core composition to see what effect it has on the bulk properties of the star. A second objective of the project is to investigate "twin stars" which are a theorized branch of neutron stars with smaller radii and higher densities. This research project uses the latest data provided by astrophysical instruments such as NICER (Nuclear Interior Composition Explorer) and the gravitational-wave detectors LIGO and VIRGO in complement to the modeled data to shed light on the properties of super-dense matter, neutron stars, and theorized twin stars.

#### 148 10:35 AM

# Exploring the Circumgalactic Medium of Quasars: A Search for Nearby Interacting Galaxies Cynthia Ibrahim (Undergraduate)

A challenge in the study of the circumgalactic medium (CGM) around quasars is pinpointing what causes quasars with cool circumgalactic gas to be more luminous than ones without. The CGM is the gas surrounding a galaxy, which is outside their stellar disks and within their virial radius. It is important because the CGM is a source of fuel for star-formation which can then drive stellar winds that can help recycle metals. Here we explore galaxies near quasars, at redshifts 0.4 < z < 1.0, to test if they are interacting (or merging) with the quasar which may dynamically disturb the cool gas in the quasar's CGM. This could possibly lead to gas accretion which would fuel the quasar. One way to test for interaction is by investigating the nebular emission of galaxies near a quasar's environment. We do this by looking for a correlation between intensity (or ratio) of emission lines and distance from quasar. Specifically,

we are focusing on nebular emission lines associated with star formation (e.g. H-alpha, H-beta, and [OII]) with the goal of searching for enhanced star formation, which could be evidence of an interaction with the nearby quasar. Here we will present the preliminary results of our Magellan/LDSS3 spectroscopic survey of galaxies within guasar environments. From our initial case study, we find no evidence of enhanced star formation for the galaxies near the quasar. Our future work will focus on incorporating the full sample of all 19 quasar fields with optical spectroscopy and determining other physical parameters such as metallicity and ionization. 149 10:45 AM

#### Orbital Characteristics and Habitability of the Circumbinary Planets Caleb Ben Christiansen (Undergraduate)

Circumbinary planets orbit a pair of stars rather than a single star like the Earth does. The habitability of such planets is more complicated than that of a single star system because of the variability introduced by a second star. The habitable zone is the portion of the system where liquid water is capable of persisting on a planet's surface, and is thought to be the most likely place to detect extraterrestrial life. In a single star system, this zone is determined by the distance of the planet from the star; too close and it is too hot, too far and it is too cold. In circumbinary systems, the habitable zone is a dynamic area influenced by not one, but two stars, and the size and eccentricity of their orbits. In addition, to have stable orbits, circumbinary exoplanets also must orbit beyond the point of critical instability, which is the distance or orbital period a planet must exceed to maintain a stable, long-term orbit. We show that, with only one exception, the circumbinary exoplanets tend to orbit near the point of critical instability. We also compare the orbital periods, radii, and insolation (incident energy from the stars) of all known Kepler and TESS circumbinary planets against single-star planets and confirm that circumbinary planets often have low insolation. Of the 14 currently confirmed circumbinary planets, we calculate 5 have an insolation that places them within the habitable zone. While these planets are likely gas giants, any rocky moons they may host would be interesting to explore.

#### Session K1

**Oral Physical and Mathematical Sciences** Saturday, March 20, 2021, 11:00 AM

#### 150 11:05 AM

Mathematical Models for Cystic Fibrosis: Ideal Antibiotic Treatment Protocols Peter Uhl (Doctoral)

Cystic Fibrosis is a genetic condition that is characterized primarily by build-up of a thick mucus layer in the lungs which causes frequent lung infections, chronic inflammation, and shortness of breath. The mucus layer in the lungs is colonized by a diverse community of opportunistic bacteria, many of which are pathogenic. The Climax-Attack Model (CAM) proposes that most of these bacteria can be grouped into two separate (but both pathogenic) communities: the faster-growing, transient, and facultative attack community, and the slower-growing, stable, aerobic climax community. In this talk, I will present several mathematical models to characterize the interaction of these two communities that exist in competition for a shared resource. Our model can describe a data set of the two communities obtained from a patient at the University of California San Diego Adult Cystic Fibrosis Clinic undergoing an exacerbation event and treatment with antibiotics. Using a spatially homogeneous deterministic model, I will show that the dynamics between the two communities is governed by the oxygen dependent growth rate of the aerobic climax community. Since the interaction of the two communities is highly dependent on their location within the lung, I then introduce a spatially heterogeneous agent-based model to characterize how the communities coexist throughout space

#### 151 11:15 AM

Network Models for Analyzing the Deformities Induced by the Ecotoxicological Contaminant Tris(4-chlorophenyl)methanol (TCPMOH) in Developing Zebrafish (Danio rerio) Ashley Schwartz (Doctoral)

Tris(4-cholophenyl)methanol (TCPMOH) is a recently discovered environmental water contaminant with an unknown origin. Although novel, it is highly persistent in the environment, bioaccumulates in marine species, and has been found in human breast milk. The increase in findings of TCPMOH in the environment and human samples poses itself as a possible threat to human development. This study investigates the effects of TCPMOH using the zebrafish model (Danio rerio) by assessing TCPMOH induced deformities during the developmental stage. With the help of Sant Lab of public health at SDSU, zebrafish have been exposed to 0.0, 0.5, 1.0 or 5.0 µM TCPMOH and monitored during the developmental stage. Exposures began at 24 hours post fertilization (hpf) and continued until 168 hpf while microscopy images of each fish were taken 24-hour intervals. From these images, morphological data has been gathered assessing deformities and mortality of each sample at every time point. This study aims to assess if TCPMOH perturbs the developmental process and how one deformity may lead to another. A complex network model has been developed to analyze the association between deformities and mortality within and between experimental groups. This study has developed four total network models that each include 5 subnetworks with 6 nodes each using mathematical correlations and spectral decomposition analysis. The spectral radius for each network has been assessed and reveals morphological deformity associations and a statistically significant increase in deformities in exposed samples. A key finding is TCPMOH exposed samples experience statistically significant developmental deformities and mortality. Node importance analysis reveals yolk edema is highly associated with the onset of other deformities and mortality. The findings of this study reveal the harmful effects of TCPMOH and the necessity to evaluate its origin to halt the continual contamination of our environment. With new environmental contaminants continually being discovered, the network model developed may be applied to determine the morphological damage any new toxicant may have.

#### 152 11:25 AM

LCMS Analysis of Secondary Metabolites Involved in "Sibling Rivalry" Zone in Marinobacter algicola Ellen Kuang (Doctoral) Heather Thorogood Mary Carrano

A qualitative untargeted metabolomics approach was used to identify candidate small molecules responsible for motility inhibition in the "sibling rivalry" inhibition zone between two Marinobacter algicola colonies in collaboration with the Carrano lab within the Chemistry department. Using artificial seawater media plates solidified with 1.5% agar, two sibling colonies were plated 1-3 cm equidistant from a center line and grown in the dark until an inhibition zone formed. Then, the agar in between the two colonies, as well as the agar on the other side of each colony from the inhibition zone, were excised and separately centrifuged to extract all the liquid from the agar. The supernatant was then sterile filtered before loading it onto a Sep-Pak to remove any remaining agar. The samples were then eluted with 2mL of methanol and dried on a rotary evaporator. All samples were reconstituted with 1mL of 1:1 acetonitrile:water prior to analysis on the liquid chromatograph-mass spectrometer (LCMS) system. Reverse phase chromatography (RP) in positive mode was used in combination with hydrophilic interaction liquid chromatography (HILIC) in negative mode to analyze the samples. We primarily relied on the bioinformatics platforms XCMS Online spectral alignment, feature detection and statistical analysis, while the Global Natural Products Social Molecular Networking (GNPS) was employed for metabolite identification. Statistically significant features on XCMS Online were filtered such that only those with a fold change ≥5, p-value ≤0.05, and maximum intensity ≥10000 were used for further compound identification, yielding 296 features to parse. Using MS2 fragmentation against various databases, we confirmed the following compounds: salicylic acid, 2-isopropylmalic acid, dethiobiotin, guanine and D-pantethine. These compounds are pending verification with standards, however preliminary motility assays in Carrano's lab have shown salicylic acid as a promising candidate. We are now working on identifying how these molecules are biosynthesized in the bacterium.

#### 153 11:35 AM

# Deep Neural Networks for Linear Koopman Embeddings Daniel Alford-Lago (Doctoral)

Koopman operator theory shows that nonlinear dynamical systems can be represented as an infinite-dimensional linear operator acting on a Hilbert space of observables of the system. As such, the spectral components of the linear Koopman operator provide a complete description of the dynamics of the system. However, determining the relevant modes and eigenvalues of this infinite-dimensional operator can be difficult. We present a deep learning framework for obtaining a subspace spanned by a finite set of eigenfunctions of the Koopman operator as well as the corresponding eigenvalues. Using deep autoencoders, we find a latent space representation of a time series of nonlinear trajectories that forms eigenfunction coordinates. This is achieved by parameterizing the autoencoder loss such that the latent trajectories exhibit linear dynamics. To this end, a matrix whose entries correspond to eigenvalues of the system is learned from the latent coordinates and used to advance the state. This network results in a global nonlinear-to-linear transformation of the flow and affords future state prediction. The method is tested on canonical nonlinear data sets and shown to produce results that remain physically interpretable.

#### **154 11:45 AM** Two Decoding Algorithms for Goppa Codes Esperanza Ochoa (Master's)

Quantum computers are in early stages of development. However, as soon as they become a reality, the defenses we currently use to secure communications will become obsolete. With that in mind, in late 2016, the National Institute of Standards and Technology (NIST) launched a competition to standardize a post-quantum cryptosystem. The selection of the new system, which will replace the widely used RSA, should be announced by 2025. The McEliece cryptosystem is one of the finalists of the second round of the NIST Post-Quantum Cryptography Standardization Process. As such, the system will likely be used in many applications to ensure secure communications over the Internet. The McEliece cryptosystem is code based. This means that it uses an error-correcting code (ECC) (a finite set of binary words) as part of its design. Portions of the secret message are randomly and purposely corrupted, rendering it unreadable. Recovering the original message requires decoding the ECC, which is a computationally difficult problem (NP-hard, in technical terms). McEliece's idea is that legitimate receivers work with a secret, long yet structured code, for which an efficient decoding algorithm is known; however, attackers are faced with the difficult problem of decoding a public random code. Goppa codes have been a popular choice for use with the McEliece cryptosystem due their efficiency (many of them exceed the Gilbert-Varshamov bound) and abundance. The latter makes it difficult for an attacker to determine what code exactly the legitimate user has adopted. In this work, we compare the performance of two decoding algorithms for Goppa codes, Euclidean and Patterson, considering several code parameters. In particular, we determined 20 binary Goppa codes which either met or exceeded the GV bound. What was noticed is that much depends on the code and its error-correcting capability, but one noticeable pattern is that the Euclidean algorithm is faster for codes with smaller error-correcting capability, whereas Patterson's algorithm is faster for codes with greater error-correcting capability. Given that in practice the codes used are those with greater error correcting capability (t > 50), Patterson's algorithm will likely be the best choice.

#### **Session L1**

Oral Behavioral and Social Sciences Saturday, March 20, 2021, 12:00 PM

#### 155 12:05 PM

The Effects of COVID-19 on Masters of Social Work Graduate Students Digital Technology Use, and Psychological and Mental Health Ivan Noriega (Master's)

#### Laurel Marks

University students face innumerable challenges during the COVID-19 global pandemic, including a shift to remote learning, issues creating dedicated work environments in the home, and losing access to on-campus resources. Those studying to enter social services face additional barriers in terms of telehealth, lack of access to self-care, burnout, and vicarious trauma experienced as a helping professional amidst a global pandemic. This study seeks to measure the impact of the COVID-19 pandemic on Master of Social Work students and MSW alumni from San Diego State University. Specifically, the researchers aim to understand the impacts of COVID-19, isolation, and increased use of digital technology on student's mental health, wellbeing, academic success, and interpersonal relationships. Additionally, it aims to analyze the student's experience as they navigate the uncharted territory of attending a graduate education during a global pandemic. While studies have been conducted regarding mental health and digital technology use among students, the burgeoning field of research concerning COVID-19 and subsequent drastically altered academic experience is still a new topic that offers potential for groundbreaking research and implementation. Given the local and national lockdown orders that have been in place since March 2020, some students have reported feelings of loneliness, increased stress, and decreased motivation, both socially and academically. The researchers developed a cross-sectional Qualtrics online survey and disseminated it using a non-probability, purposive, convenience online sampling method in which the first hundred students or alumni that completed the survey were included. The measures used included the Self-care Scale, Perceived Stress Scale, University Student Satisfaction Scale, Social Support Questionnaire, Oxford Happiness Scale, Rosenberg Mental Health Scale, Academic Motivation Scale, and Media and Technology Usage and Attitudes Scale. The analysis plan includes surveying the data through Pearson's r Correlation which will be used to describe the bivariate relationships. This is an important topic to pursue as the biological, societal, and social implications of this unprecedented global pandemic will be felt for generations to come and the graduates and alumni of the San Diego State University MSW program will be at the forefront of mental health care in the aftermath of COVID-19.

#### **156 12:15 PM** Lying Through One's Tweets: How Misinformation Deters Public Compliance During Crises **Corinne Zilnicki (Master's)**

More Americans than ever before are turning to social media for news. During crises, audiences are especially drawn to the unfiltered, up-to-the-minute coverage uniquely available on social networking sites. When posted online, however, crisis information must often compete for people's attention with specious commentary, counter arguments, false narratives, and rumors. Distinguishing opinion from fact on social media can be difficult; the challenge may overwhelm people's cognitive capacity and give rise to misperceptions about the truth. Misinformation can lead to harmful decision-making and is particularly dangerous in crisis situations. False rumors built on statistical, narrative, and visual evidence may negatively affect attitudes, erode trust in the government, and deter compliance with official guidance. The driving purpose of this study is to examine the roles of misinformation and attitudes in the decision-making process and determine whether different types of falsehoods or amounts of likes/retweets are more persuasive during crises. Inspired by the events of Hurricane Harvey, a disaster during which misinformation circulated widely on social media, this study employed a pretest-and-posttest online experiment to test the persuasiveness of misinformation in the crisis communication context. Building on the elaboration likelihood model, the narrative paradigm, and situational crisis communication theory, this study will empirically investigate the cognitive processes by which attitudes, behavioral intentions, and organizational perceptions develop when one consumes information during a natural disaster. This study's inclusion of persuasive message features may open new methodological pathways for public relations and mass communication scholars exploring the effects of misinformation. Additionally, this research may help public relations practitioners identify and address especially persuasive rumors before they gain traction, skew public perceptions, and disrupt the flow of accurate, life-saving information to those who need it most.

#### 157 2:25 PM

Assessing Electronic Cigarette Use and Perceptions during the COVID-19 Pandemic in the United States Jose Magraner (Master's) Deepti Gunge William Merz Ira Advani Laura Crotty Alexander

The COVID-19 pandemic has changed social landscapes, resulting in shifting perceptions and behaviors in electronic (e)-cigarette users. Research is needed to understand how e-cigarette usage and perceptions have changed so that impacts on the community may be assessed. We designed a study to define how e-cigarette use, user habits, and risk perceptions have been impacted by COVID-19. A nationally distributed 52-item questionnaire assessed e-cigarette use, dependence and perceptions, COVID-19 diagnosis, demographic data, and pre/during COVID-19 vaping habits. E-cigarette usage/dependence was assessed via the validated Penn State Electronic Cigarette Dependence Index. Questions were developed in-house to assess pre/during COVID-19 vaping habits of users and risk perceptions of both non-users and users of e-cigarettes. A total of 565 survey responses were obtained with 393 (69%) reporting no e-cigarette use and 172 (31%) e-cigarette users. Fifty (30%) vapers believed there were no adverse health effects due to vaping e-cigarettes while only 38 (9%) non-users agreed (P<0.0001). Two hundred eight (76%) non-users believed that e-cigarette use would lead to worse COVID-19 symptoms, compared to 40% of users (P<0.001). Twenty-eight percent of non-users also believed that e-cigarette users were more likely to be infected with COVID-19 versus only 11% of e-cigarette users. Fifty-three (33%) users believed that e-cigarettes are not a safe alternative to conventional tobacco (P<0.001). Of total respondents, 11 (6%) reported having had COVID-19. Fifty-nine (38%) e-cigarette users reported changing their habits during the pandemic, with 31% reporting increased vaping (P<0.001). Although 109 e-cigarette users (70%) reported vaping in a social setting before the pandemic, 38 (25%) users switched to vaping non-socially during the pandemic (P<0.001). One hundred three (67%) e-cigarette users replied that they would decrease or stop vaping if diagnosed with COVID-19, while 50 (31%) said they would continue vaping (P<0.001). Our findings show large differences in risk perception of e-cigarette use between users and non-users, which is consistent with past studies. Additionally, we characterize and document the habits of e-cigarette users during the COVID-19 pandemic, finding that e-cigarette users report increased use during the pandemic, show more caution in social settings, and reduced usage if hypothetically diagnosed with COVID-19.

#### 158 12:35 PM

Resource Insecurity During COVID-19: A Biocultural Approach to Health and Behavior amongst Resource Insecure Students at SDSU

#### Miriam Kopels (Master's)

Recent estimates suggest that resource insecurity has skyrocketed in the wake of the COVID-19 pandemic, affecting up to 23% of U.S. households -a statistic disproportionately felt by people already suffering from low economic and nutritional security. To investigate the impact of COVID-19 on vulnerable populations, we conducted a study using structured online and semi-structured telephone interviews with 113 San Diego State students who self-identified as housing and/or food insecure. Specifically, we investigated: perceptions of extrinsic mortality risk, a construct drawn from life history theory that is expected to correlate with long-term economic and health maintenance; food insecurity; Kessler-6, a non-clinical measure of psychosocial distress; and a 24-hour food recall. During the surveys, students were asked to compare their lives before and during COVID - which allows us to measure the impact of the pandemic statistically. The semi-structured interviews assessed environmental, psychosocial, and nutritional factors that potentially influence the lived experiences of students struggling during the pandemic. The questions asked students to reflect on the services available to them at SDSU, as well as the process of navigating assistance, including potential barriers and gaps in service. The overall trend we saw was that students with higher measures of psychosocial stress tend to have greater difficulty and frustration accessing assistance. This presentation will cover major statistical trends in guantitative data, as well as case studies that demonstrate the themes that emerged out of gualitative interviews. Overall, this research is a timely presentation of the issues impacting housing and food insecure students during the COVID-19 pandemic.

#### 159 12:45 PM The COVID-19 Graduate Experience Krista Confetti (Undergraduate) Jordan Klair

It is evident that many have experienced life changes due to the COVID-19 pandemic. One group whose experience has been heavily influenced are those who are currently in their graduate studies, with the global virus altering students current or planned pursuance of post undergraduate schooling. We examined multiple public forum websites to examine the experiences of STEM graduate students, focusing particularly on the role of mentorship and support during the early pandemic transition. We developed a coding tool to identify and categorize types of social support from mentors as well as the impact on students educational experiences and career aspirations. We hypothesized that an overall negative impact would be observed among graduate students and their current experience due to the COVID-19 pandemic. We utilized thematic content analysis, in which we identified key themes and commonality among students' posts. The findings revealed an overall trend of negative descriptions resulting from the pandemic, including a lack of school and social support accessible to students during a shift in their studies, and specific responses highlight nuances across types of effects of pandemic supports. Although potential reporting biases related to data collection via online forms should be taken into account, our findings may be used to implement future adjustments to graduate programs in order to better prepare for how to support graduate students in future crises. Future studies should examine whether factors previously identified as impactful in previous mentorship scenarios have become more salient during this time of crisis.

#### Session M1

#### **Oral Behavioral and Social Sciences** Saturday, March 20, 2021, 1:00 PM

#### 1:05 PM 160

#### COVID-19 and Population Vulnerability in San Diego County Jessica Embury (Undergraduate)

Beginning March 2020, the Center for Human Dynamics in the Mobile Age (HDMA) partnered with the County of San Diego Health and Human Services Agency (HHSA) to produce map products that inform local COVID-19 response efforts by public health officials and other decision makers. Web maps and interactive dashboards were created to communicate spatial data and other significant findings. Python scripting was used to automate feature layer and map update procedures in order to dynamically respond to daily changes in the data. Early research mapped the distribution of hospital and emergency department visits related to common chronic medical conditions. As more COVID-19 data became available, predictions were confirmed that communities with greater numbers of diabetes and pulmonary disease related medical visits also experienced higher rates of COVID-19 infection. While the highest case counts were in the South Bay region, zip codes with elevated cases were dispersed across the county. Subsequent

analysis of population demographics revealed an association between high case counts and majority Latinx communities. This health disparity was further clarified by the discovery that Latinx individuals were disproportionately affected by COVID-19 in most San Diego County zip codes. Although research is ongoing, preliminary findings are being used by a collaborative team funded by the National Institutes of Health (NIH) to address these inequities by establishing COVID-19 testing sites and reducing barriers to healthcare in underserved communities.

#### 161 1:15 PM

# Did the Pandemic Affect Female Workers and Aged Workers More than Their Respective Counterparts? **Bruno Calderon Hernandez (Undergraduate)**

As a direct consequence of both the economic and health crises that have occurred, the U.S has reached newfound heights of unemployment; heights that drastically surpass in magnitude that of the 2007-2010 economic crisis. The year 2020 was marked by the highest ever recorded unemployment rate since the postwar era, reaching 14.7%. The labor market greatly lacerated by both the pandemic and the economic crisis, had great imbalances in its equilibrium; due to failures in the labor market and shocks that mostly impacted labor demand, since many businesses closed or went bankrupt even with relative government aid. The principal objective of this work is to analyze the impact that the current health and economic crises have had on the labor market and employment in the U.S. The research questions being posed in this work are: Does the pandemic affect female workers more than their male counterparts? Does the pandemic affect younger workers more so than older ones? How does the pandemic affect wage workers? In order to address each and one of them, the following parameters concerning the labor market in the pandemic will be studied: telework because of the pandemic, unable to work because of the pandemic, pay status of those unable to work, and did not look for work because of the pandemic. To develop this work, data acquired from reliable databases - such as FRED and the Bureau of Labor Statistics - will be utilized. From such data, the tendency of behavior between the different groups will be identified and quantified; measuring how certain gender and age groups are favored or unfavored given the current material conditions of our society. An econometric model will be developed, utilizing the aforementioned sources. Through this work, the degree to which the pandemic and economic crises have both affected men and women, old and young, will be discerned. This research helps in identifying workers and sectors most affected by the pandemic and provides policy implications regarding where economic policies should focus on.

#### 162 1:25 PM

Prosocial Behavior Boosts Socioemotional Well-being During Chronic Stress Solana Kenyon (Undergraduate) Kassandra Vasquez Greta Majus Nancy Huyn

The present longitudinal study was conducted to further examine if prosocial behavior promotes well-being as indicated in previous studies. This study also sought to examine whether prosocial behavior could protect individuals' well-being from the negative psychological effects of chronic stress amidst the COVID-19 pandemic. It was hypothesized that higher participation in prosocial behavior would be linked to better socioemotional well-being over time. A few months into lockdown orders in the United States (Time 1), 749 adults (M age = 62.76) residing in the United States completed an online Qualtrics survey that asked participants about two types of prosocial behaviors in response to the COVID-19 pandemic: 1) CDC recommended behaviors that would prevent the spread of infection to others (e.g. social distancing, mask wearing) 2) general prosocial behavior that protects others from psychological and financial harm (e.g. supporting a local business, thanking an essential worker). In addition, participants reported on their socioemotional well-being again. The findings revealed that higher participation in CDC recommended prosocial behaviors is linked to less depressive symptoms and that higher participation in CDC recommended prosocial behaviors is linked to less depressive symptoms and that higher participation in cDC recommended with less loneliness over time. Together, these findings suggest that behaving prosocially is beneficial for the well-being of both the givers and receivers during times of chronic stress. Future studies should aim to establish the causal direction and account for personality and health factors that could possibly be confounded to the association.

#### 163 1:35 PM

Social Media Listening during COVID-19: The case study of three Metropolitan Cities in Italy Karenina Nicoli Zaballa (Master's) Harrison Yang Chanwoo Jin Rachelle De Ocampo Wayne Kepner

The COVID-19 pandemic took a toll on the world's healthcare infrastructure as well as its social, economic, and psychological well-being. In particular, Italy's unexpectedly high COVID-19 case and death rate from March to June, captured headlines due to its speed and virulence. In this study, we analyzed about 1.1 million COVID-19 tweets and extracted and classified emotions under joy, anger, and fear in three Italian metropolitan cities in the north, center, and south regions of Italy (Milan, Rome, and Palermo). The study addresses the following questions:(i) How do sentiments (fear, anger, and joy) of tweets shift over the course of the pandemic, and (ii) how do the sentiments change when lagged with specific policy shifts before and after local governments announce preventative intervention policies and significant COVID-19 specific events? Sentiments tracked with policy, social, and economic events, as well as COVID-19-specific fatality and infection rates, vary to differing degrees from one city to another. The effect of fear was also observed to trend upward toward the decline of the epidemic, in contrast to patterns observed in prior pandemics. Finally, the emotions of anger and joy in particular, at times appear to signal new case and case fatality trends. Conjectures are made regarding the role of sentiment analysis and machine learning techniques in the COVID-19 outbreak, and the value of sentiment analysis of social media in informing health communication campaigns. Understanding sentiments can help individuals and organizations of influence trace and combat the pandemic with more impact.

#### 164 1:45 PM

# How Epicurus & Marcus Aurelius Can Help Us Through The Covid-19 Pandemic **David Rich (Undergraduate)**

The purpose of this essay is to illustrate a threefold relationship among Epicurean philosophy (the aim to reconcile fear-based mental disturbances to live free from disturbance), the Stoic philosophy of Marcus Aurelius (the aim to reconcile false judgment mental disturbances in order to become immune to misfortune), and how both can offer philosophical guidance to overcome the mental disturbances of the Covid-19 global pandemic. I focus primarily on the Epicurean text "Letter to Menoeceus," Marcus Aurelius' "Meditations," how these texts have a direct relationship with each other, the Covid-19 global pandemic, and specifically their relationship with the concepts of future and control, desires, and pleasures, and death. I use this essay to make a new connection with two philosophical schools that are not historically complementary but most importantly to use philosophy as a way to alleviate the mental anguish of Covid-19.

#### **Session N1**

Oral Behavioral and Social Sciences Saturday, March 20, 2021, 2:00 PM

#### 165 2:05 PM

We Work Really Hard to...Give Them That Disneyland Experience: Within-Agency Capacities to Address Food Insecurity in San Diego County

#### Lauren Yowell (Undergraduate) Lani Morales

Food insecurity is the state of being without consistent food that is safe, nutritious, and culturally appropriate, and is prevalent in the U.S., especially among marginalized populations such as Hispanics/Latinos. In San Diego County, over half of food-insecure adults are Hispanic/Latino (55% vs. 29% for White). Food insecurity is associated with poor diet quality and chronic health conditions, which also affect Hispanics/Latinos disproportionately. Capacity-oriented approaches have the potential to improve health in low-resources settings and to reduce food insecurity and health disparities, yet local data are needed to develop effective, sustainable solutions specific to San Diego. The overarching goal of this study was to identify multi-level sources of existing capital (assets) in San Diego County to inform an integrated approach to reducing food insecurity and improving dietary intake. Methods: Framed by the Socioecological Model, and prior to COVID-19, we conducted face-to-face, semi-structured interviews with key informants at local stakeholder organizations addressing food insecurity across San Diego County (n=10). Data collection is ongoing. Key informants

provided written consent. Interviews were audio-recorded, transcribed verbatim, and checked for accuracy. The research team created an initial analytical codebook, which was used to iteratively code transcripts in NVivo12, and met regularly to discuss the coding and begin to identify emergent themes. Preliminary findings indicated that within-agency attributes appeared to be instrumental to addressing food insecurity. Notably, human capital (e.g., volunteers, staff skills in cultural competency) and interpersonal relationships of staff with their clients seemed to influence the reach and impact of the agency services, by providing clients with a personalized, or "Disneyland", experience. Additionally, agencies often leveraged across-agency partnerships to provide a holistic care approach to their services, which recognized and addressed the interrelated circumstances of food insecurity (e.g., mental health, housing). In San Diego County, within-agency attributes and a holistic care approach appeared to enable stakeholder organizations to better address food insecurity across diverse communities. Future research should consider how to continue to leverage these existing capacities in order to reduce the burden of food insecurity among marginalized populations in San Diego County.

#### 166 2:15 PM

# Motives of a Digitized Entrepreneur in a Sharing Economy Ivan Ortiz (Undergraduate)

The unexpected change of circumstance caused by COVID19 has shifted society and the economy to rely on digital innovations. This relates to the growth and strengthening of the digital economy begin with the entrepreneurs who engaged in digital entrepreneurship activity. This then creates the question of why or what factors into the digital entrepreneur engaging in the digital economy. So, I set to explore the motives of entrepreneurs, with an emphasis on digital entrepreneurs, to gain a greater understanding. The intention is to identify and create profiles through similarities in the findings. Which can then be used to understand, identify, or even develop digital entrepreneurs. Personality factors into the internal and external motivations that result in different goals for both paths. Factors to consider about personality are the locus of control, altruism, sympathy, and empathy. These factors lead to different internal and external motives. The internal is correlated to frustration, sense of obligation, achievement, passion, and relatedness. Those external are opportunities, nurturance, competence, and autonomy. By considering these factors, we can then identify the goal. That can be either for self-development (internal) or for-profit (external). The findings elaborate on the identification of the motives behind the digital entrepreneur. Also, to consider are the types of business as some are for social good while others may be regular businesses. Building onto this current understanding, we can already see a relationship between the personality, motive, and goal of an entrepreneur. Connecting this to digital-entrepreneurship between the personality motive, and how they contribute to the digital economy.

#### 167 2:25 PM

# International Business in the Food Sector: Global Analysis **Ekaterina Ghosh (Undergraduate)**

The food industry is one of the most important sectors of the global economy: its security is vital to human existence. In tandem with increasingly interdependent economies, food supply chains now span continents. The COVID19 pandemic has emphasized the fragilities of the global food industry as labor shortages, demand surges, and factory shutdowns disrupted supply chains from creation to consumption. It is clear that flexibility in supply chains and the existence of safety nets are crucial for minimizing food insecurity risk. Yet, we see an increasing consolidation in the food industry as multinational corporations such as Nestle and Monsanto actively acquire firms in other countries. Furthermore, we know little about the long-term effects of a globalized food industry on health, sustainability, and entrepreneurship. To better understand the risks and benefits that stem from the global food industry, this project aims to analyze a large sample of companies' international moves. By looking at trends in cross-border investments, our goal is to understand the global dynamics of the industry in terms of the most active sectors, players, and roles of local institutional environments. Using our proprietary RAIN database, which consists of data from Bureau van Dijk's Orbis Crossborder Investment, the World Bank, and other datasets, we are first isolating business transactions by relevant industry codes. Next, we will look for patterns and unusual observations, focusing on the spatial relationship between the investing and target companies, as well as the nature of and interaction with local institutional environments. Then, we will conduct a visual and statistical data analysis across sectors and geographies. Our preliminary findings suggest that flows in investment in the food sector include both mergers and acquisitions, as well as less intensive moves such as partnerships and facility expansions. While yet to be confirmed, we expect that the majority of investing companies will originate from advanced economies and most target companies from emerging and developing countries, namely in the Global South.

#### 168 2:35 PM

# Pandemics and Pedagogy: An Ethnographic Study on Learning During COVID-19 Charlene Holkenbrink-Monk (Doctoral)

COVID-19 has caused the word "unprecedented" to be the most overused word of 2020. Across multiple disciplines, radical changes have occurred, upending much of what we thought we knew prior to the global pandemic. Within the field of education, and specifically K-12, teachers had to shift urgently into new territory, scrambling to figure out ways to stay engaged with students. Teachers at a K-12 charter system in the central San Diego area were no different, though they began their contingency plan on March 4, 2020. This research, and ethnographic research study on this particular charter system, initially sought to understand the students' lived experiences through their educational journey during school closures from COVID-19. However, upon qualitative investigation, the researcher realized that COVID-19, while posing significant obstacles and the need for teaching innovations, students' experiences were not necessarily new, but the social barriers they were experiencing were merely exacerbated and transformed through the unique circumstances of the global pandemic. By utilizing action research, including a reconnaissance phase that leads to data collection in cycle 0, the researcher has identified three areas of focus as a problem of practice within the character. In addition, centering a critical pedagogy philosophy, the researcher rate areas of focus as a problem of practice within the character professional development as an ongoing process to dismantle institutional and systemic barriers students face as well as to address the problem of practice discovered within the initial ethnographic research.

#### 169 2:45 PM

### Black In Ivory: An Analysis of Black Students in Higher Education Nicholas Lacy (Master's)

This study seeks to reveal Black students' experiences amidst the dual pandemic, racism, and Covid-19. Currently, racial matters in the United States are once again at a high, with very vivid ties to the Civil Rights era, and Jim Crow. Analyzing one of the most famous Supreme Court decisions relevant to race and education, Brown v. The Board of Education was a landmark case that seemingly would revolutionize education for Blacks. But did it? As a result of current social and political strained race relations, many Black students in education are still the target of white supremacy and the push back of white fragility. Subsequently, this study examines Black students' voices to uncover how Black students feel about their experiences in higher education. Using tools such as The Equity Scorecard, and Racial Battle fatigue, this study reveals the magnified moments that Black students in higher education describe as inclusive and exclusive in higher education. Likewise, the current study elucidates what Black students in higher education describe as memorable moments that empowered or disempowered them in their higher education.

#### Session 01

Oral Behavioral and Social Sciences Saturday, March 20, 2021, 3:00 PM

#### 170 3:05 PM

SARS-CoV-2 on Commonly Touched and Rarely Disinfected Surfaces of the Urban Environment in San Diego County Maria Isabel Rojas (Doctoral) Mark Little Rafael Baron Isabella Livingston

To investigate SARS-CoV-2 on surfaces in the urban environment that are rarely cleaned and very seldomly disinfected, we enlisted 350 citizens from the greater San Diego County. In total, these citizen scientists collected 4,080 samples. An online platform was developed to monitor sampling kit delivery and pickup, as well as collect sample data. The sampling kits were mostly built from supplies available in pandemic-stressed stores and samples were processed using reagents that were easy to access despite the recurrent supply shortage. The methods used were highly sensitive and resistant to inhibitors commonly present in environmental samples. The proposed sampling experimental design and processing methods were successful at engaging numerous citizen scientists that effectively gathered samples from diverse relevant surface areas. Moreover, these protocols are adaptable to efforts on

surveilling the presence of contaminated fomites that would contribute to the community spread during this and future pandemics. Here, we present a strategy to involve the community to screen a surface area equivalent to more than half a million fingertips across San Diego County. The methods used were highly sensitive and resistant to inhibitors commonly present in environmental samples. The proposed sampling experimental design and processing methods were successful at engaging numerous citizen scientists that effectively gathered samples from diverse relevant surface areas. Moreover, these protocols are adaptable to efforts on surveilling the presence of contaminated fomites that would contribute to the community spread during this and future pandemics. Over 3,000 samples were tested for presence of SARS-CoV-2 RNA; 0.6 % were positive. These positives appeared evenly distributed across the entire sampling period and throughout different local infection rates. While confirming findings from other studies that address the survival of the virus on surfaces, our results demonstrate the persistence of viral RNA outside the laboratory under non-controlled real-life conditions (in situ). These findings emphasize the need to further investigate the role, however small, of contact with contaminated fomites in the community transmission of SARS-CoV-2.

#### 171 3:15 PM

# Comprehensive Understanding via Representative Variable Exploration for COVID-19 Pierre Serrano (Undergraduate)

Coronavirus disease 2019 (COVID-19) is the most significant pandemic in the 21st century and affects the lives of millions of people today. Up to December-19, 2020, more than 70 million cases are confirmed, and more than 1.5 million deaths on a global scale. For a disease that is as infectious as COVID-19, it is vitally important that public health experts understand the variables that can affect how COVID-19 viruses spread. Current studies only analyze either non-human factors or human factors, focusing on a limited number of variables that can influence COVID-19. However, there is a research gap from studies that examine both human factors and non-human factors and it is important to fill this gap because in the real world, both non-human factors and human factors affect the real-world infection rate. Subsequently, a comprehensive study is required to fully understand the extent of COVID-19's impact. Therefore, we propose a research framework named Comprehensive Understanding via Representative Variable Exploration for COVID-19 (CURVE4COVID). This study fills a variety of research gaps that still exist. With the accessibility of various data online, such as COVID-19-related Google search and government-managed data, we conduct a large-scale and multi-variable analysis of the critical factors for COVID-19 transmission, and thus can shed light on the complexity of infectious disease management. The goal of CURVE4COVID is to discover the significance and directionality of variables that effect how COVID-19 spreads. This study's findings can provide new insights into disease transmission and help policymakers enhance preventative measures and healthcare management, and thus have a far-reaching influence on society.

#### 172 3:25 PM

# Modeling the Risk of SARS-CoV-2 Transmission from Environmental Surfaces Angelica Bloomquist (Master's)

Beginning in late 2019, the coronavirus disease (COVID-19), originating in Wuhan, China, quickly spread across the globe leading to one of the most devastating pandemics of the 21st century. While direct person-to-person transmission of SARS-CoV-2, the etiological agent of COVID-19, appears to be the primary route of transmission, the contraction of SARS-Cov-2 from various surfaces in the environment is also considered a potential contributor to the disease transmission as the infected individuals shed virus onto environmental surfaces through sneezing, coughing, and breathing. In this study, we develop a mathematical model to predict the probability of detecting SARS-Cov-2 in environmental reservoirs during the COVID-19 outbreak in a community. Furthermore, we extend our model to quantify the contribution of environmental virus to COVID-19 cases in a community. We validate our model using experimental data with a large number of swab samples collected from commonly touched surfaces across San Diego County. Our model, which is capable of describing transmission dynamics of COVID-19 within San Diego County, allows us to compute the risk for an individual to encounter virus in the environment. The results indicate that the persistence of virus on some environmental surfaces can significantly increase COVID-19 cases in a community.
#### 173 3:35 PM

# Modelling Local Hotspots in the Coronavirus (COVID-19) Pandemic Nicholas Ishizaka (Undergraduate)

The goal of this research project was to model and describe the discrepancies in COVID-19 cases within zip codes in San Diego County. Despite social distancing measures, mask wearing protocols, and the severe limitation of gatherings in businesses, COVID-19 cases continued to increase almost exponentially during the pandemic. Using data from San Diego Association of Governments (SANDAG) and San Diego Geographic Information Source (SanGIS), we were able to successfully model the discrepancies between zip codes with the highest and lowest cases of COVID-19 based on income, housing, and age demographics. The data showed that zip codes with the highest median incomes such as Sorrento Valley (92121), Rancho Santa Fe (92127), Rancho Penasquitos (92129), Carmel Valley (92130), and Scripps Ranch (92131) had the lowest levels of COVID-19 cases, yet had an equal or higher amount of households compared to the lower median income zip codes such as North Park (92104), Golden Park/Mt. Hope (92102), City Heights (92105), Downtown San Diego (92101), and Southcrest (92113) which had a higher rate of COVID-19 cases). Moreover, the lower median zip codes had a higher rate of multifamily households, which is usually designated to apartment and condo buildings, while the higher median income zip codes generally had a higher rate of single family detached households, which is designated for any single standing home. There was no real significant difference in age demographics in relation to both high and low median income zip codes. Using mobility data obtained from Apple's Mobility Report of San Diego between March 30th and July 28th, we were able to see a positive correlation between movement in driving and walking versus the rate of new cases of COVID-19. Even with the increase of driving and walking, the rate of public transportation use stayed extremely low relative to the other two forms of movement. This data shows that the lockdown ordered by the State of California on March 20th was effective at slowing the spread of COVID-19 by severely limiting overall travel and movement in San Diego. However, as the state started to slowly reopen, the increase in travel and movement shows a positive increase in COVID-19 cases. One interesting data point we discovered was the highest rate of COVID-19 cases occurred near the United States Mexico Border and in San Diego proper which includes zip codes in Otay Mesa (92154), Chula Vista (91911 and 91910), National City (91950), and Downtown San Diego (92113). In conclusion, these discrepancies can be used as a reference for future outbreaks of COVID-19 to better prepare practitioners and policymakers of San Diego. These data points could also be beneficial for future outbreaks of other widespread and easily transmittable diseases.

# Abstracts of Presentations

# **Oral Sessions 2**

ABCDEFGHIJKLMNO



### **Session A2**

Oral Biological and Agricultural Sciences Friday, March 19, 2021, 9:00 AM

#### 200 9:05 AM

Resolving the Phylogenetic Relationships of the Dry-Adapted Subfamily Arbutoideae Niveditha Ramadoss (Doctoral) Alex Adame Kyle Gunther Glen Morrison Litt Litt

The Arbutoideae subfamily comprises taxa which are adapted to dry climates and diverse in the regions of Mediterranean climate of Western North America. Six genera are commonly recognized - Arbutus, Arctostaphylos, Arctous, Comarostaphylis, Ornithostaphylos, and Xylococcus but their phylogenetic relationships have long been unclear. Moreover, the genus Arbutus was found to be paraphyletic with the North American taxa forming a clade separate from the European taxa (Hileman et al. 2001). The problems with this phylogeny where paraphyly was observed are the unreliable markers, low bootstrap values and polytomy observed between the species of Arbutus. Thus, the goals of our project are to reconstruct the phylogenetic relationships of subfamily Arbutoideae and test the monophyly of genus Arbutus. Phylogenetic relationships will be estimated using maximum likelihood (ML) and Bayesian analyses of SNP data from the nuclear genome. The SNP data is generated by a next generation sequencing technique called DartSeq which allows for detection of a high number of informative SNPs across the genome. Preliminary results based on DAPC (Discriminant Analysis of Principal Components) showed that the North American Arbutus is genetically distinct from that of European Arbutus. In addition, preliminary Neighbor Joining tree and ML tree did not support the monophyly of Arbutus. This study will help resolve the taxonomic uncertainty of this subfamily thereby providing a better understanding of the evolutionary processes and clear direction for conservation of these species.

#### 201 9:15 AM

#### Using Metabolomics to Examine Dihydromyricetin's Effect on Ethanol Toxicity Kristin Hughes (Master's) Joshua Silva

Alcohol (ethanol) is highly addictive and accounts for 5% of deaths worldwide. Ethanol consumption is known for its physical effects such as nausea, loss of motor control, and vomiting, but more importantly, ethanol metabolism is attributed to the formation of toxic molecules like acetaldehydes, oxidative stressors, and proinflammatory cytokines. The toxicity of ethanol causes damage to the vital organs, most notably the liver, and can lead to a myriad of health complications such as cirrhosis and cancer. Dihydromyricetin (DHM), a bioactive flavonoid isolated from Hovenia dulcis, has been shown to counteract ethanol intoxication and diminish the toxic effects of ethanol. In previous research, DHM has been shown to not only have anti-alcohol properties, but also antioxidant, anti-inflammatory, anti-microbial, and anti-diabetic behavior. Although DHM appears to be beneficial, many of the mechanisms associated with its effects are unknown and need to be explored further. In this study, untargeted metabolomic techniques such as liquid chromatography coupled with high-resolution mass spectrometry and bioinformatics were utilized to determine the unique metabolites that were dysregulated in the livers, kidneys, and spleens of DHM-treated mice. Metabolites are small molecules that can indicate changes in metabolic activity, protein function, and gene expression. Together these changes can reveal how DHM mediates ethanol's toxicity. The data suggest that DHM does have a significant impact, as many key metabolites were dysregulated compared to mice that were only given ethanol.

#### 202 9:25 AM

## An Outside-In Approach to Improving a Neural Network Michelle An (Master's)

Bacteriophages are the most abundant and diverse genetic entity on the planet and are prominent contributors to microbiomes in all ecological systems. Their diversity makes it difficult to understand the specific contributions of phages to ecological dynamics and the effects of phages on microbiomes. Phage genes are so diverse that between 50 and 90% have functions which cannot be

predicted using traditional bioinformatics methods. Our lab developed PhANNs (Phage Artificial Neural Networks), an ensemble of neural networks that quickly and accurately classifies a putative protein sequence (ORF) into one of ten major classes of phage structural proteins or into an "others" category. PhANNs tool was trained using frequencies of tripeptides and triplet amino acid sidechain groups, plus 8 more global features (Cantu et al., PLoS Computational Biology, 2020). PhANNs focused on improving an earlier neural network classifier, iVIREONs (Seguritan et al., PLoS Computational Biology, 2012). Here we take a two-pronged approach to improving the prediction accuracy: 1) expanding the features used to train the model and 2) adding a post-neural network step that uses mutual information tokens to better distinguish between pairs of protein classes. I expanded the global feature set from 8 to more than 50 features. To capture positional information within the ORF, the amino acid sequence was divided in quintiles that were analyzed individually. An independent approach will address cases in which the network does not strongly distinguish between two structural protein classes. For this second approach, a library of "tokens" will be extracted for each protein class by scanning the training data set for short sequences that distinguish between pairs of classes. Each sequence to be classified is then analyzed against the token library and more accurately predicts in which class the sequence belongs. I demonstrate how improvements to the pre- and post-neural network steps can increase the prediction accuracy of the neural network.

#### 203 9:35 AM

### Role of IGFBP5 in Ovarian Cancer Metastasis Jennifer Waters (Doctoral)

Approximately 75% of ovarian cancer cases are discovered in advanced stages, characterized by metastasis to the omentum, a large adipose organ that lines the abdominal wall. The process by which omental metastasis occurs initially involves activating a gene program that enables cancer cells to attach to tissues in the peritoneal space. Prior studies of omental metastasis have focused primarily on the role of lipid-storing omental fat cells, or mature adipocytes, with little emphasis on their fibroblast-like precursors (preadipocytes) which are similarly a critical component of the omentum. Our preliminary studies show that preadipocytes enhance engraftment and subcutaneous growth of ovarian cancer cells. Recent RNA-sequencing experiments show that genes involved in remodeling the extracellular matrix (ECM) are upregulated in ovarian cancer cells after co-culture with primary omental preadipocytes and include genes encoding collagens, matrix metalloproteinases, and insulin-like growth factor binding proteins (IGFBPs). The most upregulated gene, IGFBP5, encodes a protein that has been shown to sequester insulin-like growth factor (IGF) within the ECM, thus protecting it from degradation and potentiating increases in cell proliferation. Overall, these findings strongly support a role for preadipocytes in facilitating ovarian cancer metastasis that depends on IGFBP5 and ECM remodeling. The IGFBPs are a family of proteins with numerous roles, including regulation of cell growth, proliferation and death, all of which are mis-regulated to promote a metastatic phenotype. We hypothesize that preadipocytes support ovarian cancer metastasis by inducing matrix protein production in cancer cells that enable engraftment into the omentum, and that this facilitates IGFBP5 mediated regulation of IGF as a mitogen source to sustain tumor cell growth. Understanding these processes will enable the design of more effective therapies for treating advanced ovarian cancer.

#### 204 9:45 AM

TWEAK Promotes a TIC-like Phenotype in Ovarian Cancer Cells Through Activation of Alternative NF-KB Ryne Holmberg (Doctoral) Samuel Gilbert Mikella Robinson Jennifer Waters Lujano-Olazaba Jacqueline Lara

Ovarian cancer patients typically respond well to traditional chemotherapy. However, most patients relapse within two years due to a small population of tumor initiating cells (TICs) which survive treatment and create new heterogeneous tumors. Our previous work has shown that the TIC phenotype is supported by alternative NF-<sub>K</sub>B signaling. We recently found that the cytokine TWEAK is increased threefold in mouse tumors following three cycles of chemotherapy treatment relative to mice receiving vehicle. Moreover, the tumors showed a corresponding increase in nuclear localization of alternative NF-<sub>K</sub>B transcription factor, RelB. Therefore, we hypothesized that TWEAK secretion is enhanced following chemotherapy and may be contributing to TIC development. We further characterized the effects of TWEAK cytokine on NF-<sub>K</sub>B activation and development of TIC features like spheroid formation and stem cell transcription factor expression in ovarian cancer cells. Using stable reporter and CRISPR knockout lines, immunoblotting, transcription factor binding assays, and qRT-PCR, we have shown that TWEAK stimulation of the HGSOC cell lines OVCAR8,

CaOv4, and OV90 induces a strong and sustained alternative NF-κB response. Specifically, we demonstrated upregulation of the non-canonical NF-κB members ReIB, p100, and NIK, as well as the proteasomal processing of p100 to p52, and nuclear translocation of ReIB and p52. Additionally, TWEAK stimulation promotes the expression of SOX2 and confers an increased spheroid formation ability. Taken together these results suggest that TWEAK promotes a TIC-like phenotype in ovarian cancer cell lines through activation of non-canonical NF-κB signaling. Mouse experiments are underway using CRISPR-knockout cells and an antibody against the TWEAK receptor to investigate the role of this signaling axis in supporting relapse. Given the high response rate of ovarian tumors to cytotoxic chemotherapy, clarifying critical processes that enable TIC development immediately following chemotherapy could lead to exciting new therapeutic strategies to prevent relapse.

### **Session B2**

Oral Biological and Agricultural Sciences Friday, March 19, 2021, 10:00 AM

#### 205 10:05 AM

Global Pattern of Soil Microbial Residence Time Liyuan He (Doctoral) Victoria Broadnax

Microbes drive biogeochemical cycle of carbon and nutrients in soil. The turnover of soil microbial biomass is thus a key factor controlling carbon and nutrient cycling in terrestrial ecosystems. However, little is known about soil microbial biomass turnover and its controls. With a comprehensive compiled dataset (2627 data points) of soil microbial residence time (MRT), we analyzed the biogeographic patterns of soil MRT and its controls. Based on a generalized linear model considering the interactive role of soil microbial traits, climate, vegetation, soil microclimate, and edaphic properties, we built an empirical model by selecting the most important variables in explaining the variations in soil MRT. Combined the empirical model and available environmental variables, we generated the global map of soil MRT. Our results suggest a clear biogeographic pattern of soil MRT distribution, with clear gradients of soil MRT trends along climate, vegetation, soil microclimate, and edaphic properties. Large variations exist in microbial residence time among biomes, with the largest soil MRT in boreal forests and grasslands and the smallest in wetland and bare soils/deserts. Among environmental factors, edaphic properties are the most influential factor in explaining the variations in soil MRT. Comparing the simulated MRT with the observed data, we found high consistency between simulated and observed MRT at plot- (R2=0.86), site- (R2=0.88), and biome- (R2=0.99) levels. We found a clear latitudinal gradient of soil microbial residence time, with longer MRT in high-latitude regions and shorter MRT in equatorial regions. This study reports the biogeographic distribution and controls of soil MRT. The biome-level and global estimates of soil MRT are of critical importance for understanding microbial contributions to the climate system under a changing climate.

#### 206 10:15 AM

### Capturing Soil Moisture Dynamics Using "Hydrologic Signatures"

Ryoko Araki (Master's)

Changing climate and land cover are altering soil moisture patterns, which potentially intensify droughts, increase fire risk, and reduce crop yields. To assess and mitigate the disasters, it is primarily important to understand the role of soil moisture in water and energy cycles. Recent development of dense soil moisture networks (clusters of sensors in a field) has enabled us to capture soil moisture dynamics at unprecedented high spatial and temporal resolutions. Yet, soil moisture data are often evaluated based on statistical metrics, such as spatial mean or variability. Here, soil moisture values may not fully characterize the watershed behavior, or enable us to test whether models accurately represent processes, such as deep-drying of soil layers or anomalies in seasonal cycles for drought prediction. In this study, we applied the emerging concept called "hydrologic signatures" to field soil moisture network data to guantify the soil moisture dynamics. "Hydrologic signatures" are indices that characterize multiple aspects of watershed behavior. Model parameters and structures can be evaluated based on the models' ability to reproduce the signatures derived from observation data. We selected eight soil moisture network sites around the world under different land-uses, from shrublands to forests, snowy mountains to wetlands. From the time series of soil moisture data, we extracted six types of signatures that represent seasonal, event, and soil hydraulic dynamics. The results successfully showed that comparing 'event rising timing' and 'event response amplitude' signatures at multiple sensor depths can distinguish differences in flow pathway of precipitation on the ground. The distinct signature values at shallow soil depth in Hamburg site shows that land-cover is a major control of the flow pathway; urban areas tend to cause overland flow than green space. Moreover, 'seasonal transition' and 'distribution type' signatures showed potential to distinguish the freezing/ thawing of water in soil, as well as strength of seasonality in arid/temperate environments.

#### 207 10:25 AM

Non-Targeted Chemical Analysis of Transboundary Surface Water Flowing from Tijuana, Mexico to San Diego, USA in the Tijuana River Valley **Stephanie Laughery (Master's)** 

Monitoring transboundary flow from Mexico into the United States in the Tijuana River Valley has long yielded common pollutant profiles indicating unchecked urban runoff and untreated sewage flows. Increased attention on the human health consequences from interacting with these surface flows calls on better characterizing pollutant profiles that can be used by leadership to control sources - and better characterization includes developing in-depth chemical profiles, which is the goal of this project. Non-targeted chemical analysis will be performed on water samples from "Canyon collectors", a series of ditches and canals that connect the U.S. and Mexico in the Tijuana River Valley watershed via urban channels. They have been in use to hold and divert transboundary sewage flow and urban runoff without systematic or significant attention to monitoring human health hazard impacts and pollutant profiles until more recently due to outside pressure. Previous laboratory results indicate the presence of contaminants associated with industrial and agricultural activities and untreated sewage flows. This project will investigate what the chemical profiles support in regards to scenarios like illegal dumping, industrial site leaks, pipe breaks, and urban runoff. Effective mitigation and control of anthropogenic sources that flow in the canyon collector system will be integral to binational efforts in reducing human exposure to pollutants of concern in the Tijuana River Valley and connecting regions. Testing surface waters from six sites along the U.S.- Mexico border in the Tijuana River Valley will provide a useful chemical profile of contaminants from sources that have the potential to pose health hazards to humans. Oasis HLB Solid Phase Extraction (SPE) was used to perform non-targeted analysis of samples to determine the profile for contaminants of concern in the water samples collected from the six canyon sites near the border (San Diego-Tijuana). Results are currently analyzed using GCxGC/ChromaTOF to build a profile of chemical contaminants present in the transboundary water flow. A comprehensive chemical contaminant profile will be established in the transboundary water. We will identify chemicals of concern and prioritize them which will impact the watersheds and ecosystem. Preliminary data shows presence of solvents, fuels, flavorants, perfumes, dyes, resins, industrial compounds, urban drool in multiple collection sites.

#### 208 10:35 AM

# Hypoxia Promotes Phage Resistance which Can Suffocate Phage Therapy Ashley Schumann (Master's)

A burgeoning health crisis in the 21st century is the emergence of multidrug resistant (MDR) bacteria. Pseudomonas aeruginosa, an opportunistic pathogen that causes lung infections in immunocompromised and Cystic Fibrosis (CF) patients, is progressively becoming more antibiotic resistant. Phage therapy is a promising new antibacterial for CF patients suffering from MDR P. aeruginosa infections. However, the reduced oxygen content found in CF lungs can alter pathogen physiology in such a way that influences phage-bacteria interactions and decreases the efficacy of phage therapy of pneumonia. In this study, phage lysis kinetics and resistance were compared under normoxic (21% O2) and hypoxic (14% O2) atmospheric conditions, with the latter mimicking the lungs. We found that under normoxia, phage PAK\_P1 inhibited bacterial growth in only 25% of treatments over 18 h, which remained clear. In treatments that developed phage resistance, bacterial outgrowth developed at 10.5 h and bacterial density continued to increase for the remaining 7.5 h. 45% of resistant cultures under normoxia developed large chromosomal deletions (LCDs) ~200 kbp in length. In contrast, under hypoxia PAK\_P1 was unable to inhibit bacterial growth, leading to phage resistance in 100% of cultures, with outgrowth developing at 13.5 h. However, resistant mutants did not display LCDs under hypoxia. One of the genes excised in LCDs within normoxic cultures was galU, a gene involved in synthesizing lipopolysaccharide (LPS), the cell surface receptor for phage PAK P1. This suggests that galU deletion causes phage resistance in cultures with bacterial outgrowth under normoxia. Together, we conclude that greater oxygen availability reduces the rate of phage resistance and promotes LCDs in P. aeruginosa. LCDs in this pathogen grant resistance to pyocins, oxidative stress, as well as cephalosporin and carbapenem antibiotics. In CF, LCDs may attenuate virulence and increase sensitivity to secondary antimicrobial treatment. This suggests that combining oxygen therapy with phage therapy may improve the effectiveness of infection eradication.

#### 209 10:45 AM

Bench-Scale Investigation of Biophysicochemical Processes Occurring within a Novel Waterless Flushing Onsite Sanitation System Rachel Astete Vasquez (Doctoral)

Wet onsite sanitation systems (OSS) such as pour-flush latrines, septic tanks and aqua-privies are in prominent use across global regions Facilitating the efforts of developing communities to curb practices of open defecation; and offering solutions for sewage disposal in areas with limited access to centralized pipe networks. Knowledge of how these systems treat wastewater is limited in scope, primarily focusing on reducing concentrations of pathogenic microbes and nutrients through several mechanisms that occur

during secondary treatment in constructed wetlands or percolation through subsurface soil matrices. Consequently, studies have neglected to assess the primary anaerobic tanks included in many wet OSS for their role in wastewater treatment, considering them as merely a vessel for storage prior to. This investigation seeks to determine the contributions of these receptacles (either as the primary or solitary component of OSS) to the overall treatment of wastewater performed by these systems. The current study serves to provide preliminary data on the physicochemical processes occurring within waterless flushing toilets. Regular use of facilities is simulated at the laboratory scale, while documenting the evolution of effluent water quality characteristics and bacterial population dynamics under four different waste introduction regimes, including: complete waste disposal with and without mixing, urine diversion, and exclusion of discarded anal cleansing materials. Regular monitoring of pH, total dissolved solids (TDS), and electrical conductivity (EC), along with the periodic analysis of solids, volatile fatty acids, total organic carbon, nutrients, and bacterial enumeration, will lend an understanding of the performance of these systems in response to the repeated introduction of non-dilute waste, and project the longevity (or failure) of OSS in real world applications. Preliminary results demonstrate a slight increase in TDS, pH, and EC over the course of three months in all four tanks, while turbidity has decreased. The urine diversion tank exhibits significantly lower pH, EC, and TDS than the other systems. Future studies will explore ways to optimize the quality of wastewater from these systems through modifications to the tanks and the incorporation of additional, site-appropriate technologies – utilizing computer modeling techniques to predict performance outcomes, and experimental work to verify the results

### **Session C2**

Oral Biological and Agricultural Sciences Friday, March 19, 2021, 11:00 AM

#### 210 11:05 AM

The Role of Root-Associated Methanotrophs in Enhancing Drought Tolerance of Plants, while Sequestering the Greenhouse Methane from the Atmosphere in (Semi)Arid Ecosystems Nathalie Delherbe (Doctoral) John McNamara Chynna Bowman David Collins

Linking micro-and macro-scale phenomena to global biogeochemical cycles is a big challenge. Our work takes the first steps towards associating symbiotic associations of microbes to desert plants with global methane cycling. Our first hypothesis was that methanotrophs associated with the roots of plants from (semi)arid ecosystems can enhance the innate tolerance to the drought of these plants. Secondly, we propose that this plant-methanotroph association in (semi)arid ecosystems has a major role in the methane cycle, which ultimately serves as a significant sink of atmospheric methane. We used the plant model Sorghum bicolor, which is a genetically diverse and important bioenergy crop, with good prospects for production in marginal (semi)arid lands, to study how the addition of the methanet consumption/emission. The rates of this plant to simulated drought conditions, in addition, to measure rates of methane consumption/emission. The rates of this experimental setup were compared to in situ field measurements in the Anza Borrego Desert in California. Additionally, we have studied the microbial communities (metagenomes) of the desert soil to determine under which conditions methanotrophic communities had higher abundances. Our data suggest that in this arid ecosystem, methanotrophs are associated with vegetation and that the association might enhance native plant drought tolerance. Furthermore, we show that supplementation with native Methylocaldum isolates from the Anza region can improve drought tolerance in Sorghum. Our work provides essential evidence that the association between plants and methanotrophs in (semi)arid ecosystems plays a major role in supporting the vegetation diversity of those ecosystems which subsequently might be key for methane cycling, having a significant impact on the global levels of this potent greenhouse gas, and ultimately influencing the global climate.

#### 211 11:15 AM

# Syngameonic Interspecies Hybridization in Pinyon Pines Ryan Buck (Doctoral)

The two-needled pinyon pine (Pinus edulis) experiences some of the highest mortality rates among forest species after prolonged periods of drought, which are expected to increase in intensity with climate change. A close relative, Pinus monophylla, has one needle-per-fascicle, a trait thought to be adapted to more arid environments. Both species are dominant in the Southwestern US and Baja California and play important ecological roles in supporting biodiversity. Despite occupying different ecological niches, they have

overlapping distributions, facilitating potential hybridization. Two additional needle types have been observed near contact zones Fallax-type and californiarum-type. Both have one needle-per-fascicle but have varying numbers of resin canals and stomatal rows. Additionally, californiarum-type overlaps in distribution with Pinus quadrifolia, which has four needles-per-fascicle and is sister to P. monophylla. Individuals with intermediate morphology have been observed in their contact zones, leading some to believe they also hybridize. In this study, we used morphological and next-generation sequencing data to test for hybridization, detect the direction of gene flow, and determine the extent of the hybrid zones in this complex. We examined the entire range of these five pinyon pine taxa to determine the evolutionary patterns of gene flow among species and discover the extent of hybridization. We hypothesize that the three previously described taxa, P. edulis, P. monophylla, and P. quadrifolia will be independent species that hybridize and are parent lineages of californiarum-type and fallax-type, which both result from that hybridization. Genetic population structure was determined using the software fastSTRUCTURE, a Discriminant Analysis of Principal Components (DAPC), and a Principal Coordinates Analysis (PCoA) in R. Lamarc and fastsimcoal2 were used to examine the magnitude and direction of gene flow as well as possible hybrid speciation events. Our results support P. edulis, P. monophylla, and P. quadrifolia being independent species, with fallax-type resulting from hybridization between P. edulis and californiarum-type, and californiarum-type possibly being its own species. Additionally, hybridization events among all species pairs were detected, suggesting the presence of a rare multidirectional multispecies network called a syngameon. These hybridization events could have profound impacts on species' abilities to survive in future drought conditions.

#### 212 11:25 AM

Population Genetic Delineation of Conservation Units of the Endangered California Freshwater Shrimp, Syncaris Pacifica

#### Abdul Ada (Master's)

Habitat loss and fragmentation pose severe threats to biodiversity and are a major concern for endangered species. Species with smaller and more isolated populations are generally at a higher risk of extinction because they are not able to maintain as much genetic diversity in the face of environmental change. I applied population genetic techniques to a study of the endangered California Freshwater Shrimp (Syncaris pacifica), a small crustacean found in the streams of Marin, Sonoma and Napa Counties. This is the only remaining species in the genus Syncaris, and its unique evolutionary history suggests that it is a relic from the ancient biota of northern California. Its naturally fragmented landscape has been further subdivided by agriculture and development. I used a genomic approach to delineate conservation units in this species, and estimate current population parameters for those units. Using a panel of 357 genetic markers, I found strong genetic differences among watersheds, and to a lesser extent among minor tributaries. Although connectivity between continuous stream sections is very high, population sizes are relatively small. These results provide a basis for establishing conservation units and effective management strategies in this endangered species.

#### 213 11:35 AM

# The Role of Microhabitat Selection in Cardiac Behavior of intertidal Mussels Gabriella Kalbach (Master's)

A central goal of ecological research is tracking the abundance and distribution of species over time. As climate change increases temperature and dryness in some regions, suitable habitat for many species has shifted or been lost entirely. One particular ecosystem where these consequences are of concern is rocky shorelines where species face climate change conditions in both the marine terrestrial environments caused by tidal cycles. Intertidal species like mussels are sessile, meaning that they cannot move to a new habitat when faced with unfavorable conditions. Because of this, selection of suitable habitat is critical for survival of these organisms. Microhabitat refugia can buffer harsh conditions by creating shade or forming tide pools, while settlement in a location with prolonged aerial exposure during low tides can decrease feeding ability, fecundity, and survival. The effect of microhabitat selection on many sessile intertidal species is not well understood, though it likely plays a large role in future species distributions as favorable habitats are lost due to climate change. To identify the biological impact of microhabitat characteristics on a common intertidal mussel Mytilus trossulus, 16 individuals were fitted with infrared heart rate sensors in summer 2020 to monitor heart rate non-invasively. Comparisons were made between two microhabitat treatments: one group was constantly submerged in tide pools and another group was exposed to air during low tides. I tracked individual heart rates to identify differential responses to varying environmental conditions over small spatial scales. Mussels exposed to air had higher average heart rates (22.9 beats per minute) compared to continuously submerged individuals (19.5 bpm, p-value = 0.007). Exposed treatment mussels showed variation in heart rates corresponding with tidal cycles. This heart rate cycling displayed by exposed mussels suggests that heart rate slows during aerial exposure and speeds up during submersion, likely caused by an increased feeding and respiration effort during high tides. Mussels that face prolonged aerial exposure may have fewer opportunities to feed, therefore negatively impacting growth and fecundity in comparison to their conspecifics in more favorable microhabitats. Identifying the role microhabitats play in organismal physiology informs management decisions regarding vulnerable intertidal communities.

#### 214 11:45 AM

Dysregulation of the Human Gut Microbiome Through Oral Contraceptive Use Myedith Damba (Master's) Kayla Vale Cruz Jackie Stenton Cameron Hallisey

Metabolomic studies have recently increased in popularity due to new and improved technology to analyze large data sets that link the metabolites found in biological systems to metabolic pathways, which can give insight into upstream protein function or gene expression changes. There is an inherent link between our gut bacteria and brain function known as the gut brain axis. Gut bacteria are known to produce neurotransmitters and hormone-like metabolites. Different bacterial species contain different metabolic pathways, much of which are uncharacterized and may be connected to development and/or progression of neurological disorders. Changes in bacterial metabolism are of particular interest when exposed to pharmaceuticals. Oral contraceptive pills containing the active ingredients levonorgestrel and ethinyl estradiol are taken by many women to prevent unwanted pregnancies and can have other advantages including treating hormonal induced acne, reducing the frequency and intensity of cramps, and controlling heavy menstruation flow. Although the pill has many benefits, it can also have adverse effects like lability, depression, and mood swings. To date, preliminary data has been generated from my current studies that illustrate dysregulation of Vitamin B metabolites produced by Bacteroides fragilis perturbed with levonorgestrel and ethinyl estradiol. The impact of oral contraceptives on the gut microbiome is relatively understudied, but we postulate the similarities of unwanted side effects, i.e., depression, lethargy, fatigue, and headaches could be due to the dysregulation of Vitamin B metabolism in B. fragilis.

### **Session D2**

Oral Biological and Agricultural Sciences Friday, March 19, 2021, 12:00 PM

#### 215 12:05 PM

Indoor Hydroponic Strawberry Production Daniel Pentico (Undergraduate)

In the context of increasing world population and limited water and farmland resources, improving the sustainability of food production is imperative to meet the growing demand for food. Hydroponic food production is efficient in water and land use and may help address the food insecurity challenges. In addition, the nutrient solutions supplied to the plants can be readily altered to change the nutrition and flavor profiles of the food. The objective of this study was to investigate the effect of potassium, a key nutrient for sugar synthesis, on sweetness of hydroponically grown strawberries. Eight Quinault strawberries were planted in two identical growing chambers using ebb and flow hydroponic systems. The control strawberries were grown in a standard hydroponic nutrient solution. The same nutrient solution supplemented with 10 mM K2SO4 was used for the treatment strawberries. An 8-inch outtake fan was used to exhaust heat and bring in CO2. Two clamp fans were used for direct air movement on the plants. A 15-minute feeding cycle was used to supply the nutrient solution at 10 pm, 1 am, 4 am, 7 am, and 11 am. A 15-hour lighting cycle that was on at 9 pm and off at 12 pm was provided by light-emitting diode (3000K, 5000K, 660 nm, 760 nm) fixtures 24 inches above the plants. The lighting output was adjusted between 20% to 100% depending on the temperature. Temperature in the growing chambers, temperature, pH, salinity of the nutrient solution, nutrient and water use, and vegetative characteristics of the plants were monitored and logged daily. The pH values were maintained within a range of 5.5-6.6. Salinity ranged between 460-760 ppm for vegetative growth and 540-870 ppm for the flowering and fruiting stage. Temperature in the growing chambers ranged from 24 °C to 37 °C while the temperature of the nutrient solution was in the range of 19-29 °C. Due to extreme weather and spider mite infection, the plants failed. The total water and energy use of the project was 25 L and 173 kWh, respectively. A better environmental control is warranted to repeat the experiments.

#### 216 12:15 PM

Assessing Drought Tolerance in the Tribal Oak Quercus agrifolia Nelly Rodriguez (Undergraduate)

Of the 600 species of oak trees worldwide, more than 20 are native to California. Quercus agrifolia (Coast Live Oak) in particular has been shown to be not only of ecological and archaeological importance but also cultural as well. Distributed throughout California and northern Baja California, this species provides housing and food sources for many animals, restores and improves watersheds

through its root system, and is culturally important to many Tribal communities, providing abundant harvests of acorns to their families. Unfortunately, multiple threats, including several diseases, are affecting these trees and are exacerbated by droughts and high temperatures which diminish the plants' natural defenses. Previous studies have found that Quercus agrifolia has two varieties (var. agrifolia and var. oxyadenia). These varieties differ in the amount of trichomes on their leaves, with the var. oxyadenia having more trichomes and a lighter color as a result, both of which may confer some resistance to extreme temperatures and aridity. The presence of trichomes could increase water retention and be an adaptation to drought conditions. Interestingly, this variety is distributed more inland and has a restricted distribution in the south of California and northern Baja California. In this study we hypothesize that the var. oxyadenia exhibits higher drought tolerance in relation to the var. agrifolia. We are conducting a greenhouse experiment to test if individuals of var. oxyadenia perform better when subjected to drought conditions. We have partnered with Tribal groups and have collected seeds from Tribal lands and other areas where these two varieties are distributed. We have planted the seeds and will be measuring their performance (e.g. height, mortality, photosynthesis). Our end goals are to see which variety has higher natural defenses and to return the surviving plants to their Tribal lands for further growth and expansion.

#### 217 12:25 PM

Experimental Crosses Reveal Seedless Fruits in the Functionally Diecious Cylindropuntia wolfii Carlos Portillo (Undergraduate) Niveditha Ramadoss Amy Orduno

Cylindropuntia wolfii is a rare, native and endemic cactus that is narrowly distributed across the US/Mexican border particularly in the Jacumba area where it is dominant and well adapted. Histological studies have shown that this species has a functionally dioecious sexual system, with individuals having either male or female flowers, however many fruits carry aborted seeds which affects the sexual reproduction and therefore perpetuation of this species. Thus in this study we aimed to understand the reproductive biology of C. wolfii. We carried out experimental crosses to determine if aborted seeds are due to a lack of pollen and ovule viability. We compared natural crosses (e.g. bee-pollinated) against manual crosses, either self pollinated or outcrossds. A negative control was used as reference, in which flowers were covered during the whole experiment to prevent pollination. Crosses were performed in May and fruit development was tracked during the entire season. Mature fruits were collected from August to September. The fruits were opened and the aborted ovules and mature seeds were counted using a microscope. The seed set was estimated as total mature seeds per total number of ovules. We observed seeds in outcrossed females but no seeds in males in any crosses, corroborating that the sexual system is functional dioecious. We found the seed set in general was low and that of the outcrosses were significantly higher than the seed set of bee pollinated flowers, indicating there is a problem in the pollinator efficiency or abundance. This study is part of our first steps toward analysis of the fruits of C. wolfii which has been afflicted by reduced seed production.

#### 218 12:35 PM

# Blue Water Quantities Downstream in Rondonia, Brazil Olivia Griffin (Undergraduate)

Deforestation, global climate change, topography, soil type, and farming practices upstream have been an increasing factor in fluctuating discharge rates of blue water flowing downstream in Rondonia, Brazil. For centuries, the Amazon has been a buffer for when the ocean fails to supply water. However, as climate change increases, temperature and evaporation demand increase, while rainfall experiences high variability (Levy et al, 2018). As deforestation increases, blue water runoff is increased during the dry season. However, topography and soil mediate the impacts of both deforestation and climate change (Savenije, 2000). Through the use of geographical information software, major controls on hydrologic flows at existing stream gages in Rondonia, Brazil will be determined. Sixty-nine watersheds were delineated that have streamflow data within the state, and the results were cross-validated with drainage areas from the Brazilian government. Adjustments were needed in the gage location, as gage locations were often inaccurate and produced watersheds that were extremely small and high in error. The watershed boundaries and statistical analysis will be used to determine the landscape controls on dry season discharge, including slope, geology, deforestation and watershed area. The data being collected allows for an estimate on the amount of blue water on properties where a team of economists have conducted interviews, and the effects of geology, slope, and deforestation on the quantity of blue water at the property level. This project will work to answer the question, how does watershed size, slope, geology, and deforestation affect blue water quantity within Rondonia, Brazil? Future predictions of these discharge practices will be able to determine how each factor is affecting blue water quantity downstream, and allow for informed decisions to be made so that future practices benefit both farmers and the Amazon ecosystems

#### 219 12:45 PM

Categorizing the Skin Microbiome of California Rays Emma Kerr (Undergraduate) Ryan Hesse Asha Goodman Lais Lima Haggerty Haggerty Colton Johnson

Microbes are some of the smallest and most important organisms on the planet. They are tiny but mighty, and can form important relationships with host organisms, called a microbiome. Rays like all other macroscopic organisms, are hosts to a microbiome. Rays are part of the class Chondrichthyes and have several features that may affect the structure of the skin microbiome, including mucus production, denticle structure, and benthic lifestyles. California is home to many species of rays including round rays, Urobatis halleri, bat rays, Myliobatis californica, butterfly rays, Gymnura marmorata, angel sharks, Squatina californica, and, thornback rays, Platyrhinoidis triseriat. Here we describe the skin microbiome composition of U. halleri, M. californica, G. marmorata, S. californica and P. triseriat. Microbiome samples were collected along the coast of California in collaboration with California Department of Fish and Wildlife. Samples were sequenced using shotgun metagenomics on SDSU's Illumina MiSeq, screened for quality using PRINSEQ, and annotated using FOCUS to identify the microbial taxa present in each microbiome. Preliminary analysis showed the microbiome of each species of ray demonstrated different taxonomic compositions. In addition we will identify the core microbiome of each species. For this analysis the core microbiome will be identified based on each taxa's presence or absence in a sample, and defined as taxa present on all of the individuals of the same species.

### **Session E2**

Oral Biological and Agricultural Sciences Friday, March 19, 2021, 1:00 PM

#### 220 1:05 PM

### Pre-conditioning ES-MSCs for Osteochondral 3D-Bioprinting

#### Joel Kopcow (Undergraduate)

In situ 3D-Bioprinting allows precise and controlled deposition of hydrogels laden with cells and signaling molecules directly into a patient's defect. With the goal of 3D-bioprinting embryonic-derived mesenchymal stem cells (ES-MSC) into osteochondral defects in situ to heal bone and cartilage, the formation of these tissues must be induced without the use of specific media, growth factors, or other stimuli that could impact each unique end phenotype. Our previous work has shown that the addition of TGF $\beta$ 3 into our fibrin-based bioinks is sufficient to induce ES-MSC chondrogenesis, but a suitable treatment to induce osteogenesis is still needed. The presence of beta tricalcium phosphate ( $\beta$ -TCP) or nano-hydroxyapatite (nHyap) is known to support or induce osteogenesis and bone-like tissue formation (Zhang et al. 2016; Calabrese et al. 2016). Mixing these directly into our bioinks did not produce a stable construct, but previous additions of these nanoparticles to monolayer culture and subsequent 3D pellet formation led to bone-like constructs. To expand on previous studies, the goal is to now test whether the monolayer addition of these nanoparticles to ES-MSC culture will also support mineralized bone-like tissue formation in our fibrin-based bioinks without the need for specific osteogenic media. The pre-conditioned ES-MSCs will be mixed into a fibrin-based bioink and extruded directly into decalcified bone defects or onto tissue culture plastic. Gene expression, histology, and mechanical testing will be used as endpoint analysis to assess osteogenesis. If successful, a multilayered, biphasic bioprinting scheme may be implemented for osteochondral defects that can have separate but integrated osteogenic and chondrogenic layers to support healing in osteochondral defect sites

#### 221 1:15 PM

Elucidating the Effect of Catalysis and Inhibitor Binding on Isocitrate Dehydrogenase 1(IDH1) Through Engineering of Alpha-Helix Mutants Vinnie Widjaja (Undergraduate) Alexandra Strom Kaitlyn Sabo

#### An Hoang

Isocitrate dehydrogenase 1 (IDH1) catalyzes the conversion of isocitrate to  $\alpha$ -ketoglutarate using NADP+ as a cofactor. Point mutations in IDH1 can confer the ability to convert  $\alpha$ -ketoglutarate to D-2-hydroxyglutarate, a known oncometabolite. R132H is a common oncogenic point mutation found in IDH1 that can drive gliomas and glioblastomas. R132H destabilizes an important IDH1 regulatory segment, the  $\alpha$ 10 helix, of the IDH1 homodimer. IDH1 mutant inhibitors have been found to have little effect on wild-type (WT) IDH1/ IDH2. Two IDH1 inhibitors highlight a highly plastic allosteric pocket on IDH1 where the R132H mutation destabilizes the structure allowing inhibitor access to this pocket. This selectivity is important for minimizing toxicity when treating IDH1 driven tumors. While we and others have characterized the catalytic features of these reactions, it is not well understood how IDH1 activity is regulated through conformational changes within the  $\alpha$ 10 helix. We hypothesize that stabilizing point mutations to the  $\alpha$ -helix domain will disrupt inhibitor binding by forming ionic interactions and structuring the active site, indicating that this region is crucial for regulation of IDH1. We predict that the introduction of proline mutants to destabilize the  $\alpha$ 10 will still allow for inhibitor binding, indicating that destabilization of the  $\alpha$ 10 helix is not as crucial for inhibitor binding. In order to test these hypotheses, we have designed and will heterologously express and purify mutants that encourage salt bridging as a stabilizing factor, along with mutants that will disrupt the  $\alpha$ 10 structure. Ultimately, these studies may suggest that stabilizing the  $\alpha$ 10 domain may play an important role for regulating IDH1 activity, helping illuminate new mechanisms of IDH1 regulation.

#### 222 1:25 PM

Using hiPSC's to Understand the Mechanism of Alzheimer's Genetic Risk Factors, and its Effect on Astrocyte-Neuron Interactions

#### William Gaor (Undergraduate)

The project that I will be taking part in at Scripps focuses on investigating a known Alzheimer's genetic risk factor, which is the allele 4 of the APOE gene. Our goal is to identify the mechanisms by which the presence of this allele affects astrocyte-neuron interactions by using human induced pluripotent stem cells (hiPSC) derived neural cells. We will utilize lentiviruses to force the expression of select transcription factors (TF) which can drive the differentiation of iPSCs into neurons and astrocytes. Due to the scale of this project, we will transduce several cell lines of Alzheimer's disease relevant genotypes with lentiviral vectors that carry specific transcription factors and select, by sub-cloning and then genotyping, the ones that have the integrated virus+TF combination. Knowing that the virus integrates itself into the genome of the cells, we can have control over when the factors need to be expressed. Since making viruses is a time consuming process, using stable cell lines can help alleviate certain issues regarding variabilities between different viral batches and also optimize the differentiation process and duration of the experiments. My role in this project is to generate human iPSC stable lines that carry the transcription factors that will drive their differentiation into neurons and astrocytes. Ultimately, the goal of this project is to discover new diagnostic methods for potential Alzheimer's patients to accurately tell us if someone will develop the disease before they show symptoms.

#### 223 1:35 PM

# Metabolic Engineering of Clostridium cellulovorans for PET Degradation and Applications in Bioelectrochemical Systems

#### Kaytlin Barker (Undergraduate)

Finding sustainable ways to treat polluted water is a constant challenge in the 21st century. In order to develop sustainable water treatments, researchers are using new synthetic biology tools to optimize biological species in water treatment systems. Micro- and nano-plastics are challenging to remove from wastewater without energy-intensive membrane filtration. Instead, a biological process that is capable of converting plastic into energy, while simultaneously desalinating water, could result in the net-zero energy removal of micro- and nano-plastics. To test the development of such an optimized system, this project will develop a bioelectrochemical system (BES) that utilizes genetic engineering to optimize a sustainable, plastic-degrading, desalination bioreactor. Specifically, the goal of this project is to create and optimize a BES that uses a genetically modified species of microbes to optimize the desalination of water, the degradation of polyethylene terephthalate (PET), and the collection of biofuel. To achieve this goal, Shewanella oneidensis will be optimized for methane

#### 224 1:45 PM

Structural Analysis of Isocitrate Dehydrogenase 1 Inhibition Alexandra Strom (Undergraduate) Kaitlyn Sabo Vinnie Widjaja

Structural consequences caused by mutations of metabolic enzymes have the potential to drive human disease, such as cancer. Isocitrate dehydrogenase 1 (IDH1) is one such enzyme with this capability, as mutations can lead to gliomas, glioblastomas, acute myeloid leukemias, and bone cancers. In humans cells, IDH1 is responsible for catalysis of isocitrate to  $\alpha$ -ketoglutarate, key metabolites in the tricarboxylic acid cycle. Cancerous mutations of IDH1 yield the neomorphic conversion of  $\alpha$ -ketoglutarate to D-2-hydroxyglutarate, a proposed oncometabolite. Fortunately, small molecule IDH1 inhibitors have exquisite selectivity for mutant IDH1 in a disease state. This selectivity is most often influenced by structural changes caused by one prominent mutation at residue 132 which induces a conformational change to the regulatory segment of IDH1 when mutated from arginine to histidine. This regulatory segment is a critical alpha helix in IDH1, as it facilitates catalysis of substrates. While it is currently proposed that this segment must be disordered for small molecule inhibitors to bind to IDH1, this may not be a requirement, as other IDH1 mutations produce a variety of conformations of the regulatory segment ranging from ordered to completely disordered. We hypothesize that a completely disordered regulatory segment is not necessary for IDH1 inhibitor binding. To test this hypothesis, we employ computational and biochemical methods to stabilize and destabilize this region in order to understand its role in catalysis and inhibition. We expect that manipulating stabilization of the regulatory segment will identify critical weaknesses of and structural aspects necessary for IDH1 inhibitor design.

### **Session F2**

Oral Biological and Agricultural Sciences Friday, March 19, 2021, 2:00 PM

#### 225 2:05 PM

Application of Molecular and Morphological Markers Reveal Population Substructuring Within the Widely Distributed A. xalapensis of Mexico

#### Samantha Mihalic (Undergraduate) Alexandra McElwee-Adame M. Socorro González-Elizondo

Arbutus is a genus in the family Ericaceae (subfamily: Arbutoideae) with at least ten species distributed in North America. Several new species have been recognized, thought to be varieties or synonyms of Arbutus xalapensis, ranging from Texas, New Mexico, along the Pacific coast of Mexico and as far down as Nicaruaga. Because of its wide distribution occupying several ecological niches and its morphological variation, some authors suggest this species may be delimited further. Moreover, species delimitation in the genus has been obscured by incomplete lineage sorting and hybridization, requiring genomic analysis in order to resolve these questions. No genetic studies exist assessing the species delimitation in A. xalapensis and its population structure. In this study we assess the species boundaries in A. xalapensis and explore the population structure of this species using molecular markers and applying bioinformatics and morphological data. We collected leaf material throughout the distribution of A. xalapensis in Mexico. DNA will be extracted from all possible samples in order to represent the species' geographic range and sequence in order to obtain single nucleotide polymorphisms, or small fractions of the genome. STRUCTURE and DAPC analyses will be used in order to find population genetic structure and show clusters based on genetic distance. STRUCTURE can be used to show genetic data alongside the geographic range in order to compare similarities between samples. We will also be looking at the morphological differences between the two ranges, as the branching patterns and trichome data differ, allowing us to further delimit the species. This population genetic study coupled with morphological data will further our knowledge of A. xalapensis and potential new species of Arbutus.

#### 226 2:15 PM

# Identifying Fruit Metabolites and their Effects in the Human Gut Microbiome Using Untargeted Metabolomics through MS/MS

#### Esmeralda Alvarez (Undergraduate)

Including fruits and vegetables in a diet help improve overall health and prevent diseases. Fruit contains many bioactive compounds such as phytochemicals and flavonoids that interact with the gut microbiome affecting human health. Our research is focused around identifying these bioactive compounds in various fruits and studying their relationship with the human gut microbiome and their role in overall health. Metabolite extractions were performed on three melon species: cantaloupe, watermelon, and honeydew, by crushing and homogenizing ~1mg of store bought fruit with liquid nitrogen. They were then placed in 2:2:1 acetonitrile:methanol:water and dried down with nitrogen gas to prepare them for a BCA analysis. The samples were then run on a liquid chromatography column and QTOF Mass spectrometer in positive mode. The run collects MS/MS data of metabolite peaks that can be identified by metabolomic databases. Results: Around 5,000 metabolites were found that were different from each sample class using XCMS Online metabolomics bioinformatic software. The PCA plot shows clear separation between watermelon, cantaloupe, and honeydew indicating the different sets of sample classes. The metabolites found had a p-value <0.01 and a minimum signal intensity of 5000. XCMS also has a metabolic pathway analysis feature that was used to map out altered metabolic pathways between the three melon classes. Specific metabolites must be validated through MS/MS data matches with databases and literature. Preliminary data shows that the methods of extraction are yielding enough data for analysis. Research on this topic is ongoing and is being optimized to include more fruits and larger volumes to compare samples to one another.

#### 227 2:25 PM

#### Use of Pro-Differentiation Approach for Treatment of Colorectal Carcinoma (CRC) Paris Offor (Undergraduate) Joshua Alcantera

Differentiation therapy is a non-conventional therapeutic modality aimed at re-activating endogenous differentiation programs in cancer cells with subsequent tumor cellular maturation and concurrent loss of the tumor phenotype. This approach could be used with chemotherapeutics therapy and/or radiotherapy to promote the differentiation of resistant cancer cells. In this study, we used unbiased computational mathematical tool called Boolean logic to identify invariant genes signatures that drive differentiation of colon stem cells present in the base of the colon crypts and halt the initiation and progression of colorectal adenomas and cancers (CRCs), despite disease heterogeneity. The Boolean logic identified CDX-2 as a differentiation marker for the colon stem cells. Augmentation of CDX-2 can be achieved by administration of specific activators. To generate the proof of mechanisms for our hypothesis, we will treat CPC-APC mice (CDx2-Cre-APC min), the commonly known model for CRC, with the specific activators and assess the effect of these compounds on the CRC progression. In addition, we will isolate the colon stem cells from these mice, grow them as 3D organoids, and then treat them with these activators. We plan to assess the differentiation of 3D organoids +/- activators by microscopy. Also, we will analyze the transcriptome changes in the enteriods by qRT-PCR. Moreover, we will check the differentiation markers in the organoids by confocal microscopy and immunohistochemistry.

#### 228 2:35 PM

# Demonstration of Putative Formaldehyde Activating Enzyme Function in Methylomicrobium alcaliphilum 20ZR

#### Yasmine Afshin (Master's)

Methanotrophs are prokaryotes that utilize methane as their sole source of carbon and energy. These microbes are genetically tractable and can serve as a model platform for investigating single carbon metabolic pathways. This study uses methanotrophic Methylomicrobium alcaliphilum (20ZR) and methylotrophic Methylobacterium extorquens AM1 to examine cellular strategies for formaldehyde oxidation/detoxification. All organisms can produce formaldehyde as a byproduct of methylation/demethylation reactions. Since formaldehyde is a highly reactive chemical with numerous toxic effects, most organisms have evolved detoxification pathways. Methylotrophic bacteria represent an extreme formaldehyde handling case, as aerobic growth on single-carbon (C1) substrates such as methanol or methane involves formaldehyde as a central metabolic intermediate (Vorholt, Marx et al. 2000). Methanol is oxidized to formaldehyde in a reaction catalyzed by a pyrroloquinoline quinone-dependent methanol dehydrogenase. The formaldehyde then crosses the cytoplasmic membrane, and in the cytoplasm, it then reacts with the C1 carrier molecules tetrahydrofolate (H4F) or tetrahydromethanopterin (H4MPT). While a dedicated enzymatic system tightly controls formaldehyde condensation with H4MTP, a formaldehyde activation enzyme (fae), the formaldehyde and H4F condensation is still assumed to

be a spontaneous reaction. We found that H4MPT-pathway mutations do not display any significant phenotype upon growth on methane or methanol, indicating that alternative pathways are also active. Methylomicrobium alcaliphilum (20ZR) possesses two homologs of fae (fae2 and fae3). Considering the high toxicity of formaldehyde and the high redundancy of formaldehyde activating enzymes, we hypothesize that Fae-homologues contribute to formaldehyde condensation with H4F. A set of complementation assays with the M. extorquens AM1-Δfae mutant (Nayak and Marx 2014) were carried out to validate the fae's functional activity- homologies. We then found the Fae2 functions in the tetrahydromethanopterin pathway, while Fae3 does not react with H4F and most likely has alternative functions. The role of fae3 in the H4F pathway is being validated via additional genetic studies.

#### 229 2:45 PM

P'urépecha Parents' and Caregivers' Perspectives on Childhood Asthma and Environmental Determinants of Asthma Management and Treatment

Sophia Rodriguez (Master's) Maria Pozar Adriana Chavez

Communities of color and low-income communities tend to be hosts of more heavily polluted land due to environmental racism. Childhood asthma has been a primary concern for P'urépecha residents in the eastern Coachella Valley (ECV). As an indigenous community, they have historically faced discrimination in Mexico and their health and well-being is impacted by their non-citizenship status and their proximity to the Salton Sea as residents in the Torrez Martinez reservation. As the Salton Sea evaporates and becomes drier, harmful dust with agricultural toxins is exposed and lifted onto the air. P'urépechas' citizenship status, socioeconomic status and occupation as migrant farmworkers places them in a structurally vulnerable position. Understanding childhood asthma treatment and management within the P'urépecha community is important in alleviating health care access and utilization. Aims: To explore P'urépecha parents' and caregivers' perspectives on childhood asthma and the Salton Sea. To investigate environmental determinants of childhood asthma including barriers or facilitators of asthma management and treatment. Eight semi-structured interviews were conducted with P'urépecha-identifying residents, audio-recorded, and transcribed. Structural violence and environmental injustice frameworks informed the analysis. Data from the interviews were synthesized using rapid qualitative methods and were aggregated into domain-specific matrices. Four environmental determinants were associated with childhood asthma management and treatment: lack of linguistic health services, limited specialized health services, patient-provider relationship, and economic hardship. There are no linguistic services for P'urépecha speaking migrants. Limited pediatric clinics are interrelated with transportation barriers. Negative experiences with providers create mistrust and low utilization of services in the ECV. Lastly, financial hardships prevent families from relocating and leaving the region. The environmental disaster of the Salton Sea will only worsen, and childhood asthma symptom severity will be exacerbated by the hazardous dust. Our preliminary findings reveal we need more pediatric care in the ECV region, P'urépecha speaking promotores in community clinics and mobile health clinics to alleviate the health disparity gaps this community is facing. Additionally, understanding P'urépecha traditions and healing modalities is critical to improve provider-patient interactions. Lastly, distinguishing P'urépechas from the Hispanic/Latino identity is vital in highlighting the structural violence and health inequities specific to this community.

### **Session G2**

Oral Business Economics, Public Administration and Education Friday, March 19, 2021, 3:00 PM

#### 230 3:05 PM

Data Swagger - Cultivating Data Literacy to Drive Digital Transformation Darshan Davis (Undergraduate) Janmae Pagador Nelson Huynh

Data literacy is the ability to understand and communicate with data. Since the amount of data is growing at an unprecedented rate, it has become necessary to process, understand and use data in an effective and efficient manner. That said, the problem now faced is the transformation of current and future employees to see value in data, and be willing to not only effectively use it, but trust it so that they can become data literate. Prior research argues that because employees who have access to data do not see its true value; they are therefore discouraged from using it all together. We devise that promoting data literacy will allow for smoother responses to challenges such as data application contextualization and personalization, improve intradepartmental and interdepartmental data

communication and thus lead to easier paths to meeting organizational goals through data-driven decision making. Data itself is there: tables, charts, statistics, system-generated insights; however, what is not there is the link between personal drive and data applications. Our study presents the barriers to data literacy and explore frameworks that allow employees to organically develop data literacy. Based on a case study of two Business Intelligence units affiliated with a U.S. Government agency, we identified major factors such as lack of motivation to understand data, resistance towards change, and lack of knowledge on how to contextualize the value of data. We believe these factors go hand-in-hand with each other and therefore this challenge requires a systematic approach to data literacy and training. To develop a practical framework, we consider Jack Mezirow's Transformative Learning Theory and recent developments in data democratization, work culture, and corporate education models. Transformative Learning Theory has three common themes that we use to further support our case. First is the centrality of experience-a learner's desire to use their own experience to validate data in front of them. Second is critical reflection-examining assumptions and changing beliefs and behaviors through reflection and dialogue. Third is rational discourse - discourse being a key factor to transformation of an individual's learning, which in our case is data. These themes inform a systematic approach that allows an organization, especially government agencies, to become data literate. Our work is driven by the fact that the term 'data literacy,' along with data science, is no longer relevant to solely IT Departments. It is relevant to every single member of a functional organization. We propose an experience-centered, reflection-driven, and cooperative approach to data literacy training and thus builds employee trust-rather than making data and data tools available and expecting employees to use and trust data. There is this misconception that organizations should be looking for "data-driven" people to join their team, when in reality they should be looking for people that are able to drive data themselves, because data by itself is not driving anything. There is not a lot of research and information out there as to how organizations can transform their employees' introspection about data. Hence, why we seek to develop a training module that normalizes the exchange and understanding of data across every organizational level.

#### 231 3:15 PM

## Big Data Analytics and Visualization: P-Card Fraud Isabella Gaffney (Undergraduate)

This study discusses the pervasiveness and impact of purchasing card (p-card) fraud among various organizations and industries. I examine the types of p-card fraud, red flags relating to such frauds, and the challenges organizations face when aiming to detect, mitigate, and prevent p-card fraud. I also examine internal control systems that organizations can implement to mitigate p-card fraud and I discuss recent advancements in data analytics and visualization tools that can be utilized to detect potential p-card fraud. My study has significant implications to various stakeholders who hope to learn specific techniques and tactics that can be implemented to prevent p-card fraud within their organizations.

#### 232 3:25 PM

The Impact of Research and Mentoring Programs on Black and Latinx Female Social Science Students' Pathway to the Professoriate

#### Nora Leyva (Doctoral) Reka Barton

This quantitative study explored the relationship between women of color (WOC) students' participation in research and mentoring (RMP) programs; and their consideration to pursue a career in the professoriate within the social sciences. Survey data were collected from 1201 undergraduate and graduate students enrolled at a Southern California, public university designated as a Hispanic Serving Institution (HSI). Data collected from 629 female students within the social sciences suggest that while a majority of Black and Latinx female students in these fields aspire to complete a graduate degree and are aware of existing RMPs available at their university, only a small fraction have the opportunity to participate in RMPs that would enculturate and prepare them for a career in the professoriate. Furthermore, the study's findings indicate that there is a significant relationship between RMP participation and ethnicity. Additionally, a correlation analysis suggests that there is a positive relationship between RMP participation and aspirations to pursue a research career that could lead to the professoriate. These findings suggest that HSIs and Minority Serving Institutions should center the presence and promotion of research and mentoring opportunities on campus to WOC from underrepresented minority groups within the social sciences.

#### **233 3:35 PM** Exploring Graduate Student Identity and the Intersection of Multiple Sub-Identities Adriana Corrales (Doctoral)

Graduate education follows an apprenticeship model, primarily aimed at preparing students for academic careers; however, the inclusion of teaching within this apprenticeship is not always clear as faculty, students, and other stakeholders do not agree on the need for instructional training. Despite the variability in training available to graduate students, across departments and institutions, over half will be graduate teaching assistants (GTAs) at some point in their education. This number increases to 91% for chemistry graduate students. This discrepancy between hiring graduate students as GTAs and inconsistent inclusion of instructional training indicates a misalignment between the needs of graduate students and the support programs offer. This also speaks to the imbalance in graduate student professionalization that is prevalent in the lack of preparedness of new faculty to teach. To better support graduate students in their professionalization, we must first understand how graduate student identities develop. Here identity development represents the aspects of the student that the program supports including teaching identity, research identity, and others. The focus of studies are generally placed either on teaching or research identity, but not both simultaneously. Graduate student identity has also been introduced as a lens for encompassing multiple sub-identities, however teaching identity is not emphasized. The goals of this project are to a) understand graduate student identity development and the development of sub-identities and b) understand the relationships between graduate students' multiple sub-identities in the context of particular institutional environments. Through the collection of interviews from 19 chemistry graduate students across two institutions and analysis via gualitative methods, this work expands upon the conceptualization of graduate student identity. Sociocultural and identity theories were employed to understand graduate student identity development. Preliminary analyses show an emerging dichotomy between newer and older graduate students and the extent to which each group develops sub-identities beyond a science identity. This work expands upon the conceptualization of graduate student identity in order to address how to better support graduate students.

#### 234 3:45 PM

# Race and Attainment Differences in Postsecondary Students' Academic and Social Integration Amir Zargar (Doctoral)

Both academic and social integration are crucial elements of the college experience, and are taken into account in models of student persistence. While academic integration consists of experiences that formally play a role in students' education such as student connection with faculty and staff, and interaction with peers in study groups, social integration involves less formal experiences that function to incorporate students into the university environment; these experiences could take the form of any extracurricular activity such as joining clubs, fraternities, sororities, and sports teams. There are contrasting stances on the topic of academic and social integration in relation to students of color with some scholars questioning the applicability of models of student persistence to those who are not in the majority. Researchers also question whether there is enough empirical evidence to support these models with respect to their emphasis on academic and social integration. This study sought to use national longitudinal survey data (Education Longitudinal Study of 2002) to build on existing research and provide insight into the impact of academic and social integration on the persistence to degree attainment of students of color at postsecondary institutions. Factorial ANOVA results indicated that mean academic and social integration scores were higher for both white students and students of color who had attained a degree. These findings suggest that regardless of whether a student is a part of the ethnic majority or minority, academic and social integration scores are higher for those students who persisted in school long enough to achieve a degree. Thus, developing intervention programs at the postsecondary level to foster the academic and social integration of students who persisted in scolal integration of students may lead to improvements to students' academic achievement and, ultimately, degree attainment.

### **Session H2**

Oral Interdisciplinary Friday, March 19, 2021, 4:00 PM

#### 235 4:05 PM

Latinx Leadership: A Grounded Theory Approach to Conceptualizing Latinx Leadership for Mid-to-Senior Level Community College Administrators

#### Ángel Gonzalez (Doctoral)

Researchers have noted the need for diverse and culturally relevant leaders at community colleges (Turner et al., 2008). Nonetheless, leadership remains predominately white and cisheterosexual at every level (American Council on Education, 2019; Bustillos &

Siqueiros, 2018). About 48% of undergraduate students enrolled at community colleges are Latinx/a/o and incoming generation z are largely identifying as LGBTQ+ (Laughlin, 2016; Snyder et al., 2016). This juxtaposition provides space for my qualitative dissertation that examines the experiences of Latinx community college administrators. I situate my study within four critical theoretical strands of borderlands and conocimiento (Anzaldua, 1987, 2002), queer theory (Butler, 1990), and intersectionality (Crenshaw, 1989) to deconstruct Latina/o Leadership (Bordas, 2001). Through grounded theory methodology and testimonios and queer chisme methods, I hope Latinx community college leaders share experiences they have encountered with institutionalized marginalization (Bernal et al, 2012; Gutierrez, 2017), thus resulting in a new leadership model, Latinx leadership.

#### 236 4:15 PM

## Direct to College: Inner-City Pipeline Julio Catano (Master's)

San Diego is one of the most diverse cities in the United States. The U.S. census states 58% of the city's population is of BIPOC demographics. There is a lack of this representation on stage and media throughout San Diego's performing arts community. This paper aims to propose a program like the City Heights Educational Collaborate in order to address the issue of lack of diversity in arts entertainment in San Diego. In 1996, San Diego State University and philanthropist Sol Price partnered up to start a pilot program. Its premise was to raise the college entrance rate for the student population of City Heights. The data are still being analyzed, but it was found that student admittance into SDSU from Hoover High School did increase. City Heights is considered one of the most diverse neighborhoods in the United States, according to Niche. This makes it a prime source for a pilot program with the aim to increase diverse representation in the arts. An arts education program in this neighborhood could prove fruitful. Furthermore, a program targeting other diverse neighborhoods like Paradise Hills, Encanto and Skyline would more effectively expose communities to the arts that geographically are far away from the major arts institutes of San Diego. Targeting arts education would be an ideal trial sample. By reaching a vast number of neighborhoods, and a concentrated amount of students focused in arts education, immediate impact would be easier to track. Getting into demographically diverse schools and introducing the students to an industry that many times is reserved for elite circles from a young age, we could ensure multigenerational practical arts training. By the time students reached high school level, they would be connoisseurs of an industry that eludes these specific neighborhoods. Having younger diverse connoisseurs of the arts could help bridge the disparity of lack of representation. We can compare current participation in the performing arts by demographics to participation in the future, if arts education was provided in these culturally diverse neighborhoods.

#### 237 4:25 PM

### How Education Impacted My Cultural Identity as a Minoritized Immigrant: An Autoethnographic Exploration

#### Matyas Hanna (Undergraduate)

Learning a new language, adapting to new environments, and being stereotyped in middle school contributed to my mentality of feeling unfit for the dominant culture. Immigrants and minorities tend to feel obligated to assimilate, thus leading frequently to the oppressive suppression of their cultural identity and customs. By analyzing my educational experience in my adopted country, I explore the effect cultural identity has on success and which educational programs helped me feel connected with my community. In my autoethnographic research, I explore how my personal educational experience as an Iraqi-American lead to the suppression of my cultural identity. An autoethnography is a narrative approach to qualitative research. Using this methodology, I analyzed my current cultural position in my community and my future self by identifying my purpose in life. I undertook a literature review of ten papers that used quantitative and qualitative data that included interviews, observations of classroom environments, and research. The selected research papers were both national and international in scope and thus included the experiences of minorities worldwide. I used reflection and reflexivity to engage in a self-inquiry process of my personal experiences related to the research findings to reveal the role my cultural identity played in my success as a student. My autoethnography supports the literature findings that classrooms oriented to the dominant culture tend to create or reinforce dominant stereotypes of the minorityized group that influence culturally diverse students to assimilate to the norms of the dominant culture. Whenever minoritized students feel obligated to assimilate, that negatively influences how they critically examine their experiences. As Paulo Freire described, students must be taught to become critical thinkers of their surroundings to achieve positive environments. As a Chaldean immigrant from Irag, I experienced a school environment rooted in the dominant American culture. My cultural competency interfered with my connection with my own culture, thus hindering my cultural competence in my native and adopted culture. Allowing students to become critical thinkers of their learning and experience leads to questions and reflections that allow them to freely pick and choose their cultural identity.

#### 238 4:35 PM

#### Institutional Agents at Two and Four year Hispanic Serving Institutions Ana Hernandez (Undergraduate) Heather Thorogood

Faculty play a major role in the retention and success of underrepresented and Latinx STEM transfer students1,2,3, the purpose of this literature review is to understand how faculty and staff act as institutional agents (IAs)4 to support Latinx or underrepresented STEM students within Hispanic-Serving Institutions (HSIs) and community colleges. Examining the role of IAs within these contexts is vital given that HSIs and community colleges provide key access to STEM higher education for underrepresented students. HSIs, higher education institutions that enroll at least 25% Latinx students, are eligible for federal funding to support Latinx students.5 Despite institutions having HSI designation, researchers assert that institutional policies and practices tend to focus on serving all students rather than specifically serving Latinx students.6 We used three databases: EBSCO, Google Scholar and OneSearch to conduct our literature review including several key words (e.g., institutional agents, STEM, HSIs, HSI servingness, community colleges, Latinx, on-campus support, etc.). The final database included 14 sources. We used Zotero, a reference management software, to help us organize our sources, and NVivo 12 qualitative data analysis software to organize ideas from the literature and develop a conceptual map. Overall, key literature shows that faculty and staff contribute to the success and retention of Latinx and underrepresented students in STEM by acting as IAs (see Figure 1). It is important that the diversity of faculty and staff reflect the student population, and IAs in positions of power are provided the professional development training to create inclusive spaces and culturally relevant curriculum within HSIs.7, 8, 9, 10, 11, 12 Faculty and staff may also act as IAs by offering support to STEM students during the critical transition from community colleges to four-year institutions through targeted academic, financial and social programs.13,14, 15. Lastly, the future of STEM, including a diverse population of STEM professionals, highly depends on funding and grants to sustain key partnerships between IAs who together provide critical systems of support generating more equitable educational experiences and outcome for Latinx and other underrepresented students in STEM at HSIs.16, 17, 18

#### 239 4:45 PM

#### A Student Narrative of Resilience: Autoethnographic Reflections on the Virtual Learning Transition Sarah Roberts (Undergraduate)

This research paper explores the personal narrative of a college student while attending university from home during a pandemic. In framing the theoretical approach, the theory of communicative resilience is discussed. A self-reflexive analysis details the personal narrative of a college student at San Diego State University and the way they engaged in sensemaking around quarantine regulations and social distancing. This study employs an autoethnographic approach, which is a research method in which a writer connects the self to the larger events and culture around them in an analytical fashion while offering insight into their personal development. It is found that communication transforms under circumstances like a pandemic in three major ways: 1) The way academics is discussed intrapersonally, 2) the introspection of mental health, and 3) the impact resilience has on these communication processes

### **Session I2**

Oral Creative Arts and Design and Visual or Performing Arts Saturday, March 20, 2021, 9:00 AM

#### 240 9:05 AM

Poor Unfortunate Queers: The "Stock Queers" in Disney's Movie Musicals Andrew Montgomery (Master's) Kyle Montgomery

The American musical is inherently queer because they are an art form of performing "straightness." The entertainment industry is run by heterosexual, cisgendered men who do not allow featured queer storylines, only side characters. Therefore, "art imitates life" and queer artists must perform "straightness" to assimilate in life and in their industry. The lack of visibility or representation of prominent queer storylines provides room to perpetuate "negative" queer stereotypes including: untraditional flamboyancy or masculinity, excessive personalities, manipulative behavior, sexual/sensual acts, among many others. In the past, we see a repetitive template used of categorizing these queer characters into specific "stock queer" roles: the funny queer (e.g., Daryl in Crazy Ex-Girlfriend), the pitiful queer (e.g., John "Plato" Crawford in Rebel Without a Cause), or more prominently in the villainous queer (e.g., Norman Bates in Psycho). Although Hollywood is progressing slowly, the Disney Corporation continues to use the three outdated, queer, stock

characters, establishing to audiences at a developmental age that the LGBTQI+ community is odd, unnatural, or immoral. These "stock queers" date back to Disney's first full-length film but utilized the most in every film released between 1989-1999, known as the Disney Renaissance (e.g., Terk in Tarzan, Pain and Panic in Hercules, Ursula in The Little Mermaid). Due to the massive accomplishments made during that decade, the template was "copied and pasted" for each film since (e.g., Office Spector in Onward, LeFou in Beauty and the Beast, Evelyn Deavor in Incredibles 2). Unfortunately for the queer community, these movies have become box office hits and a staple in households, spreading damaging fallacies across the world and more dangerously to their target audience: children. Disney television programs have improved (e.g., Andi Mac, Good Luck, Charlie, High School Musical: The Musical: The Series), their film division seldom implements nuanced or accurate representation in the mainstream movie musicals they have become famous for. The LGBTQI+ community must implement coding, meaning they recognize or interpret plot points or character traits that feel queer in order to reclaim, soften or deflect the negative attention created from the three, Disney "stock queers.

#### 241 9:15 AM

## Immersive Theatre in Education: Placing the Student at the Center of the Curriculum Melissa Glasgow (Master's)

A traditional classroom is like a proscenium stage. The teacher performs a lecture, and the students sit passively at their desks as the audience. The performance can be captivating, but often it is difficult for the teacher to hold the attention of the classroom. Even an adult audience can lack the attention span required to sit through a two-hour play, and yet we ask students to pay attention in the same way for a seven-hour school day. Punchdrunk Enrichment aims to change the way students are involved in their education by bringing immersive theatre to schools. Immersive theatre alters the role of the audience by putting them at the center of a production. This type of audience is living in the world of the show and actively participating in it. By utilizing this genre, Punchdrunk Enrichment puts the students at the center of a lesson in the same way. Their immersive learning experiences are designed to directly involve students, activate all the senses, and leave lasting impressions about topics such as literature and local history. They aim to bring their projects to schools as examples so that ultimately teachers can create their own similar, student-centered lessons. Using Punchdrunk Enrichment's case studies as a model, I will illustrate the various ways that immersive experiences can be implemented in education to improve students' critical thinking, emotional intelligence, and imagination. Even in 2020, key elements of immersive learning can be applied on a smaller scale to engage students who must transform their familiar living rooms into unique spaces for learning.

#### 242 9:25 AM

## Injury Risk Reduction in the Professional Musical Theatre Performing Artist Christopher Shin (Master's)

Professional musical theatre performing artists are comparable to elite athletes executing skills at a high level. While the labels of "artist" and "athlete" may seem to be worlds apart, they are one and the same in describing the professional musical theatre performer. Whether they are an actor, singer, dancer or triple threat, the repetitive stress from a demanding eight show week schedule can accumulate and take a significant physical toll on the body. Though injuries cannot be prevented, injury risk reduction can be accomplished through careful examination of repetitive patterns in movement. Neglecting parts of the body that are repeatedly stressed can have a domino effect on other body parts. I will argue the importance of pinpointing these patterns and strengthening the affected areas as well as training the complete physical body like an athlete in order to optimally perform at a high level. As a working professional, I have frequently experienced physical injuries from repetitive strain. Between 2016 and 2019, I sustained injuries in five out of the seven musicals I performed in that required rehabilitation. With the help of orthopedists, chiropractors, acupuncturists and doctors of physical therapy who specialize in performing artists and elite athletes, I was able to not only rehabilitate my body but understand how to potentially reduce the risk of injury in the future. Unlike a tennis player who relies on a racquet or a violinist who relies on a violin and bow, the musical theatre performer relies solely on their body: their body is their instrument. By actively seeking to restore balance from the physical repetition of performing eight shows a week, the performing artist is able to sustain these stresses with a strong instrument.

#### 243 9:35 AM

# Raise the Stakes: The Benefits of Social Emotional Learning in Arts Education Casey Craig (Master's)

There has been much research and analysis on social and emotional learning (SEL) with younger students and its benefits in the classroom - but why should this approach to education be confined to younger students? SEL studies, in the K-12 classroom, have shown positive outcomes in regards to socialization and its promotion of emotional understanding and empathy. I argue that if applied intentionally, SEL techniques can positively contribute to a collegiate performing arts education. SEL's approach to emotional understanding is especially impactful in the acting classroom. Through an SEL lens, students create strong bonds with one another and cultivate emotional understanding that can enhance character development, bringing deeper meaning to scene work and script analysis. This article will explore SEL principles and look at specific classroom case studies, to lay the groundwork for incorporating SEL into a collegiate performing arts education. An SEL-focused classroom teaches students to recognize and discuss emotions, as well as fosters healthy modes of regulating these emotions. Students who participate in a classroom which uses an SEL lens are versed in managing daily challenges, and build empathy skills that contribute to positive relationships. Empathy helps us to understand each other and builds an emotional pathway for interpersonal connection - imagine if we brought that knowledge and understanding into our acting and performance training. Understanding of emotions and how they are managed, or mismanaged, is integral to building and shaping a character within an actor's performance throughout a play. The SEL concepts of mindfulness and self-reflection are as equally important to the performer as the understanding of emotions and empathy, these tools provide a way for the performer to assess their work and adjust or improve accordingly. SEL skills could be vital for entering the world of the performing arts, and aid in setting the performer up for success in the professional arena.

#### 244 9:45 AM

# Rewriting a New Narrative through Soft Power: Empowering Asian Americans to Defy Stereotypes and Claim the Stage as a Platform **Sheldon Gomabon (Master's)**

Although many recent commercial musical theater productions have attempted to acknowledge the presence of Asian Americans in our society through increased representation on stage, the real work in validating the Asian American identity and experience involves giving those actors authentic characters and stories to tell. In this presentation, I will refer to the Asian American solo performance movement beginning in the 1970's, where artists fought ethnic stereotypes by creating their own work rooted in autobiographical stories, performed in avant-garde, underground productions. Drawing from this performance tradition, Asian American playwright David Henry Hwang uses the literary device of autobiographical self-insertion to create a character called "DHH" as a way to comment freely on racial tensions through a fictional character who encounters many of his own life experiences. In Hwang's 2019 production Soft Power, he uses "DHH" to question his experience as an Asian American in America in order to bring to light his real-life hate crime experience and highlight the tension and fear many Asian Americans have felt following the 2016 election. Hwang elevates the stage as a platform to empower the Asian American voice during a time of social strife, speaking freely about his frustrations and anger with his country, often going against the model minority stereotype. I will argue that there is an opportunity for other Asian American playwrights to utilize these same devices to create authentic characters in new works intended for commercial musical theater. The rise of social media proves there is wide appeal among today's audiences for authentic personal content. Capitalizing on this trend, musical theater playwrights can use partially autobiographical characters to be unapologetically authentic, cultivating an audience who chooses who they want to interact with, and therefore choose to evolve with those creators. By putting Asian American bodies front and center in a more abstract and vulnerable presentation, walls are dismantled, intimacy is created, and audiences are compelled to humanize a character regardless of their feelings towards that character's race.

#### 245 10:05 AM

# Creating Theranos: A Broadway Actress Sets Out to Create a Pharmaceutical Musical for Our Pandemic Times **Victoria Fowler (Master's)**

Elizabeth Holmes and her diagnostic company, Theranos, could have prevented the deaths of over 250,000 people, but her ego got in the way. While running tests for SARS-1 in China, Holmes came up with an idea for new in-home blood testing technology which could have been implemented for the diagnosis of Covid-19, an irony I am heightening and musicalizing in my forthcoming musical theatre project, Theranos. As a Broadway actress, I've been involved in the making of many musicals, always as a performer. Learning to create one from scratch is proving an entirely different challenge. This article explores the various ways I am setting out to write my first musical, from the first internet search on "how to write a musical," to learning music notation software to conducting historical research on commercially successful biographical musicals such as Evita by Tim Rice and Andrew Lloyd Webber and Hamilton by Lin-Manuel Miranda. By using my professional-level knowledge in specific areas of musical theatre and 'filling in the gaps' where my knowledge may be less refined, I hope to craft a musical that will impress upon an audience the relevance and dire warning within the story of Theranos, and the fatal flaw of its creator, Elizabeth Holmes.

### **Session J2**

# Oral Creative Arts and Design and Visual or Performing Arts **Saturday, March 20, 2021, 10:00 AM**

#### 246 10:15 AM

# Rewriting the Scenic Design Process Through the Lens of Emotional Awareness **Reiko Huffman (Master's)**

Rewriting the Scenic Design process through critical awareness would iwelcome wider perspectives of artists and designers for different backgrounds into this field. By using the common language of emotion as the foundation of motivating design choices, the field values all different kinds of individuals from wide backgrounds in order to tell true and authentic stories. It opens up more opportunities for BIPOC artists, artists with disabilities and artists from the LGBTIQA+ community to utilize those unique aspects about themselves as fuel that can better convey a character and their environment.

#### 247 10:25 AM

# Broadening Broadway's Soundwaves: An Increased Call for Popular Music Audition Songs Clinton Sherwood (Master's)

If your musical theatre audition book is mostly selections from Broadway scores, you're behind the times. Most new musicals going into Broadway theatres are asking actors to bring in audition cuts from songs on the radio. This is a shift from 20th century musical theatre auditions and it is not enough to have only one piece from your favorite popular artist. Variety is key. In 2019, actors had a wide variety of musical theatre audition opportunities. They could have been asked to prepare a Motown piece for Ain't Too Proud, a Top 40 pop hit for Moulin Rouge, a rock song with range for Tina, and a folk cut for Girl From The North Country. In addition to having a range of music genres to prepare for these calls, actors are also expected to understand what stylings make these genres different and embody an authentic sound that lives in them. The preparation and research is steeped in music history and the different groups of people who contributed to the vast array of sound qualities. In the past, having one 'legit' musical theatre audition song may have worked for an actor to audition for a range of 'legit' musical theatre shows. The same idea doesn't translate for the most recent audition notices. Singing a song by Ani DiFranco would work well for Girl From The North Country but would not be appropriate for Ain't Too Proud. Examining audition notices from the past two decades, I will clarify how the requirements for the shifting musical theatre world have changed. These advancements remodel the job field for the prospective musical theatre performer.

#### 248 10:35 AM

#### Tenacious D in The Pick of Destiny: The Mainstream Rock Opera Buffa Nick Newman (Master's)

Though there is heavy debate about what rock opera is the true originator of the genre, the fact that this musical hybrid emerged in the 1960s is indisputable. Throughout the ensuing decades, successful rock operas such as Tommy, Quadrophenia, American Idiot, and Jesus Christ Superstar typically carried themselves in a serious manner, tackling serious issues from war to psychedelic hysteria. As if to mirror the reaction to rapid growth of opera in the 17th and 18th century, Tenacious D produced The Pick of Destiny, a comedic rock opera that provided the rock world with a mainstream rock opera buffa. Through looking at what exactly defines an opera buffa and observing several examples and tropes that come with the genre, pairing that with the widespread theatrical release of The Pick of Destiny, the work fits into many opera buffa molds. Following techniques like centering the plot in a modern setting and parodies of opera tropes as well as current trends, Tenacious D provides social commentary as well as sticking to the comedic nature of opera buffa. Over the years, The Pick of Destiny has slid through the cracks of American pop culture due to its underwhelming box office performance and become some sort of cult classic, but this research will show that Tenacious D cemented themselves in rock and roll history by producing a mainstream rock opera buffa amidst a world of heavily serious rock operas.

#### 249 10:45 AM

### Third Cinema is Dead; Long Live Third Cinema Neha Pearce (Master's)

The term "Third Cinema" was first coined by Argentinian filmmakers Fernando Solanas and Octavio Getino to unify their goal to make cinema that would incite social change and create a new national identity in the face of cultural and political domination by colonial powers. The movement was then extended to all filmmakers working to create films that would sit as an antithesis to the "first cinema" of Hollywood or the "second" European art cinema. Third Cinema was a proposal to create an alternative to the filmmaking that existed, a "third" option. This paper calls for a revival of the Third Cinema theories as they provide strategies that are valuable to contemporary filmmakers and activists. A literature review was conducted to connect Third Cinema theories on the form and function of filmmaking to the social and political goals of current filmmakers, scholars, and activists such as social, gender, and racial equality in the Feminist and Black Lives Matter movements. The Third Cinema movement has died out, but with the social and racial inequalities that America is now reckoning with, Third Cinema has rich theory and history that social justice movements of today can build upon instead of starting their work from scratch.

### **Session K2**

Oral Creative Arts and Design and Visual or Performing Arts Saturday, March 20, 2021, 11:00 AM

#### 250 11:05 AM

InSimulation: The Tecolote Biome, Composite and Photogrammetry Photography as the Basis of an AR Experience

#### Chrystal Sabrina Davidson (Undergraduate)

InSimulation stands for Installation Simulation, it was created from an appreciation of both physical simulated and installation environments. Its mission is to promote and advocate for mental and environmental health through the arts. Due to the coronavirus pandemic, the idea of using virtual technology, such as augmented reality(AR) for the creation of these simulated environments came to be. Photography is the basis of the environment's formation through the use of composites and photogrammetry techniques, turning images into digital assets which can be manipulated in an AR application making them interactive on a smartphone or tablet. InSimulation: The Tecolote Biome, is an AR educational gaming experience allowing participants to interact with the Tecolote Canyon Natural Park. The program educates and advocates for our collective understanding that what we are looking at in the canyon is an environmental baseline that can be improved upon through various eco-friendly practices. The eco-friendly practices introduced in the gaming storyline will teach us about the impacts of invasive species and pollution, the importance of staying on pathways for the sake of flora in the chaparral biome, and the ways the local fauna contribute to the health of the ecosystem. The creation process of this application will be archived so that it can be used as a template to create AR versions of other natural sites. This is a theoretical outline of the project which is in its early stages. I am interested in collaborators such as biologists, geologists, and environmental advocates familiar with the area.

### 251 11:15 AM

## A Musician's Guide to Virtual Collaboration Javier Piñón (Undergraduate)

The most integral parts of any musician's career are their ability to collaborate with their peers and their ability to present their music to an audience, and the current coronavirus lockdown has severely limited our ability to do both of these things. Throughout this past summer, I produced an album where I sought to find the best ways to collaborate virtually with my peers. I compiled the results of my experiences into a guideline that musicians can use to learn the best ways of collaborating virtually with each other. The first step in music production is brainstorming, which can be done well through almost any video calling platform like Discord, Zoom, or Facebook Messenger. The only necessary stipulation is that it has a built-in chat to allow easy file transfer. The issues of working virtually become obvious in the recording phase because conventional programs are simply unable to provide the latency-free communication that's required for seamless virtual performance and recording. There are several workarounds, the most effective being to send the music to the collaborator for them to record on their own end. This works best if they have a quality recording environment and equipment, but using their phone inside an isolated space like a car or closet can also work in most situations. If, for whatever reason, the collaborator doesn't wish to be responsible for recording themselves, it's possible to route the audio from a video call into a Digital Audio Workstation (DAW), such as Pro Tools, Logic, or Ableton, using the program Soundflower. This allows you to assume responsibility for the recording process, allowing them to focus on their performance. In order to minimize latency, using Jitsi Meet for video communication and Cleanfeed for audio communication is the optimal setup to use. Through my research over the summer, I've found that the technology isn't quite there yet for ensembles to practice and perform virtually. There's simply too much lag between everyone's feeds to play together properly. Given a few workarounds, though, it's definitely possible to collaborate effectively in duos or small groups, no matter the budget.

#### 252 11:25 AM

#### Examining the Influence of Gamelan on Mid-Late 20th Century Composers Lou Harrison and Steve Reich Kiya Klopfenstein (Undergraduate)

Large global expositions (i.e. "World's fairs") presented European and American audiences a wide array of international musical cultures. The southeast Asian tradition of the gamelan, in particular, enamored composers, musicologists, and the general public alike. Understood by musicologists to be a highly complex and sophisticated musical system, which developed independently from Euro-American music, the gamelan captured the fascination of modernist composers seeking to expand new musical possibilities outside of the codified western tradition. Two composers, Steve Reich and Lou Harrison found themselves drawn to the gamelan tradition through similar means in the mid 20th century, yet each demonstrated a markedly different approach to their synthesis between gamelan and Euro-American music. This study compares the ways in which Reich and Harrison incorporated ideas from the gamelan into their compositions and examines their respective work in light of the critical issues of 'authenticity' and 'cultural appropriation,' using several compositions from each composer as case studies. To investigate the extent of gamelan's influence on each composer's work, I draw from musical scores, performance practices, interviews, and musicological literature. Through the exploration of both problematic and productive aspects of musical hybridization in works by two distinct, high-profile American composers, I hope to contribute further nuance to important conversations about integrity and equity in the practice of cultural exchange.

### **Session L2**

# Oral Creative Arts and Design and Visual or Performing Arts **Saturday, March 20, 2021, 12:00 PM**

#### 253 12:05 PM

#### The Walk Michelle Natividad Stein (Master's)

My research investigates identities and traditions passed down in Filipino culture and the hegemony of American/Western colonialism. Through the medium of furniture and domestic objects, paired with historical research, I create dialogs that address the psychological damage of acculturation and the liberation of feminist ideas. In this piece, The Walk, I am ruminating on the symbolisms of the peacock chair, the psychological imprisonment of inequity and empowerment. The peacock chair is an iconic furniture piece in photography and the American film industry. The chair's ability to frame a person's presence in a regal manner was adapted by Hewy Newton, civil rights activist and co-founder of the Black Panthers. Unfortunately it's induction into the American market was made possible

through the exploitation of imprisoned Filippinos. This peacock chair is a reclaimed piece of furniture. The rattan, split from wear, was repaired and painted white to hide the damages by its owner. This act also hid the decorative darker strands that added to the chair's original beauty. It's broken condition and white washed treatment spoke profoundly to the acculturation adapted by Filipinx Americans. Specifically, the psychological scars we hide and the manipulation of our mannerisms and appearance in exchange for acceptance in a white dominated world. Radiating from the chair is an extension, made of hand split and steam bent bamboo. The bamboo appears to encircle the chair creating an ornate cage with no door. The bamboo spirals around the chair and creates a path to an opening positioned right behind it. A person sitting in the chair must stand up, walk the path created by the spiral to exit the enclosed space. Similarly, an outside person must be willing to enter the opening, walk the spiral and sit in the chair to experience the feeling of imprisonment. This chair is a symbol to empower those who experience inequities and acknowledge the hurt, but also provides the path to step away from it. I want to offer those who are foreign to these thoughts a path to feel the discomfort as a means of understanding.

#### 254 12:15 PM

#### Howka: Deconstructing Colonialist Narratives and Establishing a Radical Alternate Past Through Art and Media John Mollet (Master's)

By utilizing, synthesizing, and adapting media and communication theories, including Marshall McLuhan's "The Medium is the Message" hypothesis and Walter Benjamin's theory of mechanical reproducibility, this exhibit aims to anatomize, dissect, and deconstruct colonialism through art forms. By using these artistic expressions as a praxis of indigenous politics, this exhibit seeks to create a radical alternate past within contemporary spaces and traditional narratives. Art expressions include a mass-produced educational zine entitled "'lipay Aa: the language of this land" that will encompass Kumeyaay words as a counter the erasure narratives of San Diego history pertaining to language and land, a brutalist concrete structure of the agave plant, a multi-faceted symbol with many meanings to the region formerly known as "Alta California" and as a proposed replacement for many of the problematic colonial statues, and a final zine labeled "Collective of the Decolonization of California" which will include photographs of indigenous art suspended around San Diego, representative of the Otherwise landscape which preceded the currently venerated Spanish Colonialist landscape. Ultimately, these pieces will work in tandem to shed light on the duel importance of creating new mediums to spread messages of decolonization while actively adding our voice to older mediums embedded in colonial acts, such as print, sculpting, and photography, that were/are utilized to maintain colonial power structures.

#### 255 12:25 PM

### Homecoming : A Meditation on the Natural World J'Arrian Wade (Undergraduate)

With COVID altering our lives greatly, I tasked my mentor and me with the project of creating an at-home immersive theatre experience to attempt to evolve to the times. My project asks the participant to go into a meditative state while igniting all the senses to stimulate a dream-like experience to simulate the transformative power of theatre. The project has an auditory element and a physical element that creates an atmosphere for the participant. We started with very broad concepts and spent the beginning period brainstorming and compiling synchronicity across topics. This transformed into a complex script centered around spirituality with physical props. It follows the story of turmoil and betrayal between Earth and Humanity. The participant fades from conversation to conversation acquiring the narrative slowly allowing the audience to know all perspectives to prompt reflection. The story follows guides as they attempt to convince humanity to reconnect with mother earth. It subliminally asked the participant to hold accountability for environmental effects. This script was rehearsed and performed by TTFM students and alumni in the span of a week and a half. In the rehearsal period, we experimented with body movements and vocal techniques to simulate intimacy and comfort in a foreign platform such as zoom. A soundscape was put together to match the script by Andrew Guitireiz, a TTFM alumni, which elevates the entire project to a new level. Then a recent graduate Emily Gavin came onto the project to help with the physical element, props. We compiled a participatory altar board that had physical elements such as candles, incense, and even a light projector to simulate a whole new world intertwined with the storyline. The participant is called within the story to do an action to ignite each element. Once constructed, the boxes were sent out to selective participants and we took back their feedback on several aspects of the project. We focused on accessibility, understanding, artistic relevance, and fun. Overall everyone thoroughly enjoyed the experience and even accounted that this is a product they would like to purchase and experience again. (https://www.turnkeytheatre.com/)

#### 256 12:35 PM Doxology For Strings Andres Wong (Undergraduate)

"Doxology for Strings" is an original composition with a style based on the extensions or intensifications of the intonations of spoken language. In this case, the spoken language is an English translation of a doxology, i.e., a prayer of praise to God, which dates to the first century CE as follows: "Give glory to the Father and to the Son and to the Holy Spirit, as it was in the beginning, is now and ever shall be, world without end! Blessed are You, God, our Creator and Father; Blessed are You, Jesus, our Lord and our Brother; Blessed are you, Spirit, our Comforter; Blessed are You, God, our Triune God! Holy Myst'ry! Glory to the Holy Trinity. Amen. Amen!" In these trying pandemic times, those spared from the virus, as well as survivors of COVID-19 and their families and friends all over the world, find a deeper relationship with the spiritual realm, whether in an Eternal Being or something less defined. All of them can only give thanks and praise for their lives being spared. No matter one's outlet for worship, this piece is an expression of thanksgiving and encouragement to others, two sentiments which are universal. The beauty of this work is that it is inclusive and accessible to all. The subject of this piece is the Triune God known also as the Holy Trinity. Because the string section is the foundation of the orchestra, the string ensemble for which this piece was arranged is fitting for its subject because the ensemble represents the foundational nature of God in the entire universe. Also, the string instruments make up a homogenous ensemble that mirrors the united nature of the Trinity. This piece runs for about 3 minutes and 20 seconds.

### **Session M2**

Oral Interdisciplinary Saturday, March 20, 2021, 1:00 PM

#### 257 1:05 PM

Love Languages: Means of Affection and Relationship Satisfaction April Joy Payumo (Undergraduate) Brody Sarsfield Maddison Pitts Zachary Smith

This project investigated the relationship between the five love languages and relationship satisfaction and how gender and ethnicity may influence a person's preferred love language. This study had 198 participants who completed a forty-three question survey assessing the impact of love languages on one's relationship satisfaction. A stepwise regression revealed that acts of service contributed the most to a person's relationship satisfaction out of all the love languages. Analysis of the data revealed no significant relationship between love language style and gender or race/ethnicity. Further examination of the responses also supports a correlation between love language category and relationship satisfaction. This paper concludes with a discussion of the implications and future research geared towards expanding the scope of this study.

#### 258 1:15 PM

Dog Whistle Rhetoric: Investigating Implicit Versus Explicit Racialized Rhetoric in Reinforcing the Republican Base Rebecca James (Master's) Andrew Anderson

The evaluation and understanding of Trumpian rhetoric, in opposition to current political foes and allies, leads to a greater understanding of the political divisiveness currently plaguing the United States through racialized rhetoric. Specifically, the focus of this project will be on the use of racially explicit comments made by Donald J. Trump either through his Twitter account, a political rally, or during the course of an interview and how it affects political ideology (See Appendix). We then are comparing explicit to implicit forms of racialized rhetoric. This study examines the uses of political rhetoric from the context of the 2016 U.S. Presidential Election campaign to Trump's presidency in order to analyze the emergence of explicit racism throughout the Trumpian evolution. Though its meaning and utility is highly contested, Trump's rhetoric is a significant window into this new phase of U.S. politics. Defined in terms of nationalism, tribalism, and nativism, Trump employs emotional evocations of racism, spurring physical displays of aggression and violent acts that stem from fear, threats, hatred, and division. In this study, we seek to assess experimentally the level of resonance

that racially charged messages resonate with prospective voters. We seek to codify the distinctions of racist appeals through the intensity of the language used in actual texts by Trump, comparing these original intense or explicit forms to more moderated implicit forms of language. It is imperative to understand the issues at hand in order to challenge racism and bias to create more inclusive and representative rhetoric and environments.

#### 259 1:25 PM

Family Satisfaction: The Importance of Communicating Ria Diddee (Undergraduate) Mackenzie Moore Sam Nguyen Michelle Anne

In this study, the overall purpose is to focus on how communication competence and communication styles increase or decrease familial satisfaction rates. The variables measured include familial satisfaction, communication competence, parental styles, and communication styles. Specifically, 215 people from different types of backgrounds completed a survey regarding the fulfillment within their families. We used the regression model to see the level of variance and relationship satisfaction. The correlation matrix revealed openness (.714) and emotional/instrumental (.681) variables as highly significant in satisfaction. Inversely, the variables, including the heartland forgiveness scale (-.449) and maintaining structural stability (-.352), were the most insignificant on the scale. The paper concludes with an in-depth discussion of variables either correlating or not having any significance with familial relationships' satisfaction. This paper will further discuss the aspects that affect familial satisfaction.

#### 260 1:35 PM

#### Work Climate and Employee Engagement as Antecedents for Digital Intrapreneurship Keith Buchanan (Undergraduate) Sophie Chance Jeremy Parson

For years, organizations and business analysts have been concerned about worker displacement because of automation and advanced technology. Even more emphasis has been placed on rising income inequality and global shifts in markets. To make matters worse, the combined health and economic impacts of 2020 have left lasting damage-disrupted labor markets have revealed the failures of our social contracts. Millions of people have lost their livelihoods, and millions more are at risk from this global recession. This is a pivotal moment in world history-the decisions we make today will layout the course for the success of future generations. The data collected in our research will allow executives to make well informed decisions and ensure that investments in digital venturing will be well-allocated. While the need to adapt to digital transformation is obvious, the motivation for employee engagement in the process is unclear, and there is no suggested work climate for the post-covid era. We would like to see an increase to the 10% success rate of new ideas within an organization. For our contribution, we propose a growth-framework for organizations who need a long-term plan for adjusting to the post-covid era. We aim to construct a multi-dimensional model to gauge digital intrapreneurship behavior and outcomes. We use Albert Bandura's Social Cognitive Theory of Learning to measure environmental, behavioral, and personal factors that inevitably guide employee engagement. We discuss Bandura's theory in depth as it relates to digital intrapreneurship context and employee engagement. Our final contribution is defining the digital intrapreneur. While there are hundreds of papers dedicated to traditional intrapreneurship, we have identified key components that digital intrapreneurs must utilize to be successful in 2020 and beyond. The ability to contribute to ideation, experimentation, and finally implementation are the characteristics of our digital intrapreneur. We find that to bring an idea to the marketplace, certain attributes in the work climate must be present to foster our preferred digital intrapreneurial behavior. Having a great idea is futile if the climate doesn't allow for it to be realized.

#### 261 1:45 PM

# Rethinking Management of Individuals Convicted of Sex Offenses: A Review of Supervision Conditions **Sofia Bianconi (Undergraduate)**

Throughout the United States, sex offense-specific supervision conditions are systematically put in place by community corrections agencies to manage individuals convicted of sexual offenses. However, these conditions are put in place with little evidentiary research to support their utility or effectiveness, and there is little knowledge about the consistency of these conditions across jurisdictions. The purpose of the research activities in the project, "Sex Offender Management and Supervision (SOMS): A Nationwide Assessment of Policy and Practice," is to create a nationwide repository statutes, policies, and procedures on managing individuals convicted

of sexual offenses. The multi-method dataset created includes a quantitative and qualitative compilation of documents related to collecting sex offense specific community supervision in the United States. The analysis strategies included descriptive and thematic analysis. Using Excel and the qualitative analysis program NVivo, I compiled, sorted, coded the data on supervision conditions, both general to all probationers/paroles and specific to those with sex offense convictions. Ultimately, I analyzed complete data from sixteen states, thirteen of which had sex offense specific conditions. I conducted deeper analysis on eight of the most common sex offense specific conditions implemented in these states. Then, I considered sex offender conditions that are less common, analyzing them against best practices in community supervision to see how some might impede or enhance the effectiveness of supervision. This preliminary analysis begins assessing the effectiveness of our system and creates a new path on how post-conviction management, and ultimately justice, is implemented.

### **Session N2**

#### Oral Interdisciplinary Saturday, March 20, 2021, 2:00 PM

#### 262 2:05 PM

## The Associations between Urinary Paraben Exposures and Global DNA Methylation Leili Sahrai (Undergraduate)

To examine the associations between urinary concentrations of methyl-, propyl-, butyl-paraben, and the sum of these parabens and global DNA methylation. This cross-sectional study included 711 women with breast cancer and 598 women without breast cancer from the Long Island Breast Cancer Study Project, a population-based case-control study of breast cancer. Paraben biomarkers were measured in spot urine samples collected on average within three months of the first diagnosis of primary in situ or invasive breast cancer in 1996–1997 or at enrollment into the LIBCSP. Global DNA methylation content was measured using two independent validated peripheral blood DNA assays: 1) Long Interspersed Elements-1 (LINE-1), and 2) Luminometric Methylation Assay (LUMA). We used ordinal logistic regression to estimate odds ratios (ORs) and 95% confidence intervals (CIs) for the associations between quintiles of urinary concentrations of creatinine-corrected parabens and global DNA methylation expressed as a percent and categorized into tertiles. The women in this study were 22-96 years old. Over half (55.6%) attended college or had an education beyond college. Of the women, 16.7% had a first-degree history of breast cancer. About two-thirds (65.4%) were post-menopausal. Over half (52.0%) had BMIs ≥ 25 kg/m2. The highest versus lowest quintiles of methyl-, propyl-, butyl-paraben and the sum of these parabens were associated with ORs for LINE-1 methylation ranging from 0.76 (95%CI=0.56-1.01) for butyl-paraben to 0.71 (95%CI=0.51-1.00) for methyl-paraben and with ORs for LUMA methylation ranging from 1.24 (95%CI=0.93-1.67) for butyl-paraben to 1.55 (95%CI=1.10-2.18) for methyl-paraben, after adjusting for age, case status, education, BMI, menopausal status, hormone use, menarche status, oral contraceptive use, parity, family history of breast cancer, and alcohol use. Conclusions: Urinary parabens were associated with lower odds of LINE-1 methylation, which estimates global methylation levels of repetitive elements or transposons, and with higher odds of LUMA methylation, which estimates genome-wide methylation of gene promoters. Future studies should examine the mediating role of DNA methylation in the association between parabens and breast cancer risk.

#### 263 2:15 PM

# Improved Safety of Phage Products Used for Human Phage Therapy Andrew Sue (Master's)

Phage therapy is in development to address the growing need for effective antibacterials to control the rise of antibiotic resistant infections. The production of therapeutic phages requires cultivation on bacterial cells, which leads to high lipopolysaccharides (LPS) contamination from lysed cells in phage preparations. LPS is an endotoxin that can lead to septic shock, organ failure, and death of patients. Therefore, it is critical that methods be developed to remove LPS from phage products used in human therapies. In this study, timed temperature reduction was used to minimize free endotoxin in bacterial cultures. Generally, bacterial populations are susceptible to phage for approximately 8 to 10 hours. After that time period, resistant bacteria outgrowth dominates, and phage production no longer occurs. By reducing optimal bacterial growth temperature of 37°C to 4°C before phage resistant mutant outgrowth, we found a 55% reduction in lysed bacterial cell debris. As an additional benefit, we found that the volume of phage lysate that can be downstream ultrafiltrated was improved by 2-fold. Importantly, maximum phage numbers were not significantly reduced by cooling cultures. A reduction in endotoxin in the initial stages of phage production not only enhances downstream purification process, but it also ultimately provides a significantly safer phage product for human therapy.

#### 264 2:25 PM

## DFT analysis of Chiral Perovskite N-Heterocyclization Harrison Pearce (Doctoral)

Recently a new perovskite with a chiral surface coating was developed which can catalyze an N-heterocyclization reaction in a chiral manner when all groups are S, but in a manner that leads to a racemic mixture when all organic surface groups are R. It is hypothesized that before N-heterocyclization, pre-chiral discrimination on the surface before subsequent charge transfer results in this strange chiral phenomenon, and that this pre-chiral discrimination relies on both ligand chirality and a naturally chiral surface. DFT calculations with a mixed local basis set were carried out on perovskite surfaces (both R and S) to find the origin of this behavior. So far, probable surface binding sites have been found.

#### 265 2:35 PM

# Characterization of Functionally Distinct Human Spermatogonial Cell Subsets Christopher Smith (Master's)

Spermatogonial stem cells (SSCs) are essential for long-term spermatogenesis. There is considerable interest in human SSCs (hSSCs), as they have the potential to cure some forms of male infertility. However, to develop "SSC therapy" strategies, it is essential to understand both the cellular and molecular mechanisms driving hSSC self-renewal and development. A critical question that must first be answered to understand the above is to define markers that specifically label hSSCs. As part of this, it is important to also determine the degree of heterogeneity of undifferentiated spermatogonia (uSPG), which is the class of germ cells in the testis that harbor SSCs and progenitors. Human uSPG were initially identified by morphology (they are called A-dark and -pale spermatogonia), and then later with a few markers using immunohistochemical analysis. However, the protein markers that have been identified by traditional analysis are not very specific, as they are typically also labeled differentiating SPG and sometimes later-stage germ cells. Thus, these classically-defined markers have not proven useful in specifically identifying hSSCs. They also have not provided insights into the heterogeneity of uSPG. A recent big step forward towards addressing these questions was the application of single-cell RNA sequencing (scRNAseq) analysis to define cell subsets in human testes 1-7 (also see recent commentaries on this topic 8,9, as well as Tan et al. COCB [in press]). Some of these scRNAseg studies identified clusters of cells that had gene expression ("transcriptome") characteristics of being highly enriched for hSCCs or other uSPG subsets. For example, our Sohni et al. paper identified cell clusters we referred to as "SSC-1A," "SSC-1B," "SSC-1C," and "SSC-2," all of which had characteristics of being uSPG5. Guo et al. defined two uSPG subsets - that they called state "0" and "1"-which likely correspond to one or more of the subsets we defined4. Is this plethora of uSPG cell clusters-including several that seem to harbor SSCs-functionally meaningful? My project is designed to answer this question.

#### 266 2:45 PM

Quantification of the Protein-Protein Interactions of Muscle Myosin Chaperone UNC-45 and its Cofactor Hsp83 by Single-Molecule TIRF Microscopy Stephanie Silva (Master's) Andrew MacLeud Andres Jimenez Young Kwang Lee

Myosin is an essential protein required for intracellular transport, cytokinesis, endocytosis, and muscle development. Myosin folding is facilitated by two main chaperones: UNC-45 and its cofactors Hsp70 and Hsp90. However, little is known on how these two proteins collectively operate in the folding of myosin. In the present study, we quantify the protein-protein interactions between UNC-45 and its cofactor Hsp83, from Drosophila melanogaster, by directly visualizing binding events at the single-molecule level using total internal reflection fluorescence (TIRF) microscopy. We immobilized UNC-45 proteins, fused with an N-terminal mEGFP and Avitag, onto a streptavidin-functionalized glass slide. We then introduced Alexa 647-labeled Hsp83 proteins to the immobilized baits. The protein-protein interactions were resolved as diffraction-limited spots by TIRF microscopy. By counting the occurrence of these binding events with time, we were able to convert them into kinetic rate for the binding between UNC-45 and Hsp83 (kon). Measuring the distributions of the binding duration provides enough information to determine the kinetic rate for dissociation of the UNC-45 and Hsp83 complex (koff). Finally, a combination of the kinetic rates allows for determination of Kd value. Additionally, we are interested in studying the interactions between UNC-45 with truncated TPR domain and Hsp83 to explore a possible Hsp binding site outside the TPR domain.

### Session 02

Interdisciplinary Saturday, March 20, 2021, 3:00 PM

#### 267 3:05 PM

Detection of Surface Nicotine in Indoor Environments Using Commercially Available Wipes Nalima Joshi (Master's)

Thirdhand smoke is the lingering residue that remains in indoor environments once secondhand smoke seeps in dust, objects, on surfaces wherever tobacco has been smoked. Unlike secondhand smoke, thirdhand smoke is not easily detectable; the stale odor of tobacco smoke is indicative of thirdhand smoke residue, but it does not always produce a pungent, distinctive odor. Tobacco smoke pollution measured in a real-world field setting can sometimes be invasive, if not complicated and costly. Surface wipe sampling for nicotine, one of the thirdhand smoke contaminants, has shown to be a reliable and favorable collection strategy to detect residue and can distinguish between a smoking and nonsmoking environment. The current protocol used for surface sampling is a complex, multistep process that involves, among others, a fresh mixture of 0.1% ascorbic acid at the laboratory. Cotton rounds are placed in clean petri dishes, and a pipette is used to transfer 2 mL of ascorbic acid to wet them. Using the cotton rounds wetted with ascorbic acid to collect surface samples, a template with 100cm2 area opening in the center is taped to a material that is likely to be infrequently cleaned, such as a wooden door or cabinet, and the exposed opening of the template is wiped. This sampling method requires training for research assistants to prepare the ascorbic acid solution in the lab and collect surface wipe samples in subjects' environments. Considering that surface wipe is an important tool of thirdhand smoke pollution assessment, it is important that the public can easily collect surface wipe samples in their homes by themselves. For a DIY testing kit, it is necessary to simplify the sampling protocol. This proposed study aims to compare the performance of different commercially available wipes, such as lens cleaner wipes or facial wipes, with the cotton rounds wetted with ascorbic acid. These wipes will be compared to the current method on their ability to extract and recover nicotine on multiple surfaces commonly found in indoor environments, such as walls, wooden furniture, or a glass surface, so that residents may detect thirdhand smoke exposure in the comfort of their own homes.

#### 268 3:15 PM

# Non-Targeted Chemical Analysis of Silicone Wristbands from Children Exposed to Secondhand Tobacco Smoke and Electronic Cigarette Vapor

#### Pamela Olguin (Master's)

Secondhand smoke (SHS) is the involuntary exposure to the chemicals released at the end of a cigarette or exhaled by a smoker. SHS contains more than 7,000 chemical constituents including polyaromatic hydrocarbons (PAHs). PAHs are organic substances consisting of fused benzene rings that result from incomplete combustion, such as the burning of tobacco smoke. Exposure to these compounds can occur by dermal absorption, oral ingestion, or inhalation. Several PAHs have been established as probable carcinogens by the U.S. Environmental Protection Agency (EPA), International Agency for Research on Cancer (IARC), and U.S. Department of Health and Human Services (HHS). The EPA has identified a list of Priority 16 PAHs that are of emerging concern. A novel method to quantify the secondhand smoke exposure via silicon wristbands is implemented in this research. Silicon wristbands are deployed to children (4-14 years old) to be worn in a week-long period to capture average exposure. In this study, the wristbands are the method of collection to quantify the accumulation of contaminants that children are exposed to in households of electronic and conventional cigarette smokers. The wristbands are extracted for all contaminates that were collected and analyzed by GCxGC/TOF MS with the novel non-targeted and target analysis method. From the analyzed data, a statistical comparison is conducted on the chemical profiles collected via silicone wristbands from children in different environmental conditions such as conventional smoke, e-cigarette vape, and no smoke households by non target analysis. Additionally, unconventional PAHs are guantified for children exposed to conventional smoke, e-cigarette vape, and non-smokers outside of the EPA Priority 16 via silicone wristbands. The data collection is completed from the GCxGC/TOF MS however, the analysis of the data is still in progress. Overlap of chemical exposure between the conventional and electric cigarette exposure individuals does seem to occur. This research could further validate the novel methods of non-targeted analysis by GCxGC/TOF MS and silicon wristbands for tobacco related research.

#### 269 3:25 PM

### Evaluation of Aerobic and Anaerobic Membrane Bioreactors for Treating Trace Organic Chemicals in Municipal Wastewater

### Jade Johnson (Master's)

Many arid regions around the world are expected to experience greater water scarcity, due in large part to climate change. Thus communities are increasingly looking toward more sustainable water management solutions, including recycling wastewater through advanced treatment techniques. Membrane treatment processes are advantageous in water reuse schemes because they can be effective for removing turbidity, pathogens, and some trace organic contaminants (TrOCs). TrOCs are of emerging concern because they are underregulated, understudied, increasingly ubiquitous in the environment, and many have been identified as potentially toxic to aquatic life. Many studies have used targeted approaches to evaluate TrOCs in water reuse systems, however given the broad range of existing chemicals, a nontargeted approach is needed to uncover both the expected and unexpected compounds present. This research aims to evaluate and compare the removal and transformation of TrOCs in aerobic and anaerobic membrane bioreactor (MBR) treatment systems, using the comprehensive two-dimensional gas chromatography time-of-flight mass spectrometry (GC×GC/ TOF-MS) for a non targeted analysis (NTA). We hypothesize the NTA of samples throughout the aerobic and anaerobic MBRs treating the same wastewater influent, will identify unexpected chemicals, chemicals that are more easily removed, persistent chemicals. and transformation products. Municipal wastewater from a sewage treatment facility was transported to SDSU's Water Innovation & Reuse Lab, where it was fed into each aerobic and anaerobic MBR system. Composite samples collected include influent, and from each MBR system: bioreactor effluent, sludge, and membrane permeate. For NTA analysis, samples were extracted, concentrated, then followed by analysis of TrOCs using GCxGC/TOF-MS. Data analysis was conducted using ChromaTOF software, "Statistical Compare", and followed by a manual review and tentative compound identification. For analysis of TrOCs, following a peak selection protocol and then preliminary manual review, 487 persistent compounds, 361 transformation products, and 297 compounds that were removed by at least one of the MBR systems are tentatively identified. Further compound verification and statistical analysis is ongoing. We expect this research will uncover TrOCs not previously known to be discharged into the environment, and provide new insights into which treatment (aerobic or anaerobic) is better suited to removing different classes of compounds.

#### 270 3:35 PM

#### Analysis of Cigarette Litter in Sediment and Water Samples in Kendall-Frost Natural Reserve Mission Bay, San Diego Katelyn Nynas (Master's)

Smoked cigarettes, or "cigarette butts" are the most common items picked up in urban and beach cleanups worldwide. Rain and wind cause butts to migrate to municipal storm drains and are then carried to coastal regions by water channels. They contain a nonbiodegradable filter, paper, and the remaining, burnt tobacco mixture, consisting of thousands of chemicals, several of which are carcinogenic to humans. Wetlands are ecosystems flooded by water, either seasonally or permanently, they are diverse ecosystems that support a wide range of vegetation and animal life. They play a number of functions, including water purification, water storage, processing carbon and stabilizing shorelines. Due to urbanization, California has lost more than 90% of its wetlands and many today are threatened. Kendall-Frost Marsh Reserve is a protected wetland located in northeast Mission Bay in San Diego. It is surrounded by an urban setting that requires constant, active management. There are several storm drains that channel urban runoff into the reserve making this reserve vulnerable to effects of urban pollution. Kendall-Frost is an ideal place to assess environmental impacts of tobacco product waste. My research involves collecting water and sediment samples from four sites inside Kendall-Frost (from November 2019 - present), two drain outfalls and one point further downstream per outfall. Samples are prepared through solid phase extraction (SPE) and run for non-targeted analysis by a comprehensive two-dimensional gas chromatography with time-of-flight mass spectrometric detection (GCxGC-TOF-MS). While targeted analysis of nicotine and cotinine are analyzed by liquid chromatography triple quadrupole mass spectrometry (LC-MS/MS). I hypothesize that there are quantifiable amounts of nicotine and cotinine, among other pollutants, in Kendall-Frost and that these amounts are affected by season. Samples collected from November 2019 - September 2020 have been analyzed. Preliminary results of outfall water samples showed presence of nicotine and cotinine, while presence of cotinine was prominent in stormwater samples. Caffeine and diethyl phthalate were detected in all sampling events. But, polycyclic aromatic hydrocarbons (PAHs) and their products were only observed in one site.

#### 271 3:45 PM

#### National Trends in Younger Onset Obesity-Related Cancer Incidence Talia Begi (Undergraduate) **Osika Tripathi**

#### **Paris Offor**

Obesity is a well-known risk factor for a number of cancers including cancers of the endometrium, thyroid, and liver which have increased in recent years in the United States (U.S.). Additionally, the younger adult population of the U.S. has experienced an increase in obesity in recent years, as have ethnic minorities, and those living in the Southeast. The objective of this study was to describe recent trends in the incidence of 11 obesity-related cancers among adults under the age of 50. Using Surveillance, Epidemiology, and End Results (SEER-18) data, we estimated age-adjusted incidence rates from 2001-2016 for cancers of the following sites Female breast, colorectal, endometrial, esophageal, liver, kidney, multiple myeloma, non-cardia gastric, ovarian, pancreatic, and thyroid. Results were stratified by age (<50 and ≥50 years old), race/ethnicity [non-Hispanic white (NHW), non-Hispanic black (NHB), Asian American or Pacific Islander (AAPI), and Hispanic], geographic region (West, Midwest, Northeast, and Southeast), and sex (male and female). We used SEER\*Stat and JoinPoint software for all analyses. We observed statistically significant increasing trends in the incidence of younger-onset colorectal cancer in NHWs, NHBs, and Hispanic males (APCs=5%-12%), kidney cancer in all race groups (APCs=10%-18%); multiple myeloma among NHB males (APC=13.1%) and females (9.7%); non-cardia gastric cancer in Hispanic males (APC=3.5%); and thyroid cancer in NHW (APC=22.5%) and AAPI (APC=30.0%) males. Regional stratification revealed statistically significant increasing trends for younger-onset myeloma in females (APC=13.7%) and males (APC=12.0%), non-cardia gastric in females (APC=12.6%), and thyroid cancers in females (APC=21.3%) and males (APC=25.8%) in the Northeastern U.S.; and younger-onset colorectal cancer in males (APC=6.9%) and females (APC=8.6%) in the Southeast U.S. The incidence rates of many of these cancers were not increasing among adults over 50. We observed increasing trends in younger-onset cancers of the kidney. colorectal, multiple myeloma, non-cardia gastric, thyroid, and female breast. Preventing obesity through education, availability of high-quality foods, and healthcare accessibility may reduce the impact of these cancers. These results also suggest that a reduced age for screening for colorectal cancer may improve opportunities for earlier detection and improved prognosis in younger adults.

# Abstracts of Presentations

# **Oral Sessions 3**

ABCDEFGHIJKLMNO



### **Session A3**

Oral Engineering and Computer Science Friday, March 19, 2021, 9:00 AM

#### 300 9:05 AM

Characterization and Modeling of Cell Wall Imperfections in Aluminum Honeycomb Cores Using X-Ray CT Imaging Adrian Rivera (Doctoral) Hyonny Kim

Honeycomb cell imperfections may significantly affect the failure of sandwich composites in core crushing and shear modes. Identification and quantification of the different types of imperfections and evaluation of their effects on the mechanical response of honeycomb cores in flatwise compression is presented. X-Ray computed tomography (CT) scans of honeycomb cores in co-cured composite sandwich panels were performed. Image analysis methods are applied to characterize and quantify core cell geometry and cell wall waviness. An approach is developed for extracting cell wall mid surface planes and waviness for constructing finite element models using shell elements. Analysis results from models with the as-manufactured imperfections are compared to results from models with idealized geometries to evaluate the effect of the as-manufactured imperfections on the initiation of cell wall buckling and subsequent core crushing.

#### 301 9:15 AM

# Workers' Ergonomics in Work Zones: Identifying the Contributing Factors and Developing an Automated Approach for Safety Monitoring **Binh Pham (Master's)**

Work zone safety is a major concern for highway construction workers and the State Department of Transportation (DOTs) in the US and Canada. The US Center for Disease Control (CDC) reports that while work-related deaths in work zones affect many occupations and trade workers, construction laborers comprise the majority of such fatal injuries. Previous research has demonstrated the potential of work zone safety technologies to provide adequate warning for workers, ensure drowsy drivers are attentive and secure other cautionary alerts to drivers and workers. Specifically, work zone intrusion alert technology (WZIAT) provides an alert-generation mechanism to secure needed reaction time for workers in the event of a vehicle intrusion into the work zone. However, WZIAT systems and devices only consider intrusion of passing vehicles into the work zone through sensors that are placed on traffic cones, wireless networks, or automatic flaggers. Work zone safety hazards can be categorized into two distinguished classes; accidents with vehicles or equipment and human-factor ergonomics. The former is an obvious threat and has been the subject of many safety studies where accidents with vehicles intruding to the work zone or with the heavy equipment already inside the work zone result in worker injuries. The latter, ergonomics, has received the same level of attention. In this research, the ergonomics aspects of construction work specific to the work zones are studied. Specifically, common work zone activities with a high potential for unsafe body movements and postures are identified. For example, the excessive vibration and repetition due to the use of widely used specialty equipment in work zones such as jackhammers are studied in particular from the ergonomics perspective with reference to standards for safe operations. Next, a machine learning methodology to detect unsafe levels of vibration and repetition using mobile wearable sensors is developed and preliminary findings are reported in this research. Upon successful completion, the research will detect unsafe activities in work zones and provide the basis for generating alerts to the worker engaged in ergonomically unsafe activities.

#### 302 9:25 AM

#### Can AEC Professionals Trust AI-Based Technologies? Newsha Emaminejad (Master's)

The construction industry proved ripe for disruption by artificial intelligence (AI) and robotics and one that deserves such study for different reasons. First, the industry relies heavily on labor for manual work and involves various stakeholders with decision-making power throughout a life cycle of a typical project. Second, construction practitioners are generally reluctant to adopt new technologies and the use of antiquated work processes is prevalent. Third, small businesses comprise the vast majority of the industry with a share of 82.3% and smaller companies tend to be late majority and laggards in technology adoption. Finally, the competitive-bid-based nature of the industry with typically a very small profit margin (i.e., 3-5%) makes construction practitioners more conservative in using

new technologies with unproven reliability, privacy/security guarantees, or cost-saving performance. Considering these factors and the socio-technical complexity involved in trusting AI and robotics-powered systems in construction, this paper attempts to present a comprehensive review of the relevant published studies in the academic literature. Since the topic is relatively new within the construction research literature, examples from other fields with similar traits will be also reviewed throughout this study. Adopting a systematic review approach, the authors have studied more than 100 scholarly publications using a keyword search. As a result, a taxonomy is developed for implications of trustworthy AI and robotics in construction that takes into account the type of construction (e.g., new vs. existing, vertical vs. horizontal, and workflows and methods) and trust factors (e.g., transparency and explainability, reliability, privacy, and security).

#### 303 9:35 AM

Threat Intelligence Modeling Environment Lance Cameron (Master's) Alexander Nestler Marc Perez

Effective cybersecurity in the modern threat environment requires a real-time understanding of what computing assets must be protected, what the vulnerabilities of those assets are, and which vulnerabilities present the greatest risk. Maintaining this knowledge for a large network is impossible for human operators alone. A solution to automate data collection and correlation of asset-vulnerability-threat is needed to adjust to the current threat environment. The Threat Intelligence Modeling Environment (TIME) incorporates cyber-threat intelligence (CTI), vulnerability data, and computing asset data to determine what vulnerabilities are present on local network assets and score them according to their severity and likelihood of exploitation by threat actors. To create the TIME system, our team first developed scripts and data stores to automate the collection of CTI and vulnerability data as they are released by the information security community. Next, we developed scripts to automate the inventory of local network asset data and creation of valid Common Platform Enumerators (CPEs) for each piece of hardware and software on the network. Then, scripts were created to correlate CPEs with vulnerabilities, correlate vulnerabilities with the threat actors known to exploit those vulnerabilities, and finally produce a Common Vulnerability Scoring System (CVSS) score to indicate the severity of that vulnerability is exploited by an attacker. After system creation, we developed dashboards that present the variety of CTI generated by the TIME system. These dashboards would enable a security operator to quickly assess what vulnerabilities are present on their network, if any threat actors are known to exploit those vulnerabilities, and how severe an incident would be if that vulnerability is exploited. To test the TIME system we virtualized a model network environment with several assets running different software; we then compared the CPE creation and asset-vulnerability-threat correlation from TIME with our own manual efforts. TIME created valid CPEs, correctly identified which vulnerabilities were present, correlated those with threat actors who exploit them, and output rational CVSS scores. By incorporating open-source CTI, open-source vulnerability data, and local asset data our team has developed an information system that automates discovery and prioritization of vulnerabilities present on a network.

#### 304 9:45 AM

#### Rapid Oxidation and Reduction of Lithium for Improved Cycling Performance and Increased Homogeneity Kelbi Redguest (Master's)

This work enables highly "uniform" and "reversible" deposition of Li metal in carbonate electrolytes through a one-time rapid oxidation and reduction (ROAR) treatment. Over the years, Li metal has been plagued with irreversible dendritic growths that create isolated and unusable structures called "dead Li". Accumulation of dead Li negatively impacts the ion transport, performance, and safety of Li metal batteries. To address this long-standing problem, we have developed an in situ process to uniformly create reversible Li deposits. Our results demonstrate that a combination of high-voltage pulses, which rapidly oxidize and reduce Li in both directions (ROAR treatment), leads to strikingly more homogeneous morphology and eliminates reaction pathway transitions. We validate that ROAR treatments eliminate traditional "mossy dendrites" under extended cycling (<250 cycles) in standard carbonate-based electrolytes. Moreover, ROAR treatments create a 500% reduction in overpotential for electrodissolution/ deposition and eliminate "peaking" voltage behavior.

### **Session B3**

Oral Engineering and Computer Science Friday, March 19, 2021, 10:00 AM

#### 305 10:05 AM

Dual Polarized Wideband Stacked Patch Flat Panel Phased Array Antenna for Ka-Band Applications **Rudraishwarya Banerjee (Doctoral)** 

An 8x8 dual polarized phased array antenna, comprising 64 stacked patches, that covers 22.5-27.5 GHz and offers a peak gain of 21dBi over the entire bandwidth, is proposed. The single element contains a square driven patch and a square parasitic patch placed over it, with two orthogonal feed points in the driven patch. In each 2x2 unit of the 8x8 array, upper right and lower left elements are mirrored with respect to a vertical plane for high cross-polarization suppression. A beamforming network with Anokiwave RFIC, that feed four elements simultaneously, will be employed to achieve beam scanning and dual polarization.

#### 306 10:15 AM

Dual Mode Phased Array Antenna with Grating Lobe Suppression Capability using Silicon RFICs based Integrated Beamforming Network

#### Connor Laffey (Master's)

A dual mode (TM11 and TM21) phased array antenna at Ku-band is proposed using silicon RFICs based integrated beamforming network. The radiating element is a dual mode concentric ring patch and is capable of pattern reconfiguration between broadside and conical pattern. We can also excite both modes (TM11 and TM21) with proper amplitude and phase values so that we can suppress any side or grating lobe present in the array performance. These are attractive traits in a crowded electromagnetic environment because pattern reconfiguration and null steering allows a receiver to avoid enemy jamming techniques, multipath communications, and offers a novel solution to grating lobe suppression. The proposed approach will be using inter-element spacing of  $1\lambda$  in order to create more space for the beamforming network. In this case,  $\lambda$  is free space wavelength at 14.5 GHz. This creates a challenge for beamforming and the radiation pattern of the dominant mode patch. Due to the large spacing, the array factor of The TM11 mode will create large grating lobes. However, by steering the null of the TM21 mode patch, these grating lobes can be suppressed. The array utilizes Anokiwave RFICs (AWMF-0117) which provides flat panel integration of the beamforming network with the antenna aperture. A suitable beamforming network for this array is being investigated. This will involve designing a beamforming network and the development of an appropriate beamforming algorithm to perform mode combination and amplitude and phase control.

#### 308 10:35 AM

Effect of Powder Spreading on Green Body Dimensional Accuracy in Additive Manufacturing by Binder Jetting Ifeanyichukwu Olumor (Doctoral)

It has been shown experimentally that part distortion occurs during additive manufacturing because of powder spreading. It has also been shown that Bullet Physics Engine can be used for Discrete Element modeling of powder spreading during additive manufacturing by binder jetting. It is known that, due to technological restrictions, the thickness of deposited layers during binder jetting should not exceed several powder particle diameters making the application of continuum models of powder medium behavior to be problematic. Modelling of powder spreading during additive manufacturing has been carried out and the developed model experimentally validated. The conducted modeling shows that distortion of previously deposited layers depends on the amount of powder removed during spreading, on the thicknesses of the deposited layers, and on the dimensions of the manufactured components. An empirical equation describing the distortion strain as a function of powder spreading parameters is suggested as an approximation of the numerical modeling results.
#### **309 10:45 AM** Additive Manufacturing of Powder Components Based on Subtractive Sintering Approach Maricruz Carrillo (Doctoral)

Although great improvements have been made, additive manufacturing (AM) of dense complex shape ceramic and metallic parts is still a major challenge. Powder 3D printing has been gaining popularity due to its ease of use and versatility. However, powder-based methods such as Selective Laser Melting (SLM) and Sintering (SLS), utilizes high power lasers which generate thermal shock conditions in metals and are not ideal for ceramics due to their high melting temperature. Indirect additive manufacturing methods have been explored to address the above issues but have proven to be wasteful and time-consuming. In this work, a novel approach of producing high density net-shaped prototypes using Subtractive Sintering (SS) and Solvent Jetting (SJ) is developed. Additive Manufacturing combined with Subtractive Sintering (AM-SS) is a process that includes five simple steps. AM-SS can produce repeatable and reliable results as has been shown in this work. As a proof-of-concept, a zirconia dental crown with a high density of 97% is fabricated using this approach. Microstructure and properties of the fabricated components are analyzed. A major advantage of this method is the ability to efficiently fabricate high density parts using either metal powder and more importantly, ceramic powder which is traditionally difficult to densify using AM. Additionally, any powder particle size (including nano) and shape can be used which is not the case for traditional powder-based 3D printing.

### **Session C3**

## Oral Engineering and Computer Science Friday, March 19, 2021, 11:00 AM

#### 310 11:05 AM

#### Design, Build and Test of an In-House Made Ventilator System Mohamed Amine Abassi (Doctoral)

The Covid-19 outbreak presented a serious challenge to world healthcare. Its rapid spread overwhelmed the hospitals' capacity to efficiently contend with the increasing number of patients requiring immediate respiratory assistance. As the ventilators are relatively expensive (typically ranging from \$5,000 to \$50,000), and in case the healthcare capacity is outnumbered, the design of a cost-effective and a quick-home-made ventilator becomes crucial. This project represents an answer to this emergency. It is about the design, build and test of a ventilator which is affordable at low cost, easy to be operated, while meeting the essential requirements set by the Food and Drug Administration. The ventilator is composed of a valve to regulate and monitor the air pressure, a timer that controls a solenoid valve to provide pulsating air flow, a humidifier to add moisture to the air flow and a PEEP (Positive End of Expiratory Pressure) valve to maintain the pressure in human lung. An air compressor or a plant air serves the source for the air supply. A lung simulator is used to test the performance of the ventilator at different pulmonary compliance settings. The parameters including the air pressure, the inspiration time and the PEEP are fully controllable.

#### 311 11:15 AM

#### Time-Resolved Tomographic-PIV Measurements for Turbulence Modeling

#### Jose Moreto (Doctoral)

Turbulence is encountered in many engineering applications; however, it is a very complex flow phenomenon. Turbulence models are bridges connecting unknown turbulence statistical quantities so as to close the governing equations and enable us to accurately compute the turbulent flows in a variety of applications such as obtaining improved designs with better performance for airplanes, engines, automobiles, wind turbines, etc. The development and validation of turbulence models rely on high-quality data of turbulent flows either obtained numerically through direct simulation or experimentally through meticulously implemented measurements. Due to the highly three-dimensional and time-dependent characteristics of turbulence, these experiments for obtaining high-quality turbulence data are usually very challenging, thus often demanding the application of the most advanced fluid dynamic measurement techniques available in the fluids community. Recent work of Liu and Katz (2018) based on planar-PIV (Particle Image Velocimetry) clearly shows the complex nature of turbulent shear layer flow past an open cavity and demonstrates the need for a full three-dimensional characterization of the velocity field and pressure field around the cavity trailing corner. In response to this call, this research project

aims to directly measure all 3D components of the pressure-related terms in Reynolds stress budget for a turbulent shear layer flow past a cavity is by Time-resolved Tomographic-PIV coupled with a non-intrusive pressure measurement technique. The measurements are carried out in the newly built SDSU water tunnel lab facility. The water tunnel has a test section 4" wide, 5" tall, and 24" long. The instrumentation available to perform the measurements includes a high-repetition laser as well as four high-speed cameras which are used to acquire 4500 images per second. This presentation will report the instantaneous 3D-velocity and 3D-pressure measurements, along with all the Reynolds stress tensor components for the turbulent shear layer impinging in a cavity trailing corner at a 4.0×104 Reynolds number based on the cavity length.

#### 312 11:25 AM

#### SDSU Low Speed Wind Tunnel DAQ System Upgrade and External Force Balance Calibration Bradley Zelenka (Master's) Aldair Herrejon-Andrade

The San Diego State University Low Speed Wind Tunnel completed construction in 1962, shortly after the establishment of the SDSU College of Engineering in 1961. In the decades since, the tunnel has undergone several modifications to keep up with advancing technology, however, the external strain-gage based force balance has proven its accuracy and reliability and is still in use today. During the winter of 2020/21, significant upgrades were made to the data acquisition system and the force balance was calibrated for the first time since 2015. This work is intended not only to increase the accuracy and usability of the force balance, but also to document the calibration procedure and generate a detailed report for future operators and researchers to reference when conducting tests in the wind tunnel.

Data acquisition system upgrades include the move away from 1990's era hardware. The previous data acquisition computer, a Windows XP PC from 1997, has been replaced with a Windows 10 PC from 2019. The analog to digital board which reads the voltage signals has been upgraded from an over 20-year-old, 12-bit board to a 2019, 16-bit board, increasing both the measurement resolution and maximum sampling frequency by an order of magnitude or greater. Further, the data signals were previously transmitted using unshielded ribbon-wire, and reading with non-referenced single-ended readings, which caused a considerable amount of noise on the order of 0.5 V. The new system uses shielded cables for all data transmission and uses differential readings for the force balance signals, which has contributed to a massive reduction in noise, now on the order of 5 mV—two orders of magnitude improvement. The force balance was calibrated using a calibration rig from the balance's original calibration in the 1960's. A few modifications were made to the calibration setup to ensure the accuracy of the results. Weights were provided by the civil engineering lab to the wind tunnel to generate the calibration loads. The balance was calibrated using a third-order polynomial, as was done during the 2015 calibration, to capture the nonlinear variations and axis interactions present in the force balance.

#### 313 11:35 AM

#### The Effects of Plasticity on Micromechanics of Composites with Fiber Waviness Defects under Quasi-Static Compression Paulina Diaz-Montiel (Doctoral)

Advanced carbon fiber-reinforced polymer-matrix composites are high-performance materials widely used in the aeronautical and aerospace sectors due to their excellent strength-to-weight and stiffness-to-weight ratios. Some of the questions that still remain regarding micromechanics analysis of composites are related to the selection of appropriate constitutive models for each of the material constituents. Detailed investigations are required to elucidate how these models can affect the nucleation, interaction and evolution of damage modes occurring in the material with the loading history. In this work, micromechanics simulations of composites with fiber waviness defects are conducted under guasi-static compression loads. A 2D finite element model with fibers, matrix and fiber-matrix interfaces is used, and damage modes at the constituent level (i.e., fiber-matrix interface damage, matrix plasticity, void nucleation and growth) are studied. The polymer-matrix material is modeled using different elasto-plastic constitutive models including the von Mises, Drucker-Prager and Gurson-Tvergaard-Needleman (GTN) material models. The results show that micromechanics of composites need to consider the pressure-dependency of the polymer-matrix for accurate predictions of strain localization in the fiber kinking mode. Matrix dilatancy also affects the fiber-matrix interface crack behavior, and the extent of this damage mode at the regions of the fiber waviness imperfection. Voids do not show a strong interaction with the fiber-matrix damage mechanism, but as these voids coalesce and grow, they influence the distribution of plastic flow in the matrix material at locations of fiber waviness. These investigations will be useful to formulate appropriate models for progressive failure, strength and fatigue life prediction of composites. These mechanisms-based models can benefit the aerospace industry supporting educated decisions about design, inspections, repairs and maintenance of current aircraft and space vehicles.

#### **314 11:45 AM** Abort Guidance during Powered Descent for Crewed Lunar Missions Sergio Sandoval (Doctoral)

During powered descent of a crewed lunar landing mission, should any contingency or unplanned event render the landing infeasible or unacceptably risky, the guidance system must be able to switch from powered descent guidance to abort guidance to ensure that the vehicle can transition into an ascent trajectory and insert into a clear pericynthion orbit. Unlike a typical launch ascent problem, the initial condition of such an abort is one where the vehicle is still in descent and it can be anywhere during the powered descent. This is thus a considerably more difficult problem and the guidance system should be fully autonomous and adaptive. In this work, the complete abort operation is divided into two phases once abort is commenced. The first phase is a pull-up maneuver, where the vehicle is guided from the initial condition on the powered descent trajectory to achieve a specified non-negative flight path angle, while maintaining nearly a constant velocity. The next phase is fuel-optimal ascent where the vehicle ascends from the end of the pull-up phase to the insertion into a specified final orbit. This paper describes the guidance strategy, develops the guidance laws for pull-up phase, and reviews the fuel-optimal ascent guidance algorithm. End-to-end simulation results are presented from the start of powered descent, abort at an arbitrary time during descent, to the insertion into the specified orbit. The viability of the abort guidance approach is demonstrated by extensive Monte Carlo simulations.

### **Session D3**

Oral Engineering and Computer Science and Interdisciplinary Friday, March 19, 2021, 12:00 PM

#### 315 12:05 PM

Predicting Phenotype to Mechanotype Relationship in Cells Based on Intra-Cellular Signaling Networks Esra Tiftik (Doctoral) Amy Turnlund

Cells from different tissues in the body respond differently to almost the same external stimuli. For example, cardiac cells contract in response to stress hormone signaling while smooth muscles cells in the airways relax. Even for cells originating from the same tissue, these responses can vary significantly. For example, normal breast epithelial cells do not respond to stress hormone signaling in any discernible manner. However, highly metastatic breast epithelial cancer cells respond to the same external signals by increasing contractility and migration. Differences in cellular responses to a variety of other external signals such as matrix stiffness, cell-cell adhesion and even drug response have been well documented in literature. While an argument can be made that these responses are dependent on the cell phenotype, one can still not accurately predict the outcome of a particular signal even if the gene expression profile of a cell is known. We have developed a semi-quantitative-computational model to analyze the intra-cellular signaling network and its outcome in the presence of multiple external signals including growth factors, hormones, and extracellular matrix . We use this model to analyze the cell response phase space to external stimuli and identify the key internal elements of the network that drive specific outcomes within this phase space. The model is built upon Boolean approach to network modeling, where the state of any given node is determined using the state of the connecting nodes and boolean logic. This allows us to analyze the network behavior without the need to estimate all the various interaction rates between different cellular components. However, such an approach is limited in its ability to predict network dynamics and temporal evolution of the cell state. So we introduce dynamical aspects using modified hill functions for signal transmission rates within the network as well as machine learning models trained on kinetic data. Combining these three approaches, we provide a unique computational model to predict the response of cells in different phenotypic states to external signaling. We are using this model to understand the disparities in stress hormone and extracellular matrix signaling response seen in breast cancer cells.

#### 316 12:15 PM

## Facilitating Stochastic Resonance as a Pre-Emphasis Method for Neural Spike Detection **Cihan Gungor (Doctoral)**

We aim to increase the number of neural spikes that can be detected in a single channel extracellular neural recording. Approach: We propose a pre-emphasis method facilitating stochastic resonance (SR), where we introduce the band-pass-filtered noisy extracellular recording to an overdamped Brownian particle in a monostable well. The x-position of the Brownian particle is the output of the proposed pre-emphasis method. Threshold is applied on the output for spike detection. To characterize the dynamics and the solution of the system, we use a synthetic dataset generated by adding Gaussian white noise at different intensities to an intracellular recording. Then, we evaluate and compare the spike detection performance of the proposed method on a public synthetic extracellular dataset. Main results: The proposed SR-based spike detection improves the signal-to-noise ratio (SNR) of the intracellular-based synthetic dataset as much as 7.35 dB and outperforms the state-of-the-art pre-emphasis methods in false positive and false negative rates in 15 of the 16 synthetic extracellular datasets, with 100% sensitivity and positive predictivity values in seven of the recordings. Significance: The method has the potential of significantly increasing the number of neurons that can be monitored from a single-channel extracellular recording.

#### 317 12:25 PM

# Enhancing Risk Management of Software Application Assets using Natural Language Processing Alexander Nestler (Master's)

#### Lance Cameron

Vulnerabilities that exist within software application assets are among the most exploited attack vectors in the cyber domain. The National Institute of Standards and Technology (NIST) maintains an extensive database of Common Vulnerability and Exposure (CVE) identifications that contains a description of each vulnerability, base-level Common Vulnerability Scoring System (CVSS) risk scores for each vulnerability, and a list using the Common Platform Enumeration (CPE) standard to identify all affected software products and versions for each vulnerability. This dataset allows analysts to determine which software application assets in their environment contain CVE's and obtain suggested base scores to assign these applications for risk management purposes. MITRE has developed a framework for their cyber kill chain which contains Adversary Techniques, Tactics, and Common Knowledge (ATT&CK). The ATT&CK framework provides descriptions for known techniques attackers use in the wild to go through the stages of the cyber kill chain during an attack. The ATT&CK framework has been gaining more popularity recently as it has been proven to be a useful tool for assisting security teams during incident response activities and threat hunting. Currently, there is no standard from NIST for associating vulnerabilities to any technique the vulnerability is susceptible to in the MITRE ATT&CK framework. We hypothesize that security analysts can use Natural Language Processing (NLP) algorithms to determine which tactics attackers may be able to execute by exploiting vulnerabilities that exist within their local enterprise network environments. By creating machine learning models capable of analyzing the descriptions of the techniques attackers use to execute a given tactic (ATT&CK framework) with the descriptions of the vulnerabilities (NIST CVE), we believe that security teams can enhance their risk management processes, incident response activities, and threat hunting efforts. Our initial results demonstrated that one algorithm, the Latent Dirichlet Allocation for topic modeling, can associate vulnerabilities to small groupings of tactics, with the potential to possibly associate vulnerabilities to specific tactics they are most closely associated with. Further research is recommended to explore the viability of the tactic groupings, assign appropriate recommended score adjustments to each grouping and/or tactic, and use the results in an SVM.

#### 318 12:35 PM

## Target Acquisition Utilizing Spatial Computing Sergio Gonzalez (Master's)

Augmented Reality (AR) technologies have made a great stride in the last 5 years. Microsoft and other companies have really pushed forward the Spatial Computing (SC) technology that now allows users to transpose virtual environments with the real world. As technology advances, the apps we find in our mobile phones may be replaced by wearable technologies such as google glass or the newly announced Apple AR glasses. The purpose of this research is to develop SC enabled devices to aide a user with target acquisition. This will be done utilizing Microsoft's HoloLens 2 and Spatial Computing software, which includes AR. Metrics such as distance to the target, surrounding wind speed, motion of the target and user will all be measured and accounted for in order to obtain the best center point for the projectile to be aimed at. The goal of this will be able to hit a target with as much accuracy as possible. Our research will be based on archery, which is practiced in a variety of ways, such as sport and food acquisition. The project will focus on creating a viewable interface which will interact with its environment and identify the appropriate target, find its center, then

utilize data regarding the users surroundings to acquire the best central target. The overall encompassing goal of this project is to utilize the geo-spatial capabilities of this research to apply to other activities which require detailed motor function analysis, such as golf, in order to help improve the users functions. The project will also allow the user to view real time trajectory metrics via an on display graph, compare distances from start to the end of the goal and can then be compared historically to allow for continuous improvement. This research could ultimately impact how people in various activities interact with their surroundings and could further aid in other mobility related tasks such as obstacle avoidance or threat detection.

#### 319 12:45 PM

## Feasibility of Deep Learning Based Deformable Lung CT Registration Joseph Tabalon (Master's)

Deformable image registration (DIR) of lung CT is commonly used to guantify gas trapping in the lungs to assess Chronic Obstructive Pulmonary Disease (COPD) severity. However, traditional CPU-based DIR methods are often slow (minutes to hours) and may be less generalizable, challenging translation of these metrics into clinical care. We hypothesized a fast deep learning-based DIR algorithm could accurately perform DIR of the lungs. This study is HIPAA-compliant and IRB-approved with a waived requirement for written informed consent. We retrospectively sampled 9,116 inspiratory and expiratory lung CT image pairs from the COPDGene Phase I cohort. Images were first segmented at the lobar level using an independently developed 3D convolutional neural network (CNN), producing binary masks for left lower (LL), left upper (LU), right lower (RL), right middle (RM), and right upper (RU) lung lobes; trachea (TC) masks were also computed. We then trained a deep learning-based DIR algorithm for four epochs, using the VoxelMorph algorithm (VMR) for brain registration, to deformably register expiratory images to inspiratory images. 8,500 image pairs were used for training and 616 image pairs for validation. Registration accuracy was evaluated using dice overlap score between inspiratory and registered expiratory masks in the validation set. VMR dice scores were compared to those of symmetric diffeomorphic registration (SDR) as a reference standard using paired t-tests. For larger lung lobes, VMR (median [IQR] - LL: 0.85 [0.05], LU: 0.89 [0.03], RL: 0.87 [0.04], RU: 0.88 [0.07]) achieved competitive dice scores with SDR (LL: 0.89 [0.08], LU: 0.91 [0.04], RL: 0.90 [0.06], RU: 0.93 [0.05]). However, VMR struggled with smaller anatomical areas (RM: 0.67 [0.04], TC: 0.38 [0.21]) compared to SDR (RM: 0.82 [0.07], TC: 0.51 [0.19]). SDR achieved significantly better performance across all mask categories (p-values<0.01), which is expected. Preliminary results suggest fast lung registration using the VMR algorithm is feasible. Incorporation of lobar masks into the training loss and training for more epochs is expected to improve performance.

### **Session E3**

Oral Interdisciplinary Friday, March 19, 2021, 1:00 PM

#### 320 1:05 PM

Northern Channel Island Sediment Core Analysis Matthew Tinglof (Undergraduate)

In 2017 and 2018, 27 sediment cores were collected from the Santa Cruz Passage offshore from the northern Channel Islands, CA in order to reconstruct the paleolandscape during times of lower sea level. It can be difficult to reconstruct the paleolandscape on the continental shelf because wave-base erosion can erase evidence of subaerial environments during sea-level rise. However, under certain geologic and oceanographic conditions, some of these paleoenvironments survive and are preserved in the rock record, often buried beneath modern marine sediments. We used a suite of geophysical and geologic data (e.g., seismic reflection, grain size, XRF data) collected from the shelf to identify these deposits. By identifying a possible terrestrial signature in these data, it will help future geologists refine the search area for terrestrial deposits in a marine environment. The identification of these deposits is particularly important for archaeological research on early human migration into the Americas. If the first people migrated into North America along the Pacific coast during the last glacial period, evidence of this migration could now be submerged on the continental shelf. Identification of environments and resources valuable to early humans (e.g., estuaries, seeps, rivers) can help to refine the search for submerged archaeological sites. Furthermore, the identification of these environments can improve management of offshore energy development to avoid development in regions that are likely to contain archaeological sites.

#### 321 1:15 PM

## An Analysis of the Impacts of Sea Level Rise on California's Coastal Communities using GIS Atalie Gomez (Undergraduate)

Sea Level Rise (SLR) poses an increasing threat to California's Coastal Communities. Coastal Communities deemed by the State of California as Disadvantaged Communities (DAC) are at an even greater risk of flooding impacts since they lack the proper funds and infrastructure to withstand the effects of SLR. As part of the Urban Water Group, under Dr. Davani's direction, I collected data using the USGS HERA tool to create a spreadsheet of the potential impacts these communities face. Two separate SLR scenarios were considered. A 1m SLR rise and a 2 m SLR. I took factors such as demographic information, DAC status, residents affected, employees affected, total building replacement values in dollars, total area of developed land impacted in sq. miles, and total number of roads impacted in miles into consideration when identifying the most impacted coastal communities. I pulled the data collected into ArcMAP to create four Bubble Maps showing the number of residents impacted and the area of developed land that would be impacted by flooding for the 1 meter and 2 meter SLR scenario. These figures revealed that San Leandro is a disadvantaged community vulnerable to Sea-Level rise. The effects of SLR also affect communities' groundwater tables and contribute to greater flooding. For this part of the Urban Water Group's project, a specific area of interest for the Urban Water Group was the San Leandro Watershed. Using ArcMAP, I created a shapefile outlining every possible land use type encompassed in the San Leandro Watershed in the form of polygons (Figure 1). In the end, I created about 534 polygons outlining the following land use types: asphalt/ concrete, buildings, creeks, areas of dense vegetation, dumpland, marshes, open green areas, rivers, roads, and streams. The shapefile I created helped visualize how water would flow if a flood were to occur. The documents I created during my project served as supporting documents for the Urban Water Group's mission of analyzing water systems through computer modeling of compound flooding impacts. Towards the end of my project, I co-authored a journal article that was submitted to be published.

#### 322 1:25 PM

### Post-Fire Soil Modeling in Urban and Mediterranean Watersheds

#### Rey Becerra (Undergraduate)

Increasing wildfires can pose environmental challenges in urban watersheds by altering the physical and chemical properties of soil. In southern California, invasive plant species in urban riparian systems may contribute to geomorphic changes after fires. This research focuses on the Del Cerro fire in Alvarado Creek, a tributary to the San Diego River in California, which is characterized with dense and highly flammable non-native vegetation cover (primarily Arundo Donax) localized in the stream banks. This work analyzed the post-fire sediment response after the 2018-2020 storm events in upland and riparian areas of the creek. Collected soil samples consisted of a top (0-15cm) and bottom (15cm-30cm) layer for which a Loss-on-Ignition (LOI) test was performed to measure organic matter content. Particle size distributions for each soil layer were determined using a standard sieve analysis. Lastly, physical parameters from field data were used as inputs for the Erosion Risk Management Tool (ErMit) and the Disturbed Water Erosion prediction Project (WEPP) 2.0 models to simulate erosion intensities. We also observed a seasonal pattern in the organic matter content for both areas in which vegetation growth was optimal during the wet season and low during dry season. The LOI analysis of the upland top layer revealed a 34 % loss of organic matter after the first post-fire storm, while the riparian zone had an 11 % decrease. The particle size distribution showed sediments between 0.425 mm-0.180 mm were susceptible to erosion in both upland and riparian areas, sediment presence decreased from 13.4% to 2.85% by weighted mass in the hillslope area and in the riparian zone from 13.4% to 0.9%. These observations were compared to sediment delivery estimated by the WEPP 2.0 and ErMit models. Disturbed WEPP 2.0 results were higher than ErMit during the first post fire year at 7.56 ton/acre and 0.74 ton/acre, respectively, a ten-fold difference. ErMit appears to represent the study area better than Disturbed WEPP 2.0, which yielded high sediment delivery for the first five post-fire years. This research provides a better understanding of sediment dynamics through temporal patterns of organic matter, soil distribution, and models in post-fire urban environments.

#### 333 1:35 PM

## Solidworks Simulation Based on Microstructures in Naturally Occurring Seashells **Brian Tran (Undergraduate)**

Our understanding of organisms and their ability to adapt over time to their environment provided us the opportunity to implement in Additive manufacturing(AM) or other 3D printing processes. First, we begin by simulating desired models in Solidworks to obtain the most optimal design. By analyzing what makes seashells strong on a microstructural level, we can pinpoint these unique characteristics. Some of which are platelet angles and model orientation. Our goal this past summer was to generate models that implemented the characteristics of a seashell. We tested them using Solidworks Simulation, simulating the three-point flexural test,

#### 334 1:45 PM

Exploring Intra- and Extra-Cellular Drivers of Emergent Phenomena During Cell Migration Jeanette Espinoza (Undergraduate)

Cell migration is a crucial process to the biological mechanics of immune response, cancer metastasis, and tumor progression. Cell migration can be predicted with the inclusion of various parameters such as cell surface adhesion dynamics, contractile forces, chemical or stiffness gradients, and the mechanical properties of the environment. Currently, two-dimensional and three dimensional cell migration models allow for the analysis of specifically tailored parameters for individual cell types (i.e. breast cancer). However, the predictions from these models do not completely represent the wide variety of emergent behaviors occurring between all cellular and extracellular factors, such as durotaxis. As cells migrate they may durotax, or exhibit the ability to sense and migrate against a stiffness gradient. Modelling of all the possible emergent cell migration behaviors under different conditions is complex and computationally taxing, as it requires an abundance of data interplaying with multiple intra-cellular and extra-cellular interactions. Here we set off on this daunting task to explore the vast parameter space of possible intra- and extra-cellular interaction parameters to understand how these dictate the wide variety of emergent cell migration phenomena observed in biology. We start with the parameters that alter cellular force generation and cell-substrate adhesion interactions as these are critical in determining cell migration along or against stiffness (durotaxis) and adhesion strength (haptotaxis) gradients.

### **Session F3**

Oral Engineering and Computer Science Friday, March 19, 2021, 2:00 PM

#### 335 2:05 PM

## 8x8 Patch Antenna on the Kapton Film Flexible Substrate Material Nhat Truong (Undergraduate)

In this project, an 8x8 patch antenna on the Kapton film flexible substrate material is designed at 5G communication new radio (NR) band frequency of 28GHz. Performance comparison between the planar and curved study is presented to show the impact of bending the array antenna since it is a flexible substrate material. The flexible substrates like Kapton film is thin, compact, lightweight and inexpensive. In this study, Ansys HFSS is used for designing and simulating the array antenna. The array antenna has 8x8 patches. The dimensions of each square patch is L = 2.73mm and W = 3.53mm. This is designed on top of a Kapton film substrate material ( $\varepsilon r = 3.25$ , tan  $\delta = 0.02$ ) of thickness H = 0.254mm (10mil). The ground is designed on the bottom side Kapton film substrate layer. The interelement space between the radiating elements is  $0.5\lambda$ , where  $\lambda$  is the free-space wavelength at 28.0 GHz. Estimated dimension for the whole design is 54mm x 54mm. The patch array antenna is wrapped on the curved surfaces of different diameters to show the impact of the curved surface on the antenna performance.

#### 336 2:15 PM

## Exploring a 3D Printing Technique of Ceramics Using Computer-Aided Modeling James Murray (Undergraduate)

Traditional 3D printing of ceramics is expensive and lengthy to conduct. The goal of this summer project is to use computer-aided modeling to explore a new 3D printing technique for ceramics based on the flash sintering technology, a rapid sintering technique of ceramics that can form dense ceramics from powders in a matter of seconds. In particular, the theoretical feasibility of the new 3D printing process of ceramics was explored in this summer project using the finite element analysis (FEA) modeling. Firstly, a Matlab script was developed to generate a powder pack model that is then imported into SolidWorks to create a geometric file that can be read by any 3D modeling capable software. These models were then analyzed by FEA using the COMSOL Multiphysics module, from

which the conditions of the sintering process of the powder pack were recreated. It was discovered that, within a few microseconds of an intense electric potential being introduced on the powder pack model, the sintering temperature (1500°C) for the densification of the 8YSZ powders was achieved. In other words, in the case of 3D printing of 8YSZ, each layer of 8YSZ powders will be sintered within a few microseconds. This is at least 100 times faster than traditional 3D printing technology for ceramics. It should be noted that the powder pack models generated in this work possessed a close-packing density (~0.8) which is higher than that in experimental (~0.5-0.8) attributed to the imperfections in real life. To achieve a path for the electric potential to consistently travel between the electrodes, the random size particles were plotted on the edges of each other. This method resulted in an average packing density of about 80 percent, contrary to the average range of 65 percent that is recorded from practical samples. Regardless, this data revealed new information about the speed and ability to dynamically control the densification layers essentially confirming that it is theoretically possible to sinter only the contacting points between the powder compacts.

#### 337 2:25 PM

#### Exploring Augmented Reality for Naval Maintenance, Repair, and Overhaul Operations Allan Sur (Undergraduate) Alexander Nestler

The Navy Maintenance, Repair, and Overhaul (MRO) workforce faces unique and challenging cases every day. The highly complex nature of naval systems combined with the critical nature of maintenance and repair to the readiness strategy necessitates leveraging software and technology to reduce errors and maintenance costs. Augmented Reality (AR) and Spatial Computing (SC) are two technologies that the entire Maintenance and Repair industry has begun to explore that has demonstrated potential in reducing errors and cutting costs. The Fowler College of Business Artificial Intelligence Lab at SDSU has partnered with the NavSea Center at Port Hueneme to research and develop AR solutions for the Naval MRO workforce. Currently under development is a prototype application that will maintenance and repair technicians in automating the process of obtaining the relevant diagnosis procedures for a system that is used to replenish and resupply ships at sea. The application will capture error codes from the Human Machine Interface (HMI) that controls the system on a smart device like when users use an application to scan a QR code to obtain supplemental information. One component of this prototype application includes AR to overlay a 3-D model of the system components in real-time to highlight the specific component that is being diagnosed. The ability to quickly locate the affected component and automate the retrieval of the supplemental information necessary to perform diagnosis procedures will assist technicians in speeding up repair, reduce the downtime of system operations, and increase overall MRO productivity.

### 338 2:35 PM

#### LOTUS

#### Dawod Rafoka (Undergraduate)

In most engineering applications, any system is created with a combination of subsystems working simultaneously in harmony in the most efficient and effective ways possible. Lotus 2.0 is a surveying autonomous robot which is capable of driving itself in a field under extreme conditions, taking and analyzing measurements and pictures, and sending these data to the data center for further storage and analysis. Lotus is equipped with various surrounding sensors, motors, a camera, a GPU, an Accelerometer, a Microcontroller, a Microprocessor which acts like the operating brain of the robot and many other subsystems. All of these are expected to perform and feed off a single battery with the intention of not needing a human to charge the battery in the middle of a mission. With this high expectation, a Power Management Unit is needed to supply the optimum power from the battery to these subsystems in the most efficient way possible. Creating, optimizing, and testing this unit was the ultimate goal this Summer in the Summer Undergraduate Research Program. To summarize a couple of months of work into couple sentences, The Research started with searching and selecting various regulators from the market to be virtually tested via LTSpice and compared with each other. Then, the focus became on comparing their power efficiencies when operating in different working modes. The next step was looking into tuning the final circuit. This led into creating and drawing the final schematic, documentations, and the PCB design using KiCad. Once the PCB design was completed, a bill of materials was created and ordered along with the actual PCB to be later tested upon arrival with real world limitations. In the end, this project had a great turn. When a new iteration of the robot is created by a new Senior Design team, they will have all the necessary documents to optimize the newly created Power Management Unit to work for their version. Throughout the program, all the work has been professionally documented with the proper descriptions, flowcharts, diagrams, and simulation results.

#### 339 2:45 PM

## Using Vector Embeddings for Viral Protein Classification Tyler Perry (Undergraduate)

Viruses and bacteriophages (viruses that infect bacteria) are a critical component of all microbiomes. The task of classifying proteins encoded by the genomes of these organisms, especially of bacteriophages, is much more challenging - compared to those of cells given their extremely high variability under strong natural selection. To achieve a better understanding of phage genes and how phages contribute to their communities, we are developing more sensitive tools to detect relatedness and to assign these proteins to their appropriate functional classes. To this end we have applied machine learning, using feed-forward artificial neural networks (ANNs or FFNNs) trained on large datasets to accurately predict ten classes of phage structural proteins. In this project I used and adapted concepts from natural language processing, where embeddings are employed to reduce the dimensionality of inputs into a neural network, and more importantly, to capture word-word relations (in our case, relationships between protein sequences). I applied the training of embeddings to a database of 2 million viral and bacteriophage proteins from the RefSeq database. Embeddings are dense vectors representing words (or peptides or DNA sequences, in the biological case) that are trained in a shallow FFNN while preserving positional information of the specific peptide with respect to the rest of the protein sequence. The embeddings I trained measure the similarity between two peptides and give a distance metric between them. By clustering the embedding vectors produced by the model, I am able to show distinct clusters between structural phage proteins and non-structural phage proteins. I then trained a FFNN that uses these embedding vectors as input features in order to classify these phage structural proteins, with a testing accuracy of 94%. I will investigate how adding these embedding vector features to our current predictive tool, PhANNs (Cantu et al, PLoS Computational Biology, 2020), improves its accuracy.

### **Session G3**

Oral Humanities, History, Literature and Philosophy Friday, March 19, 2021, 3:00 PM

#### 340 3:05 PM

Beyond Rosie the Riveter: Women's Health Services at San Diego's Consolidated Aircraft Factory Hailee Menchaca (Master's)

Scholarship on women's roles during World War II has provided the historical field with valuable insight into the nature of gendered divisions of labor. At times during US History, women were able to assert themselves at the forefront of the US labor force, despite societal expectations revolving around ideas of moral motherhood. However, remaining gaps exist regarding the treatment of women's physical and mental health within the factory workforce. Understanding these unexplored gaps within historiography is imperative, as women's experiences during the wartime period have primarily been viewed through the lens of men's experiences in the same context. This study utilizes factory literature and archival sources from San Diego's Consolidated Aircraft Factory to challenge the pre-existing narrative of Rosie the Riveter's widely accepted representation of a harmonious labor force, allowing women to be seen as autonomous beings within the literature. Through analysis of these archival sources, I conclude that the male factory population approached women's health with misunderstanding and condescension, viewing women as volatile and unpredictable reproductive bodies who would serve only as a temporary fixture to promote the war effort. Though studies on women's efforts in munitions factories across the US made waves for the field of labor histories, this work seeks to coincide with literature that questions our prior notions of women's wartime experiences by elucidating broader trends of labor and its connection to labor and women's health resources in the twentieth century, which have remained an untouched aspect of the field.

#### 341 3:15 PM

### Mexico's Defining Years: Popular Movements During the War of Reform and the Second French Intervention

#### Cesar Cabrera Cazarez (Master's)

This paper is about how different historians have looked at and studied the role of popular movements (or guerrilla groups) in Mexico during the mid-19th century during the War of Reform (1858-1860) and the Second French Intervention in Mexico (1861-1867). I looked at the different methods and approaches taken by historians on this topic to find any gaps in the historiography.

#### 342 3:25 PM

## Down the Drain: The Enforcement of Prohibition in San Diego, California Alec Whitson (Master's)

In 1920, Prohibition went into effect, banning the manufacture and trade of alcoholic beverages in the United States. The fourteen years during which Prohibition laws were in effect saw both serious efforts to rid the nation of alcohol and widespread opposition. In San Diego, California, the enforcement of Prohibition laws was pursued by a host of federal and local law enforcement organizations. While Prohibition enforcement in San Diego was at times rather effective and represented a major expansion of federal power in that locality, it ultimately failed to rid the city and county of alcohol. This presentation argues that Prohibition enforcement in San Diego faced a combination of challenges - both uniquely local and representative of wider, national problems - that were never sufficiently overcome and ultimately compromised Prohibition there. San Diego's unique geographic location as the country's southwestern-most port city, directly adjacent to both the Pacific Ocean and the Mexican border, left San Diego open to a level of criminal exploitation that was seldom seen elsewhere. These problems required the presence and cooperation of a host of different federal agencies that already were already faced with significant issues across the country. The problems of enforcement in San Diego, rather than leading to more effective cooperation between the various federal and local agencies, exacerbated existing internal issues and fanned tensions between them. By 1927, inefficiencies in these agencies, as well as the vast scale of criminality they each faced, led to mutual suspicion, infighting, and corruption among the ranks and led to a near total breakdown of federal prohibition enforcement in San Diego, forcing local police and sheriff's officers to bear a weight that they were unable - or unwilling - to handle alone. The result was that Prohibition enforcement in San Diego, while ambitious in scope, was ultimately unable to succeed. The story of how Prohibition was enforced and ultimately fell apart in San Diego, furthermore, not only sheds light on the history of San Diego's Prohibition experience, but on that of the entire country.

#### 343 3:35 PM

### Understanding the Civil Rights Movement Through Visual Representations **Paige Ferguson (Master's)**

In May 2020, viral cell phone video footage of Derek Chauvin relentlessly kneeling on George Floyd's neck disturbed people worldwide, sparked protests across the United States against police brutality, and renewed national dialogue regarding racism. The COVID-19 pandemic amplified engagement in online discourse and activism. Users across internet platforms highlighted that protests responding to Floyd's murder are a continuation of the civil rights movement (CRM). Others likened the impact of Emmett Till's photograph to videos of police murdering Black Americans. In general, the public made historical and visual connections between the CRM and contemporary events. Before Floyd's death, visual images and representations have influenced understanding of race and race relations in various settings, such as academia, public history, and popular media. In the academic setting, teachers at all levels use political cartoons and historic photographs to illustrate significant events and historical themes to their students. My research utilizes visual rhetoric and semiotic theories to analyze visual representations of the CRM in history textbooks from well-known publishers, such as Pearson Prentice Hall and McGraw-Hill. My analysis puts the textbooks' visual narratives into conversation with images published in the newsletters of civil rights organizations, such as the Student Nonviolent Coordinating Committee (SNCC), the Congress of Racial Equality (CORE), and the Southern Christian Leadership Committee (SCLC). Comparing the visuals representations in these sources reveals how understandings of the CRM have changed over time. I draw on Michel-Rolph Trouillot Silencing the Past to demonstrate that depictions are dependent on the narrator or compiler, themselves influenced by their own historical conditions and agendas. I conclude that the textbooks' images and visual representations offer a limited view of the CRM, movement participants, and activists. While textbooks are increasingly saturated with visual media, a few famous images repetitiously illustrate the CRM. The images and visual narratives of the CRM in these textbooks require serious expansion beyond distinguished individuals and the repetitious use of iconic images from significant events. If not, American public schools will continue to hand down a distorted narrative of the CRM.

#### 344 3:45 PM

### The Anti-Homage in Poetry: Repurposing the Canon in New Contexts Grace Li (Master's)

Poetry, like any form of literature or culture-making, draws from the past as one of its foundational principles. Traditionally, the oft-cited Western canon is held as the model through which poetry can comfortably call back to, and point to, the past. It would make sense that each successive generation of poets pays tribute, or homage, to their literary forebears. The term "homage" implies necessary, non-disruptive respect or assessment, looking back into the distance without touching or maring its surface. And for the most part,

the past stays in the past. We revere what should be revered and forget what we believe should be forgotten. This distance, necessary distance, seems to be kept. In this presentation, I would like to consider more disruptive, as well as innovative, ways of repurposing the past that breaches that respectful distance. Broadly speaking, I look to poetry that questions or recycles in surprising or subversive ways the words, symbols, and signals of the past. This poetry is not chiefly concerned with references and allusions; it does not aim to land in the neutral space of the homage and make a clean metaphor out of the canon. Rather, it breaches boundaries, takes without permission, making meaning out of past literary artifacts that may not have been approved of or thought of by their originators. In this mode of "anti-homage," the original context of these literary predecessors carries much less weight than the modern context that layers on a usually more complicated meaning. This interplay of new context with past context creates a sort of hybrid third context in which the past and present can be understood as blurring with each other, rather than existing distant to each other. In my talk, I will discuss some context of the "anti-homage" in modern poetry with selections from monumental poetic works. I will also share how I make use of this thinking in my own work as a poet. With the time I am given, I hope to share insight about a fundamental need in poetry: to not simply point to the past, but to make the new.

#### 345 4:05 PM

## Christian Magic: The Use of Amulets as a Form of Christian Practice in the 4th and 5th Centuries **Berenice Tepozano (Master's)**

This paper explores Christian Fathers' response to Christian amulets and how the use of Christian amulets provided an insight into what it meant to be a Christian in the fourth and fifth centuries. This paper is a part of a broader discussion that addresses how early ideas about a Christian utopia influenced the way Spaniards constructed a social hierarchy and the caste system in the development of New Spain/ colonial Mexico in the sixteenth and eighteenth centuries. John Gager, Roy Kotansky, and AnneMarie Luijendik have analyzed the use of amulets and Christianity in the Greco-Roman world. Additionally, Dayna Kalleres, Ayse Tuzlak, and Kristi Copeland analyzed church fathers' response to the use of magic in Christianity to show how magic and Christianity are interconnected with one another. While there is plenty of analysis on magic and Christianity, this paper addresses the gaps in the scholarship, namely what teachings were Christian fathers trying to promote and how did amulets pose a threat to their mission. This paper will begin with a close examination of Alexandra's protection amulet to identify the elements within this specific amulet that would make this amulet transform into a"Christian" amulet. A brief discussion of what church fathers were clarifying the context for John Chrysostom and Augustine of Hippo's response to the use of amulets and showed how Christian authorities tried to limit what was appropriate Christian practice. A quick comparison to a group of nine amulets shows how on an individual level people were using Christian amulets as another way to practice Christianity that went against the teachings of Church fathers such as John Chrysostom and Augustine of Hippo (Amulet 125 in Gager, P.Oxy. VIII 1151, and seven amulets from Marvin Meyer). Analyzing John Chrysostom and Augustine of Hippo's response to the use of amulets and the practice of magic provides insight into what it meant to be Christian and what was considered proper Christian practice in antiquity. Ultimately, this examination demonstrates how Christian amulets posed a threat to the rise of "normative" Christian practice in antiquity.

#### 346 4:15 PM

### Feminine Blueprint for Social Transformation Jake Maguire (Master's)

The Feminine Blueprint for Social Transformation is a lecture on the hidden sociological components of the Horus/Osiris myth from ancient Egypt. This lecture analyzes the narrative of the "hero's journey" as it was understood in the Egyptian mythological landscape. The insight from this exploration shows that there's a feminine approach to healing the balance of power between male and female value systems, and that by creating a type of pilgrimage, a society can find its way back to wholeness and balance. This lecture, with power point slide presentation, walks the viewer through the different facets of social and personal obliteration and then helps the individual chart a course back from this actual or symbolic destruction to wholeness and collective well-being. This lecture can be scaled easily from 30 minutes down to 10 and can be followed by a lively and robust question-and-answer period. There are approximately 12 slides. The final message is that the women working to balance life with kindness and care have a feminine philosophical framework from which to call on that is not rooted in modern pro-masculine power dynamics such as militancy, punitive incarceration theory, or domination, but rather a methodology of community building which is akin to counseling and psychodynamic therapy. It seeks to reawaken and re-valorize the lives and voices of the matriarchal wisdom traditions that had existed in the ancient world but were silenced or erased.

### **Session H3**

Oral Humanities, History, Literature and Philosophy Friday, March 19, 2021, 4:20 PM

#### 347 4:25 PM

Why We Should Fund the Creation of Disabled Cyborgs: Pitiful Master Narratives and the Potential Counterstories of Assistive Neurotechnology Nicholas Ford (Master's)

Pity can be understood as the process of identifying our own mental anguish in others and placing our affective experiences of suffering onto them. Traditionally viewed as a positive component of human nature, feelings of pity are regarded as motivating altruism. However, this common notion of pity carries connotations that may not always obtain, including: (1) there is suffering experienced by the pitied, (2) the feeling of pity is only an emotional phenomenon, and (3) this emotion motivates people to act on the behalf of others to mitigate their suffering. We will argue that these assumptions are flawed and pity can be harmful, not only to the person pitied, but to society at large. Further, this harm should be at least partially ameliorated for disabled people by developing Brain-Computer Interface (BCI) assistive technology (AT) that changes perceptions of disabled people in the larger cultural milieu.

#### 348 4:35 PM

## "A Woman Must Soar Beyond"- The Impact of Female Volunteers in Union and Confederate Hospitals throughout the Civil War, 1861-1865

#### Kayla Robinson (Master's)

The United States Civil War, between April 1861 and April 1865 tore the United States apart and left over a million Union and Confederate casualties. The Union capital city of Washington D.C. and the Confederate Capital of Richmond, Virginia, due to the overwhelming amount of injured troops, became central hubs for the care and rehabilitation of injured Union and Confederate soldiers. Union and Confederate women immediately felt the impact of the war in these cities that began to receive an influx of injured soldiers during this time. These women, both white and African American, free and enslaved, poor and middle class, widowed and married, all felt called to service at local, field, and general hospitals throughout Washington D.C. and Richmond. Women became an indispensable part of the hospital structure for both the Union and Confederate Medical Departments and expanded their daily responsibilities at the benefit of the hospitals they serviced. The goal of the paper is to examine the impact of the holistic approach to patient care exhibited by female volunteers at the hospitals in the Union and Confederacy. This paper utilizes female volunteer's experiences at two extremely successful general hospitals, Armory Square Hospital, a Union hospital in Washington D.C. and Chimborazo Hospital, a Confederate hospital in Richmond, Virginia are case studies used to echo the positive effects of the actions taken by female volunteers for patients through the hospitals' years of operation. In turn, this paper argues that these women's attentive and holistic approach to patient care centered around providing emotional and physical comfort to patients had a profoundly positive benefit to the hospitals they serviced. This holistic approach to patient care exhibited by female volunteers at Armory Square Hospital and Chimborazo Hospital serves as a microcosm of the overall approach female volunteers had towards patient's care throughout the Union and Confederacy.

#### 349 4:45 PM

## Global Bioethics: Death, Art, and Identity Austin Cosler (Master's)

This paper focuses on the three following concepts: Art, Death, and Personal Identity. I will argue that these concepts are relational and share an interdependent relationship. The purpose of the argument will be to advocate for a pluralistic understanding of each concept that can be assumed at the institutional level in a non-relativistic manner. I will use supporting examples from both eastern and western cultures accompanied by a positive view of cultural differences. Furthermore, this pluralistic understanding implies a collective normativity that has global reach. My thesis will be that Art, Death, and Personal Identity understood relationally support a global bioethics and aesthetic because the relation is an irreducible concomitant of human experience. This thesis is institutionally useful for generating universal norms and important because the different values that we perceive change the way we function and evolve as a society.

### **Session I3**

Oral Humanities, History, Literature and Philosophy Saturday, March 20, 2021, 9:00 AM

#### 350 9:05 AM

Baldwin IV: Leprosy, Leadership, and Overcoming the Odds **Declan Krebs (Master's)** 

King Baldwin IV of Jerusalem, also known as "The Leper King," was able to overcome the social and religious stigma associated with leprosy during the period. He did this by means of strong, effective leadership; he led his armies personally, even at a young age, and checked every advance of his enemy, the Sultan Saladin. Although he did not win every battle, the Leper King insured the overall security of his kingdom during his reign as king. This effective leadership caused his people to overlook his disease. The chronicle of William of Tyre, who was Baldwin IV's tutor and chancellor, as well as Archbishop of Tyre, reveals much about the reign and person of the Leper King, including how the king coped with his illness. Scholars Bernard Hamilton and Stephen Lay also discuss Baldwin's illness, and suggest reasons of how he was able to overcome it and become a strong king. The results of this work include the following: it proves that Baldwin IV was, indeed, able to overcome his illness and be a strong king by means of effective leadership and success in battle. It also suggests that the lands of Outremer had different standards for kingship than did the kingdoms of Europe. The work demonstrates the power of effective leadership to overcome existing stigma and assumptions of character, and provides questions for other scholars to tackle concerning the nature of kingship in the Middle Ages, the place of lepers in medieval society, and how necessity and leadership can cause societies to overlook deep-rooted assumptions.

#### 351 9:15 AM

## Negotiations of Identity and Masculinity at the Nathan Harrison Archaeological Site Jamie Bastide (Master's)

During the late 19th and early 20th century, Jim Crow and Sundown Laws dominated Southern California. As a previously enslaved man living in a region settled predominantly by Anglo-Americans from the South, Nathan Harrison had to construct his identities within these societal pressures. Using historical documents, oral histories, and the archaeological record, this paper will analyze how Harrison was able to negotiate his masculinity and carve a niche for himself in San Diego. As Harrison worked, married, and aged, he was forced to deal with both the emasculation of the subaltern "other" and a stereotypical hypermasculinity associated with the working class and his pioneer past. Harrison delicately navigated these contradictory constructions, crafting different identities for distinct audiences. The skill at which he negotiated volatile identity politics of the Old West was key to his becoming one of the most popular regional tourist attractions of the early 20th century.

#### 352 9:25 AM

## The Keystone of Leadership Jennifer Alvarado (Master's)

If recent history has taught us anything, it is that one essential quality must be present for a leader to be effective. A great leader must demonstrate the wisdom of humility. A successful leader is one who guides their constituents through prosperity with restraint and crisis with compassion. A humble leader is a compassionate leader—their policies measured by a servant's heart. The leader who acknowledges the weaknesses and inequities of their community is more apt to soothe them. This presentation will explore humility in leadership against the backdrop of the rising global Covid-19 pandemic. It will examine Asian philosophical principles that have led to current effective health policy, comparing compassionate and non-compassionate strategies for dealing with the virus worldwide.

#### 353 9:35 AM

The Cognitive Collaborators of Tender Claws' PRY **Bree Hawkins (Master's)** 

In the time of algorithmically generated news articles and AI poetry bots, authorship and cognition are no longer solely reserved for the human. Works of electronic literature, such as Tender Claw's ios app-based, multimedia novella, PRY, confront and narrate this reality

by reimagining cognition of the contemporary moment. Electronic literature, the new genre of literature that is made on the computer to be read on the computer, uses its new media body to meditate on the modern mind, and PRY, in particular, does so by optimizing the affordances of a smartphone's interactive and visual technologies to digitally represent stream-of-consciousness, memory, and trauma. By renovating these concepts through computational technologies, PRY demonstrates how modern human cognition is integrated with and penetrated by digital technologies. Ultimately, PRY reveals humans and machines as inseparable cognitive collaborators in the once purely human act of telling of stories. Like the text it discusses, this project is a digitally born essay hosted on USC's scalar, an open-source platform that caters to nonlinear, multimedia arguments. The digital body of the argument nods to the coauthor- the computer- without which this piece and the text it discusses would not exist. Additionally, the project's hypertextual format, defined by its networked structure of hyperlinked blocks of text, invites readers to realize the omnipresent, digital collaborator of their reading journey.

#### 354 9:45 AM

#### A Need For "Skirted Soldiers": The Campaign to Recruit American Women into the Military During World War II Hannah Friesen (Master's)

This research project explores the vigorous recruitment process by which the United States government sought to entice women into joining the military during World War II, particularly from 1942 to 1945. The gendered experiences of women who were targeted for recruitment into the Women's Army Corps (WAC) and the Navy's Women's Reserve-the Women Accepted for Voluntary Emergency Services (WAVES)-illustrates the complex relationship between militarized women and the U.S. government during the 1940s. Prominent historians of gender and military studies, including Garth S. Jowett and Victoria O'Donnell, Leisa D. Meyer, and Maureen Honey, have analyzed wartime issues like propaganda, power and sexuality, and widespread mobilization. Their arguments are critical in understanding the gendered aspects of the female military recruitment process, however, there are still some gaps in the scholarship which this research strives to fill. Namely, there are relatively few pieces of scholarship which integrate studies of military, gender, and visual rhetoric. Using a combination of popular recruitment posters, pamphlets, and films, as well as individual servicewomen's personal correspondence, this project brings together wartime matters concerning the struggle between female militarization and contemporary conceptions of gender. With gender theory as a guiding perspective, this research argues that gender roles and expectations actively defined both the tools of propaganda, women's military service, and its associated opportunities, as well as the ways in which servicewomen themselves internalized and presented their experiences. Additionally, it analyzes the creation and stylization of propagandistic wartime messages which attempted to garner interest in women's enlistment, while evaluating the extent to which these messages permeated individual servicewomen's psyches and military identities. In doing so, this research adds to the momentum of the increasingly intertwined scholarship concerning military and gender studies and offers an additional way to examine the militarized lives of female soldiers in World War II America.

### **Session J3**

Oral Humanities, History, Literature and Philosophy Saturday, March 20, 2021, 10:00 AM

#### 355 10:05 AM

Boxers and Converts: The Place of Chinese Christian Converts in the Boxer Uprising, 1898-1901 Janie Collins (Master's)

121 years ago a group of radical Chinese malcontents assaulted the foreign quarter of Beijing in order to, in their words, "support the Qing and destroy the foreign." Less succinctly, what this group was hoping to accomplish in the summer of 1900 was the upholding of the reigning Qing dynasty and the wiping out of the influence of foreigners from their country for good. This was the Boxer Uprising, and there is much about this event that is still hotly debated and not yet fully understood by historians today. Janie Collins aims to clear up some of the confusion surrounding the events of 1900 by looking at it from the perspective of the most overlooked population involved: Chinese converts to Christianity. Although the Boxers claimed their goal was to rid China of foreigners, between the fall of 1898 and the end of the Boxer attacks on Beijing in August 1900, just over 200 foreigners (including missionaries, soldiers, and diplomats) lost their lives to the Boxers. In contrast, across that same time span, over 15,000 Chinese Christians were killed. This begs two questions: why did anti-foreign Boxers kill so many of their own countrymen? And why is this event not remembered as a case of internal Chinese conflict and violence? Collins argues that the reason Boxers targeted native Christians more so than foreigners has everything to do with Chinese beliefs about the balance of nature, religion, and the state. Her work discusses the complexities of the

#### 356 10:15 AM

### Hidden History: The Lost Murals of San Diego State University Shannon Farnsworth (Master's)

The art of murals, of painting a piece of art directly onto a wall, has a long history dating as far back to the cave paintings at Lascaux Grottos. Murals are meant to be public, permanent, and surpass individual ownership. They are the people's art, freezing a moment of time and the sentiments with it. From the 1930s through the '70s, San Diego State University students used murals to express their attitudes towards social, cultural, and political issues at a time during several significant events and historic affairs. Using different styles of art and imagery, these pieces reflect campus and community life during the Great Depression, the Works Progress Administration, World War II, and the Chicano movement. Although these pieces of art were meant to be permanent, many were lost, damaged, destroyed, or covered up. When they were erased from the walls, whether on purpose or on accident, the rich collective memory of those that created them was also lost. Owing to the efforts of the Lost Murals of San Diego State Project, many of these historic student murals can still be seen today, creating a visual and physical timeline of Montezuma Mesa's history.

#### 357 10:25 AM

## You Are What You Eat: Early 20th Century Diet in the United States Cassandra Onstad (Master's)

Deciding what to make for dinner or what to buy at the grocery store has its complexities in even today's society, however at the turn of the century these choices signified a person's race, class, and access to social mobility. More so, the turn of the century brought a new understanding of food components and diet health. The purpose of this work is to display that at the turn of the 20th century, not only emerging research-based science, but euthenics, nutrition leaders, and folk wisdom guided beliefs that the food consumed correlated to a person's virtue, superiority, and race. This research analyzes cookbooks, advertisements, government documents, and many other sources to analyze the way in which food played a role in society. As a result, the sources display that while folk wisdom and societal values had guided food selection in the 19th century, the turn of 20th century ushered in discoveries in nutritional health that reframed the selection of certain foods, mainly milk, white flour/bread, beef, and shortening. A family who could afford beef was upwardly mobile, a family who could afford white bread was healthier, a family that could consume milk regularly was stronger, and a family that chose not to use lard was nutrition conscious. This research displays the ways in which social and cultural ideas and perspectives also became part of the way people selected their food

#### 358 10:35 AM

## The Problem of Motivated Reasoning and Knowledge Isaac Castillo (Master's)

The discipline of philosophy acknowledges a variety of problems such as induction, consciousness, and other minds. However, epistemologists have not noticed that there is another problem that is lurking in the background of human cognition - the problem of motivated reasoning. Motivated reasoning reveals that human reasoning is not as objective as many philosophers would like to believe especially in relation to how humans come to know something. The problem of motivated reasoning reveals several important facts about our cognition. Individual cognizers are able to fashion an illusionary sense of objectivity that flourishes without the use of sound logical reasoning. Motivated reasoning becomes a serious threat to critical thought and a shared understanding of objectivity. As cognizers we cannot believe and know objectively if we are accepting preferable truth(s). I argue that my analysis of motivated reasoning will demonstrate how a psychological phenomenon creates a headache for particular theories of knowledge. Thus, by understanding motivated reasoning, philosophers will come to learn how to do all they can to evade or minimize it. As a result of this problem, theories of knowledge will have to seriously consider updating principles and standards that are used to explain how someone has justified true belief.

#### 359 10:45 AM

## Chinese Mythology and Contemporary Pride in Mexicali Carlos Fitch (Undergraduate)

Since the early 2010s, there has been a current revival of the Chinese pride presented through the remodeling and recreation of the Chinatown in Mexicali's downtown. The Chinese in Mexicali that arrived in the early 20th century were employed in the regional agricultural companies, such as the Colorado River Land Company. They became subject of discrimination which, generated an anti-Chinese sentiment and mythology in Mexicali, leading to the isolation of the Chinese community in an underground and "mystic" city known as La Chinesca of Mexicali. As of the contemporary times, its presence in the regions has been followed by an impactful revival of multiculturalism, identity and pride toward the Chinese community in Mexicali.

### **Session K3**

Oral Humanities, History, Literature and Philosophy Saturday, March 20, 2021, 11:00 AM

#### 360 11:05 AM

Reading and Writing in Early Modern Spain and Their Potential Connections to the Ways We Read and Write in the 21th Century Virginia Gallardo Reyes (Undergraduate)

For the 2020-2021 Research Fellow Initiative, I will carry out a research project based on one of Miguel de Cervantes's short novels: "El coloquio de los perros" ("The Dogs' Colloquium") (Madrid 1613). The focus of this project will be the examination of practices of reading and writing in early modern Spain, as well as their potential connections to the ways we read and write in the 21th century. This project is both a derivation and an expansion of the faculty research project on Cervantes's Don Quixote.

#### 361 11:15 AM

#### Black & Yellow: The Promise and Peril of Afro-Asian Solidarity

#### Kayla Daniels (Undergraduate)

This research examines the distinct relationship between Asia and the African Diaspora in the early Cold War period. Beyond just a rhetorical alliance, Asian countries such as China and North Korea joined with newly decolonizing African leaders in nations such as Ghana, Mali, Guinea, and Algeria as well as African American dissidents to stem the tide of Western colonial influence and to push for self-determination. This would prove critical as the United States emerged on the world stage as the global superpower intent on luring the favor of the Third World through soft power and global diplomacy. By centering the role and importance of Asia in this period a more complex picture emerges that unsettles some of the typical depictions of midcentury Cold War politics from a Western perspective. Examining the way this pact helped create leadership, encourage rebellion, and form a radical imaginary, helps highlight the ways in which practical tactics of resistance and Marxist ideology served as liberating forces for these oppressed peoples. Heavily relying on primary documents from the Wilson Center Digital Archive collection allows me to see the varied nature of thought and action in this period. Further, by using the scholarship of Pierre Grosser as an interpretive frame this research seeks to expand the understanding of this period by shifting the discourse on Asian and African people from objects to subjects in their own freedom narratives. Textual, structural, and psychological methods of analysis strengthen the work as they demonstrate how these nations communicated, challenged structural dichotomies of empire and colony, and expose how the psychological dimensions of colonialism were embedded within Western economic theories. This research is critical because it challenges the notion that the West was the sole gatekeeper of human rights and explores how racism, empire, and power clouded a vision for a more inclusive and balanced world order.

#### 362 11:25 AM

#### Remember the Ladies (of Color) Sara Romero (Undergraduate)

During the 1960s and the 1970s, Americans responded to the emergence of oral contraceptives in various ways. Most historians have focused on the experiences of affluent white women and maintained that the primary context was the Feminist Movement of the

1970s. One perspective not commonly considered is working-class black women. These women challenged their local communities and organizations. They recreated the Feminist movement and the fight for reproductive rights to include their own perspective. To properly have a full understanding of the reaction to reproduction rights and its contraceptives, women of color, especially black working women must be considered. To find this perspective, I researched different local and national newspapers and magazines for articles written by women of color with their opinion regarding both the use of birth control, especially the pill, and the goals of the mainstream Feminist movement. I used a variety of local zines and town papers to national papers to see how far these women and their voices reached the American population. These articles ranged from editorials, reader-submitted pieces to articles covering marches and conferences. Upon analysis, women of color agreed that women should have the right to reproductive freedom. Many of them believed it would free them from the house and give them an opportunity to raise their children properly. While they believed that women should be afforded the right to their privacy and reproductive health, they did not agree with the mainstream movement regarding the issue of sterilization. Women of color faced forced sterilizations in the revival and evolution of social and cultural eugenics. This issue caused women of color and their communities to develop their own individual movement which focused on the issues these women faced. Women of color thought of birth control as a pathway to personal autonomy especially over their futures and their quality of life. Despite a fear of such clinics and their history of forced sterilizations, women looked to change the system that had worked against them. When seeing that the mainstream movement did little to acknowledge their struggles and fears, women of color and their communities made moves to represent and create their own space and voice. Their presence and activity made changes, not only for their own communities but for all women.

#### 363 11:35 AM

### Feminine Subjugation: Machismo Ideologies in Zadie Smith's White Teeth Jorge Parra (Undergraduate)

Dominance and control are pervasive obsessions in human interactions cross-culturally, including the subjugation of weaker bodies by more physically powerful ones. The phenomenon continues to be ubiquitous in the media, and children worldwide grow up forced to negotiate it, just as I did as a boy in Southern California. Relying on theories of gender-based prejudice and oppression put forward by scholars such as Judith Butler, this paper engages with the underlying foundation of social attitudes and systematic inequalities in relation to power and dominance, applying them to literature. Zadie Smith's acclaimed Black British novel White Teeth, published in 2000, allows for an exploration of the notion of female servitude, or subjugation, and even what I would call "gendered incarceration" in the contemporary world, when considered against the backdrop of the hierarchy of power established by patriarchal perspectives and power systems. Analyses of the notion of machismo that have been deployed by scholars of Latinx culture and literature can be usefully transplanted into the late-twentieth-century, British, metropolitan world that Smith comically depicts. Machismo reinforces male entitlement at the cost of female subjects, celebrating the disempowerment of women. Female characters in Smith's novel, such as Clara, Alsana, Irie, and Joyce conform to patriarchal standards, reacting to the machismo exhibited by male characters, such as Archie, Samad, Millat, and Marcus. However, Smith ultimately suggests an alternative paradigm with the minor character of Neena, or Niece-of-Shame, and with the birth with which the novel concludes, of a child whose patriarchal lineage can never be established.

#### 364 11:45 AM

## Tucker and Dale vs. Evil: Irony Beyond Blood Audreanna Abad (Undergraduate)

Utilizing rhetorical analysis, I examine the 2010 American horror-comedy film Tucker and Dale vs. Evil (TDE) and demonstrate that its dimensions of genre and the narrative form parallel dimensions of human and societal liminality. Given the debate in genre criticism whether to categorize a text based on form or based on structure, I analyze both. The meaning, or semantics, of a film consist of a set of common building blocks such as shots, locations, and sets; while the structure, or syntax, emphasizes the film's formal aspects. Through mise-en-scene analysis of each of the film's semantic elements, such as audiovisual effects, color palette, and character archetypes, I establish it within the slasher sub-genre of horror. I argue that while many slasher films draw on redneck/"hillbilly" stereotypes to semantically function as horror, the portrayal of redneck horror in TDE fulfills a more syntactic function due to the underlying historical implications of poor Southern whites in early media representations. The narrative of TDE is thus formed by the semantics of horror but structured within the syntax of comedy. Given the nature of film genres to perpetuate stereotypes that are conditioned by societal values, the film's portrayal of hillbillies as the protagonists subverts the negative "redneck" stereotype used in earlier horror films and syntactically functions to supplement key elements in the narrative, especially the culmination of Dale's hero journey. TDE's subversion of horror film stereotypes and redneck stereotypes create a hybrid genre that reflects dimensions of human and societal liminality, such as good vs. evil, doom vs. salvation, and the internal self vs. the external stereotype. I conclude that TDE depicts misconception to a hyperbolic extent, forcing the audience to contemplate these dualities and re-evaluate their own preconceived stereotypes and prejudices through laughter.

### Session L3

Oral Humanities, History, Literature, Philosophy and Interdisciplinary Saturday, March 20, 2021, 12:00 PM

#### 12:05 PM 365

The Perils of Hubris and How to Resist it with Compassion. Lessons Learned from Asian Philosophy Jennifer Johnson (Undergraduate)

This presentation will identify a toxic Western leader and his philosophy regarding leadership and comparing this style to different schools of philosophy coming from his Eastern counterpart, Asia. By doing, we can see how the cornerstone in Asian leadership can help prevent hubris from occurring again in a position of power. Analyzing his own words and actions, we will exam the cause and effect relationship hubris has and those impacted by it. Furthermore, we examine how this environment was created and those who contributed to it.

#### 366 12:15 PM

Intersectional Identity, Emotional Dysregulation, and Related Health Disparities Among Men Isaiah Jones (Undergraduate)

The purpose of this study is to investigate the psychosocial and behavioral correlates, emotion dysregulation and minority-related life experiences of racial, ethnic, and sexual minority men. Specifically, this study will compare young adult (ages 18-30) African America/ Black, Hispanic/Latino, Non-Hispanic White, gay, bisexual, and heterosexual men to better understand how intersectional minority identity is associated with emotion dysregulation. Using Qualtrics Panels, approximately 450 participants from across the U.S. will be recruited to participate anonymously in a cross-sectional online questionnaire. Participants will be asked to complete questions concerning sociodemographic status and identity, life experiences, anticipated and experienced discrimination, interpersonal and social relationships, self-image, mental health, physical health, and health behaviors. We plan to explore the main effects of minority identity, and interaction effects of intersectionality, on emotional dysregulation. Analysis will also consist of bivariate correlations and hierarchical multiple regression analysis. We anticipate positive main effects of minority status (racial, ethnic, and sexual), and interaction effects of intersectional identity, on emotional dysregulation traits when compared to heterosexual White men. While research has explored the association of minority identity with various related factors, stressors, health outcomes, and theories, fewer have expanded on intersectional identity status within the same literature. Similarly, despite the growing body of literature surrounding emotional dysregulation as a key correlate to many minority-related disparities, even less research has been dedicated to its relationship with intersectionality. This study attempts to fill this gap.

#### 367 12:25 PM

#### Coordination of Sensed State Body State and Foot Placement Related Muscle Activation **Remy Sprague (Undergraduate)**

The dominant strategy for maintaining frontal plane walking balance appears to be control of lateral foot placement based on sensed body state. However, the timing of this control strategy is unclear. This study's purpose was to establish timing of body state sensing in relation to foot placement related muscle activation. Six healthy adults walked on a treadmill for four minutes. Body segment positions were recorded to estimate center-of-mass position and velocity (PCOM, VCOM) and swing foot position and velocity (Pfoot, Vfoot). Surface electromyography (EMG) was recorded on the four frontal plane hip muscles: Gluteus Medius (GM), Tensor Fasciae Latae (TFL), Gracilis (Gr), and Adductor Longus (AL). Foot placement control timing was assessed by determining when body state best correlated with EMG by measuring and averaging the body states (PCOM, VCOM, Pfoot, Vfoot) and EMG signals (GM, TFL, Gr, AL) within each 2% increment of the gait cycle. Then, coefficient of determination (R2) values describing the multiple regression between the average body states (independent variables) and average GM EMG (dependent variable) were assessed across 200 strides using a multiple linear regression. R2 values were determined for each body state-EMG time window combination. This analysis was repeated for each muscle tested. The correlation between body states and GM EMG was largest (R2 highest) for body states at 64% [50,70] (peak[range]) and EMG at 70% [70,74] of the gait cycle. For TFL, the correlation was largest for body states at 64% [58,68] and EMG at 74% [68, 76] of the gait cycle. For AL, the correlation was largest for body states at 70% [40,70] and EMG at 70% [70] of the gait cycle. For Gr, the correlation was largest for body states at 72% [10,72] and EMG at 72% [72] of the gait cycle. Our results indicate the body states broadly occurring before double-support and into early swing are best associated with frontal plane hip muscle activation focused around 30% of swing. These findings provide insight into the timing of body state sensing for planning foot placement and the timing of foot placement related muscle activation.

#### 368 12:35 PM

### A Literature Review: Don't Ovary Act, There is a Research Gap on the Effect of E-Cigarettes in Young Girls Reproductive System! Tahmina Habibzada (Undergraduate)

Young girls, among the ages 6-18 rely on online websites to answer their intimate guestions about reproductive health and use e-cigarettes. 42% of girls rely on medical websites to answer their intimate guestions about reproductive health. According to a study from the CDC, 4.8% of middle school girls and 18.7% of high school girls were using electronic cigarettes in 2020. A better understanding of how e-cigarettes affect female reproductive development must be conducted since the number of females vaping or using electronic cigarettes has increased as of 2018. The literature review data was collected from November 2020 to January 2021. Initial search included journal articles with keywords focusing on "e-cigarette" and "female reproductive system." The articles were then further analyzed and deconstructed by using these six categories Females, young girls, girls ages 6-18, lead and cadmium, and hormones. Upon analyzing selected qualitative and quantitative research papers, data across each research was examined to determine the relationship between the female reproductive system and e-cigarettes. Through previously conducted studies on cigarettes, further investigation on lead (Pb) levels in the blood and cadmium (Cd) levels in the urine can predict how these two main components in cigarettes cause harm to young girls. The hormonal pathway in which blood lead is associated with puberty suggested a reduction in inhibin B (InB) concentration in girls with high Pb and high Cd levels. Inhibin B (InB) and luteinizing hormone (LH) concentrations are essential for the onset of puberty and rise through puberty stages. During puberty, the female body relies on the luteinizing hormone (LH) that controls the estrogen from the ovaries, which is later measured to evaluate women's ovulation. Estrogen hormone is responsible for regulating and developing the female reproductive system and the secondary sex characteristics. Further investigation on the effect of e-cigarettes among young girls can (1) promote health awareness as the female reproductive system is essential to the well-being of over 3 billion women and (2) will better equip health professionals with needed information on the long-term effect of e-cigarettes on young girls' reproductive health.

#### 369 12:45 PM

#### The Use of Preventive Health Services in Female Veterans

#### Madisen Ferras (Master's)

There are nearly 2 million US female veterans, with this number expected to increase by 18,000 women per year for the next decade. Female veterans have additional health burdens and complex care needs compared to male veterans, including pelvic floor disorders, cervical strains, and other women's health issues. The increasing number of female veterans has created the need for research about the rates of compliance for preventive women's health services since leaving active duty. The objectives of this presentation are to 1) examine female veterans' experiences seeking women's healthcare and 2) determine the most common barriers to obtaining womens' healthcare services. This cross-sectional study used convenience sampling to recruit participants to complete an electronic survey. Eligible participants were female veterans who were no longer on active duty. Participants were asked about their personal characteristics and military service history. Additionally, participants answered questions about their experiences seeking women's healthcare to determine how many met clinical recommendations for screening (i.e., pap smears, pelvic exams, mammograms), and reported common barriers to care (response options ranged from 0 'not a problem' to 5 'a very serious problem'). Statistical analysis included descriptive statistics (e.g., frequencies and means) computed using SPSS. The mean age of the 28 participants was 31.82 (SD=7.77). Clinical guidelines recommend adult women receive pap smears and pelvic exams every 3 years and that women over 40 receive mammograms annually. Nineteen (67.9%) participants reported receiving a pap smear and 21 (75%) of female veterans reported receiving a pelvic exam in the last 3 years, and 100% of participants over the age of 40 (n=3) received a mammogram since leaving active duty. In total, 17 participants (60.7%) met all the age-applicable recommendations. The most common barriers reported to obtaining women's healthcare services were Finding time to make and go to an appointment (mean=2.75), availability of convenient appointment times (mean=2.42), and choice of provider (mean=2.22), Results revealed most veterans met clinical guidelines for women's health. Results also showed the most common barriers related to scheduling logistics. Data collection is ongoing.

# Abstracts of Presentations

# **Poster Sessions 1**

1 2 3 4 5 6 7 8 9



### **Session P1-1**

Poster Behavioral and Social Sciences Friday, March 19, 2021, 9:00 AM

#### 400 9:00 AM

Faces and Places of Research Factors that Influence Participant Engagement in Research Among Latinx Communities Marisa Torres-Ruiz (Doctoral) Victoria Telles KenJonae Wallick Cristina Rios

Does representation (e.g., cultural concordance between interventionists and participants) play a role in the success or failure of an intervention for Latinx participants? How does the location of an intervention contribute to positive study results and ultimately effectiveness for Latinx communities? We hypothesize similar demographics between interventionists and participants (e.g., ethnicity, socioeconomic background, language) positively contribute to intervention engagement and maintenance. Likewise, research activities located at trusted sites within the community will increase the likelihood that Latinx families will attend study related activities. A systematic literature review was conducted in PubMed to identify evidence-based strategies to reduce obesity in Latinx children. A concept map was constructed with key search terms using iterations of "Family-based interventions," "obesity," "Latino," and "children." Literature was initially evaluated using PRISMA guidelines and a review of the title and abstract. The following inclusion criteria were applied: 1) Primary intervention focuses on obesity prevention and/or treatment with auxiliary foci targeting related health outcomes such as sedentary behaviors, etc. 2) Participant sample includes at least 50% Latinos. 3) Participants include children between the age of 5-12, of both sexes. 4) Intervention conducted in a family-based context 5) Intervention evaluates obesityrelated measures such as BMI; weight gain/loss; weight and height; and waist circumference. 6) All interventions include a control and comparator or usual care group. 7) Interventions published between January 2010 through January 2021 in a format viable for abstraction and quality evaluation. After meeting these criteria, results were further stratified by interventionist characteristics and location of research intervention. A total of N=67 articles were identified using the initial review criteria. When stratified by interventionist characteristics, preliminary results reveal N=16 studies (24%) reported characteristics of the interventionist. Of those, N=4 studies demonstrated interventionist/participant cultural concordance and significant positive results. By location, N=25 studies (37%) were conducted in community-based locations such as neighborhood clinics. Additional results forthcoming. The faces of interventionists and location of research may be the special ingredients to participant engagement, building trust in Latinx communities, and may contribute to improved outcomes. Concordance between research staff and participants and the effect on study outcomes warrants further investigation

#### 401 9:20 AM

Cultural Adaptations of Interventions to Improve Obesity-related Health Outcomes among Latino Youth: A Systematic Literature Review Victoria Telles (Doctoral) Marisa Torres-Ruiz Kenjonae Wallick Christina Rios

Latino children, especially those with lower socioeconomic status, experience higher rates of obesity when compared to children from other racial/ethnic groups. Barriers such as lack of affordable, healthy foods in proximal areas, unsafe neighborhoods, and lack of culturally-relevant activities in the community prevent Latino youth from maintaining a healthy weight. Family-based, culturally-tailored obesity prevention interventions have shown promising results for improving health-related behaviors among Latino youth. The aim of this systematic review was to evaluate what culturally-tailored intervention strategies are effective in improving obesity-related health outcomes among Latino youth. Using PRISMA guidelines, a systematic literature review of PubMed was conducted for randomized controlled trials (RCTs) of family-based interventions targeting obesity prevention and treatment interventions for Latino children. This search was limited to interventions that included 50% or more Latinos, children between the ages of 5 and 12, a control/comparator group, a family-based context, and evaluation of obesity-related measures. Interventions were excluded if they focused on surgery and pharmacology, eating disorders treatment, and children with any disease or health condition. Studies published from January 2010 to December 2020 were included in the review. Abstracts that described the cultural tailoring of interventions that prevent obesity were examined in the proposed study. After initial inclusion and exclusion criteria were applied, the PubMed search yielded 67

articles. After stratification for any cultural-tailoring components, 13 studies were included in the review. Preliminary results showed various approaches to culturally-tailoring of interventions such as cultural practices component (e.g., folkloric dance), inclusion of visual imagery of Latino families, cooking with cultural foods, use of social-ecological model for Latino health promotion, inclusion of Latino cultural values (e.g., familismo, confianza, respeto), and provision of intervention by research staff and promotores with Latino backgrounds. Findings from this review suggest that culturally-tailored interventions may be appropriate for improving target health behaviors (e.g., SSB consumption, sedentary behavior diabetes, physical activity) in Latino youth. Further analysis includes examination of intervention effect size to determine which cultural-tailoring strategies have shown strong versus low effect in impacting obesity-related behaviors among Latino children.

#### 402 9:40 AM

## Syndemic on São Vicente Island: Tracking the Dengue Fever and SARS-CoV-2 Co-Outbreaks Jessica Pereira (Master's)

In December 2019, a novel coronavirus, named SARS-CoV-19 (COVID-19), was discovered in Wuhan, Hubei Province, China. By early March 2020, COVID-19 had spread internationally and was declared a public health emergency by the World Health Organization (WHO). As of June 2020, no vaccine or specific treatments were available for widespread disease control causing the COVID-19 pandemic to continue to be a threat to public health globally. Brazil has seen one of the worst outbreaks, with cases and fatalities increasing as the southern hemisphere moves into its winter months. In the state of São Paulo, one of the most deeply affected states in Brazil, there is the island of Sao Vicente, home to the cities of Sao Vicente and Santos. The location of the busiest, international port in Brazil, the island of Sao Vicente not only has seen infection rates significantly above the state and national averages, but has distinct social disparities, dividing the two cities, that affect government action, access to health care and testing, and the ability of residents to abide by strict WHO recommendations for transmission control. This thesis followed the COVID-19 outbreak on the island of Sao Vicente, as Brazil also was experiencing one of the worst Dengue Fever outbreaks in recent history. Labeled a "syndemic", the two concurrent outbreaks, with similar symptomatic presentation, create added challenges to controlling dueling public health emergencies on a semi-isolated island of only 57.4 km2. Using quantitative data published by local health departments along with qualitative data in the form of news articles, media coverage, and social media postings, this research identifies geographic and socio-economic disparities within, and between, these two cities that have become more prominent and impactful on residents and their health.

#### 403 10:00 AM

Web-based Eye-Tracking for Bilingual Psycholinguistics Research: A Pilot Study of the Cognate Effect Moriah Harden (Master's) Jonathan J.D. Robinson Anthony

Faculty Advisors: Dr. Henrike K. Blumenfeld, Dr. Giang Pham When looking at images and hearing words, participants' eye gazes or fixations to visual stimuli have been linked to lexical activation of target words. Data retrieved from online platforms rely on consumer webcams and are largely untested. This study aims to investigate the functionality of online platforms, such as Labvanced, to produce data of language activation, indexed by the proportions of eye gazes or potential fixations to target images. Cognate words (e.g., elephant-elefante) have cross-linguistic form overlap that can facilitate processing. We exploit a robust phenomenon in bilinguals, the cognate effect (i.e., more proportion of looks to cognate than noncognate words), to hypothesize that the data obtained within the constraints of a web-based program will mirror those of similar studies that employ a dedicated eye-tracking system. To collect eye-tracking data in a cross-linguistic study, we used the online experiment creator, Labvanced. A visual world paradigm was employed to assess lexical activation of English and Spanish words within a bilingual participant. Stimuli included cognate and noncognate target and competitor images. Each trial consisted of a 3000ms calibration screen, followed by the presentation of the picture stimuli. After a 500ms presentation of the visual stimuli, an audio target played, prompting a key-press to match the audio to the location of the target image on the display. In addition to examining the proportion of gazes to targets, a speed threshold algorithm, calculated as the average speed over distance of eve movements, was used to analyze the proportion of fixations on target images. Preliminary results showed that gaze patterns were captured every 90-100ms, yielding between 9 to 11 data points for every trial. Heat maps in target quadrants broadly captured more repeated gazes and potential fixations to cognate than noncognates targets, indicating language activation in an expected pattern based on previous research on cognate word processing in bilinguals. The pilot data here support the hypothesis, that despite the comparatively fewer data points, indication of lexical activation can be derived from web-based programs. Additional data will be collected to confirm this pattern.

### Session P1-2

Poster Behavioral and Social Sciences Friday, March 19, 2021, 10:20 AM

#### 404 10:20 AM

Association Between Participation in Therapy and Retention in a Medication-Assisted Treatment Program for People Experiencing Homelessness with Opioid Use Disorder

#### Amanda Berry (Master's)

The opioid epidemic is a public health crisis that disproportionately affects our unsheltered neighbors. Because medication-assisted treatment (MAT) is effective for preventing deaths from drug overdose and retention is associated with better health outcomes, there is a clear need for more research on factors impacting retention in care. The purpose of this study is to examine the relationship between attendance in therapy and retention in medication-assisted treatment (active prescription for buprenorphine) at 3 months for individuals experiencing homelessness. This retrospective cohort analysis examines the relationship between attendance in counseling and retention in medication-assisted treatment (active prescription for buprenorphine) for 3 months for individuals experiencing homelessness, or who are at risk of becoming homeless, being treated at a Federally Qualified Health Center (FQHC) and Health Care for the Homeless (330h) Program grantee in San Diego, CA County. The Behavioral Model for Vulnerable Populations is the theoretical framework used for this study (Gelberg, Andersen, & Leake, 2000). The cohort included 360 adults experiencing homelessness who had one prescription for buprenorphine. The final sample for analysis was filtered to only include those with more than one prescription, resulting in a sample of 212 patients, participated in a medication-assisted treatment program between 2017 and 2019. Descriptive univariate, bivariate, and multivariable modeling was conducted in SPSS. A binomial logistic regression for the association between participation in therapy and retention at three months was used to test the hypothesis that therapy appointments are positively associated with higher retention rates for individuals on buprenorphine for opioid use disorder. Covariates included sociodemographics, polysubstance use, comorbid diagnosis categories and healthcare utilization. The sample of 212 patients had a diagnosis of opioid use disorder and a prescription for buprenorphine. The sample was 65.1% men, almost exclusively white, and 32% unsheltered. Of the sample, 97 patients were retained at 3 months and 155 were not. Preliminary results from the logistic regression model showed that therapy appointments were positively associated with retention at three months (OR=1.560, p<0.001). Findings from this study inform future MAT program retention and advance knowledge in the field.

#### 405 10:40 AM

### All About the Base: Characterizing the Upper Limits of Human Hearing across Age Cailyn Kern (Undergraduate) Sky McIntyre

Distortion product otoacoustic emissions (DPOAEs) are an indicator of inner ear health. When extended-high frequency (EHF; >10 kHz) stimuli are used, DPOAEs can reflect inner ear damage at the highest frequencies of human hearing. This damage may be undetected using conventional frequencies, as damage initially occurs at the base of the inner ear which responds to EHFs. The purpose of this study is to characterize EHF DPOAEs across age, stimulus level, sex, and ear. The population included 221 females and 131 males ranging in age from 10 to 65 years with normal hearing thresholds (<20 dB HL through 4 kHz) who were retrospectively evaluated using data from the Hearing Assessment Reformulation Project (HARP) collected at Northwestern University. Five age categories were defined: 10-21, 22-35, 36-45, 46-55, and 56-65 years. DPOAEs were elicited at f2 frequencies of 10 through 16 kHz with a stimulus ratio (f2/f1) of 1.22 and low, mid, and high stimulus level (L1/L2) combinations (55/40, 65/50, 75/75 dB SPL, respectively). Measurements were made monaurally utilizing a depth-compensated in-ear calibration procedure. Collapsed across frequency, mean DPOAE levels decreased with increasing age and decreasing stimulus levels. When frequencies are examined independently, DPOAE levels vary for each age group and stimulus level combination. Low-level stimuli resulted in the fewest measurable DPOAEs, especially in the older age groups, while high-level stimuli yielded the greatest numbers of measurable DPOAEs for all age groups. Despite the fact that males had greater mean levels from 10-12.5 kHz whereas females had greater mean

levels from 12.5-16 kHz, overall DPOAE levels for males and females appeared similar. Mean DPOAE levels also were comparable between ears. DPOAE levels remain relatively constant through 12 kHz for younger age groups then decrease with increasing frequency, while older age groups show a constant gradual decline in DPOAE level with increasing frequency. Age and stimulus level have a significant influence on the range of measurable DPOAE levels across extended-high frequencies, whereas the influence of sex and ear do not appear significant.

#### 406 11:00 AM

The Relationship Between Measures of Proficiency and Grammaticality: Evidence from Preschool-aged Spanish-English Bilingual Children Emily Perlman (Undergraduate) Alicia Escobedo

Grammaticality has been suggested as a strong indicator of typically developing (TD) bilingual children's language performance (Bedore et al., 2010). In addition, bilingual children's proficiency in each language determines children's language skill, including their performance on grammaticality measures (Bedore et al., 2010). However, a variety of tools and techniques exist to measure proficiency in bilingual children, including language sample measures, scores on standardized assessments, and teacher and parent ratings of language use. To date, there is no research that examines the relationship between different measures of proficiency and grammaticality. Thus, the current study aims to examine how different measures of proficiency affect the relationship between proficiency and grammaticality. Language samples were collected from 19 TD Spanish-English bilingual children at the beginning and end of their preschool year (mean age = 4;3, SD = 4 months). Parents of participants also completed questionnaires on their child's language experiences. Per parent report, average Spanish exposure was 49.6% (SD = 32.2%) and average Spanish output was 55.5% (SD = 36.3%). Average English exposure was 51.6% (SD= 30.3%), and average English output was 45.8%; SD= 35%). Measures of proficiency analyzed were mean length of utterances in words (MLUw), number of different words (NDW), scores on standardized language assessments, teacher ratings of language use, and parent ratings of language use. Preliminary results indicate that different measures of proficiency result in different correlations between proficiency and grammaticality. In particular, language sample measures and teacher ratings of language use yielded strong, positive relationships between proficiency and grammaticality in English. However, these strong correlations were not observed between Spanish proficiency and grammaticality. In addition, parent ratings of language use yielded weak correlations between proficiency and grammaticality in both English and Spanish. Our results suggest that different measures of proficiency result in different relationships between proficiency and grammaticality. Consideration of the differences in proficiency measures is necessary in order to best characterize bilingual children's language performance and ultimately improve language assessment practices.

#### 407 11:20 AM

Stroop Effect Highlights Deficits in Cognitive Control in Binge Drinkers Jenny O'Connor (Undergraduate) Austin Myers Denali Woodruff Rebecca Carvalho Marinkovic Marinkovic

Binge drinking is a common but potentially harmful practice among young adults. Repeated cycles of high alcohol intake can lead to compulsive drinking and the development of alcohol use disorder (AUD). Neuroimaging and behavioral evidence suggests that high intensity drinking is associated with deficits in executive functioning which has been well established in AUD. Cognitive control is a hallmark of executive functioning and refers to the ability to inhibit an automatic response to optimize goal-directed behavior. However, few studies have examined gender differences associated with cognitive control as a function of binge drinking. The current study aimed to examine if cognitive control deficits associated with binge drinking are modified by gender in a sample of young, healthy adults (mean age [± SD]=22.46±3.15 years). Forty participants were categorized as binge drinkers (BD; women=21) as they reported 5+ binge episodes, defined as 5+/6+ (women/men) drinks in a two hour window, in the past six months. Forty-one demographical-ly-matched participants were categorized as light drinkers (LD; women=26), who reported having 2 or less episodes in the past six months. Cognitive control was probed using a modified Stroop task, in which participants were presented with low conflict (congruent; CONG; e.g. RED written in red) and high (incongruent; INCONG; e.g. RED written in blue) interference conditions. The Stroop paradigm

successfully elicited response conflict, indicated by lower accuracy and longer reaction times on the high conflict INCONG condition, relative to the low conflict CONG. Overall, BDs showed significantly stronger Stroop effect on accuracy (p=.04) reflected in higher accuracy interference (CONG - INCONG) than LDs. However, there were no differences in reaction times between BD and LD. Men overall tended to have slower Stroop interference response times (INCONG - CONG) than women (p=.076), suggesting gender differences in cognitive control. These results support previous findings that binge drinking is associated with cognitive control deficits. Their importance derives from previous evidence that impaired cognitive control is linked to the inability to refrain from drinking, which can lead to long-term harmful effects.

#### 408 11:40 AM

Neural Measures of Attentional Selection and Suppression in Anxiety Marisa Krauter (Undergraduate) Wendy Zhang Aniha Vijay Kumar Megan Spence

The Attentional-Control Theory of anxiety states that anxious individuals tend to be impaired in their ability to inhibit attentional allocation toward task-irrelevant distractors. However, there are multiple mechanisms of attention, and the specific attentional processes that are affected in individuals with anxiety remains unclear. The present study addressed this by using well-established event-related potential (ERP) measures of two distinct attentional processes: attentional selection (the N2pc) and suppression (the PD). Forty neurotypical young adults with varying levels of trait anxiety were asked to complete a visual-search task during which continuous EEG was recorded. Preliminary results will be presented. The results of this study can lead to an improved understanding of the neuronal processes of attention affected in anxiety

### **Session P1-3**

Poster Behavioral and Social Sciences Friday, March 19, 2021, 12:40 PM

#### 409 12:40 PM

#### Race/Ethnic Differences in the Use of E-Cigarettes During Quit Attempts

#### Giovanna Raggio (Undergraduate)

Cigarette smoking is the leading cause of cancer, and guitting smoking can significantly reduce cancer risk. There are significant racial/ethnic disparities in cigarette smoking cessation, with some groups experiencing lower rates of successful quitting compared to non-Hispanic Whites. Recently, electronic cigarettes rose in popularity in the U.S. and were advertised as cigarette smoking cessation aids. In this study, we examined associations between e-cigarette use and various cigarette-quitting behaviors across race/ ethnic groups using cross-sectional, nationally representative data from the 2014/15 and 2018/19 Tobacco Use Supplements to the Current Population Surveys. The race/ethnic groups observed were American Indian/Alaskan Native, Asian-American, Hispanic/ Latino, non-Hispanic Black, and non-Hispanic White smokers. Our results have determined that non-Hispanic White cigarette smokers reported the lowest proportion of making a quit attempt of at least 1 day (42.7%±0.7). The remaining race/ethnic groups reported larger proportions of making guit attempts, having a minimum of 46.0%. Among cigarette smokers who made a guit attempt in the last year. larger proportions of non-Hispanic White smokers reported using an e-cigarette (27.0%±1.0) compared to non-Hispanic Black, American Indian/Alaskan Native, and Asian-American smokers (14.4%±2.0, 15.9%±6.0, 21.0%±4.2, respectively). Among those who made a quit attempt in the past year, non-Hispanic White cigarette smokers were the least likely to have used e-cigarettes, nicotine replacement therapy, or prescription medications (49.1%±1.0) compared to non-Hispanic Black (66.0%±2.4), Hispanic/Latino (61.3%±3.0), Asian American (61.0%±5.6), and American Indian/Alaska Native cigarette smokers (57.7%±6.7). Across race/ethnic groups, cigarette guit ratios were lower among those who reported ever using e-cigarettes; in particular, non-Hispanic Black e-cigarette users had the lowest quit ratio (25.8%±4.7) and was significantly lower than non-Hispanic Whites (32.5%±1.2). Overall, non-Hispanic White cigarette smokers reported lower rates of making a guit attempt lasting at least one day, yet had the highest rate of e-cigarette use during a guit attempt in the past year. Non-Hispanic Black cigarette smokers had the lowest reported rate of e-cigarette use during their last quit attempt. Across race/ethnic groups, it appears that having used e-cigarettes is associated with lower rates of quitting cigarettes. Cigarette smoking cessation programs may benefit by considering prior e-cigarette use, although effects may vary among race/ethnic groups.

### 410 1:00 PM

## Adverse Childhood Experiences, Locus of Control, & Social Media Use Hana Khakpour (Undergraduate)

Adverse childhood experiences (ACEs) have been recognized across several studies to have associations with negative physical and psychological health outcomes. Perceived control over outcomes in life, or internal locus of control (LOC) has typically been related to good health and well-being, while dependency on chance and/or others, or external LOC have been related to stress and poor physical and psychological health across various studies (Renes et al., 2019). Additionally, the connection between childhood maltreatment and social media use (SMU) has been previously examined, as well as LOC's interaction with internet addiction. However, the connection between LOC, ACEs, and SMU specifically have yet to be explored thus the purpose of this study is to examine the relationships between the three. We hypothesize that there is a positive relationship between ACEs and LOC. Specifically, the more ACEs one endorses, the higher the scores on LOC (indicating external LOC). Additionally, we hypothesize that those who endorse more ACEs and high scores on LOC will endorse a greater amount of SMU compared to those who endorse less ACEs and lower LOC (indicating internal LOC). Preliminary analyses from 94 participants using an independent samples t-test show those who report having a more external LOC significantly endorsed more time spent on social media than those with an internal LOC. Additionally, preliminary results of a One-Way ANOVA indicate that the number of ACEs one has experienced is not a significant predictor of self-reported daily social media use in hours, nor is there a statistically significant main effect between the number of ACEs one has experienced and endorsed LOC. The current study's results could indicate that individuals who believe they have less control over life's circumstances may be spending more time on social media, possibly due to seeking more validation that comes externally, or from other people, rather than from within, compared to those who believe they have more control over life's circumstances.

#### 411 1:20 PM

#### Encoding Meaning Using Only Linguistic Information Amber Henmi (Undergraduate)

Vocabulary is one of the few areas of language that continues to develop through life. Successful word learning includes three stages: triggering, configuration, and engagement (Leach & Samuel, 2007; Storkel, 2011). Each stage is fundamental and only partial learning can occur if all stages are not complete. For a full understanding of the word learning process, it is critical to assess each stage. This project focuses on the configuration and engagement stages of word learning. It builds on previous research by shifting focus from recalling a recently-learned word's form to recalling the meaning of the word. Thirty adult monolingual, college-age adult participants completed two tasks. During the Learning task, participants read three sets of sentences that all ended with the same novel word. In one condition (Meaning), the sentence sets established meaning for the novel word. The control condition (No Meaning) repeated the novel word but with no meaning attached. Learning was assessed by asking participants to identify the meaning of the novel word. For the Identification task, participants viewed pictures of four objects paired with a novel word that they saw during the Learning task. They were asked to identify which image best matched the novel word, if possible. This study was conducted using the online platform, Amazon Mechanical Turk. We hypothesize that, compared to previous work focusing on word form recall, we will find a lower percent correct for our Identification task as this study examines novel word meaning recall, not just word form recall. This hypothesis is grounded in the working memory literature. Working memory can be divided to three subcategories: phonological loop, visuospatial sketchpad, and episodic buffer (Baddeley, 2002). The phonological loop occurs when recalling specific items like numbers or words (Gathercole, 2006). In our previous studies, participants were asked to identify whether they heard a word form before, which only requires the phonological loop. By asking participants to recall the meaning of the word in addition to word form, it requires them to use the full working memory system, which is a more difficult task.

#### 412 1:40 PM

Links Between Socioeconomic Factors and Early Developmental Skills in Young Children with Autism Spectrum Disorder Elisa Mendez-Pintado (Undergraduate) Lindsay Olson Stephanie Peña Bosi Chen Anika Linke

Background and Hypothesis: Broadly defined, factors associated with Socioeconomic Status (SES) represent the degree to which people have access to material and social resources. While SES impact on child development is well documented, less is known about SES and developmental outcomes in young children with autism spectrum disorders (ASD). The goal of this study was to examine the links between SES and early developmental skills in toddlers and preschoolers with ASD enrolled in the SDSU Toddler Project, a

longitudinal study of early brain markers of autism. We hypothesized that lower SES indices would be associated with lower scores on measurements of early learning and development. Methods: Mullen Scales of Early Learning (MSEL), a direct standardized assessment of children's developmental skills, and Vineland Behavior Scales, a parent-report measure of child's development, were administered to 75 children diagnosed with ASD and 49 typically developing children, between the ages of 15-64 months, and their caregivers. For this project, SES was determined with the income-to-needs ratio (INR) index derived by dividing the household income by the federal poverty threshold defined based on family size. An INR of one indicates living at the federal poverty line, which according to the 2019 US government definition is \$25,750 / year for a family of four. The MSEL Early Learning Composite and the Vineland Adaptive Behavior Composite scores were used as outcome variables. Linear regression models were used to test for associations between SES, diagnosis of ASD, and children's developmental skills, when objective measures of development (MSEL) were used (p=0.000). There was no significant effect of SES on parent-reported developmental level (Vineland). Within the ASD group only, severity of autism symptoms was also an additional predictor of child's developmental skills, in addition to SES. Conclusions Family income accounted for variability in developmental skills in young children with ASD, over and above the influence of autism diagnosis and symptom severity. These results highlight the importance of developing targeted intervention strategies for children with ASD from low-resource households.

#### 413 2:00 PM

Adaptive, Internalizing, and Externalizing Behavior of Children with Prenatal Alcohol Exposure: A Comparison of Three Parent-Report Questionnaires

#### Chloe Sobolewski (Undergraduate)

Purpose: This study aimed to compare the Behavior Assessment System for Children-Third Edition (BASC-3) Parent Rating Scale to two parent-report measures: the Child Behavior Checklist (CBCL) Parent Report Form and the Vineland Adaptive Behavior Scales-Third Edition (VABS-3) Parent/Caregiver Rating Form in children with prenatal alcohol exposure. Methods: Data for this study were collected as part of the Collaborative Initiative on Fetal Alcohol Spectrum Disorders (CIFASD). Subjects (aged 5-16) with and without histories of prenatal alcohol exposure were recruited from two CIFASD sites San Diego and Minneapolis. Parents and caregivers rated their child's observable behavior using three questionnaires: BASC-3, CBCL, and VABS-3. BASC-3 behavior scores were correlated (Pearson's r) with comparable scores from the CBCL (internalizing and externalizing behavior) and VABS-3 (adaptive behavior). BASC-3 sensitivity, specificity, and positive and negative predictive values were calculated. Results: Of the 256 subjects, 137 were male (53.4%), 184 were White (71.9%), and 66 were Hispanic/Latino (25.8%). The average age was 11.6y (SD = 3.03). Across groups, significant correlations were found for scores in adaptive (r = .86, p < .001), internalizing (r = .76, p < .001), and externalizing (r = .87, p < .001) behavior. Similar correlations were found within groups. BASC-3 sensitivity rates were 46.6%, 80.4%, and 77.9% for internalizing, externalizing, and adaptive behavior respectively. BASC-3 specificity rates were 81.5%, 80.4%, and 79.3% for internalizing, externalizing, and adaptive behavior respectively. BASC-3 positive predictive values were 81.7%, 87.9%, and 87.0% for internalizing, externalizing, and adaptive behavior respectively. BASC-3 negative predictive values were 46.3%, 69.8%, and 67.0% for internalizing, externalizing, and adaptive behavior respectively. Conclusion: Analyses determined that BASC-3 scores correlated with comparable CBCL and VABS-3 scores. These findings replicate previous reports of behavioral and adaptive difficulties in alcohol-exposed youth and provide support for using the BASC-3 in this population. Future studies should address whether the BASC-3 can be used in place of CBCL and VABS in clinical screening settings. Research supported by NIAAA grants U01 AA014834, U01 AA026102, U24 AA014815, U24 AA014811, T32AA013525, and NIH grant R25 GM058906.

### **Session P1-4**

Poster Behavioral and Social Sciences Friday, March 19, 2021, 2:20 PM

#### 414 2:20 PM

How do Vietnamese-Speaking Children Acquire English Grammar? Christopher Nguyen (Undergraduate) Elise Ramirez Quynh Dam

Individual variation is expected in second language development, which can depend on a multitude of factors, such as age and the influence of one language system on the other (Dam et al., 2020). One such variation is the acquisition and mastery of English grammatical skills. While second language acquisition has been studied extensively, there remains a lack of tools to capture the early stages of English grammatical development across diverse populations. This study explores English grammatical development in

Vietnamese-English bilinguals. Two measures of English grammatical morphemes are employed: the tense marker total (TMT) and tense/agreement productivity (TAP; Hadley & Short, 2005). TMT rewards the use of different surface forms in five grammatical verb categories: third-person singular (He kicks the ball.), past tense (He kicked the ball.), auxiliary DO (The boy did not jump.), copula BE (The boy is happy), and auxiliary BE (The boy is jumping). TAP rewards the use of sufficiently different productions of each tense/ agreement morphemes. These measures have been successfully used with monolingual English toddlers and preschoolers (Hadley & Short, 2005; Gladfelter & Leonard, 2013) and are starting to be used with bilinguals (Potapova et al. 2018). Our research question asks whether these measures can capture patterns of English grammatical development in Vietnamese-English bilingual children, and whether these patterns change with age. We analyzed language samples of 89 typically developing Vietnamese-English bilingual children, aged 3- 8 years. Language samples were collected using the Multilingual Assessment Instrument for Narratives (MAIN; Gagarina et al., 2012), where the children were given a picture sequence, heard a model version of a story, and were asked to retell the story. The samples were recorded, transcribed, and scored for TMT and TAP. Analysis is ongoing. We predict that both TMT and TAP scores will increase with age indicating that older children have a richer grammatical system than younger children. Based on the single study using these measures with bilinguals (Potapova et al., 2018), we expect that certain forms, such as third-person singular verb form and auxiliary DO, may be more frequently produced with age.

#### 415 2:40 PM

Neurofeedback as a Potential Candidate for Reducing Error Related Negativity Daniela Moreno-Duron (Undergraduate) Brooke Cullen Donatello Arienzo

Background: Anxiety disorders have a high lifetime prevalence (33%). There are effective treatments for anxiety including cognitive behavioral therapy or medication. However, these treatments can be costly, time-intensive, and inaccessible to many patients. Computerized treatments provide one avenue of addressing some of the limitations of current interventions. For example, neurofeedback is a computerized procedure where participants attempt to reduce their brain activity while performing a task implicated in the pathogenesis of anxiety. Anxious individuals show heightened sensitivity to mistakes. This oversensitivity to mistakes can be measured using a specific event related potential in the electroencephalograph called the Error-related Negativity (ERN). Thus, procedures that may reduce this sensitivity to mistakes may be useful in treating anxiety. In the current study we examined the feasibility of neurofeedback using a simple computer task that aimed to reduce the ERN amplitude as a viable treatment. Method: Twenty four participants (Mage= 20.26, age range 18-56) received neurofeedback on their ERN amplitude while completing a flanker task where they determined the direction of a center arrow flanked by two arrows on each side that either faced the same direction as the center arrow (congruent condition) or the opposite direction as the center arrow (incongruent condition). The incongruent condition in this task increases the possibility of making mistakes thus generating an ERN. Participants completed 360 trials of the Flanker task while receiving feedback on their ERN and were instructed to use various strategies (e.g., focusing on their breathing) in order to reduce their ERN. Results: The flanker task produced a robust ERN in all participants in the beginning of the task. However, comparing the ERN before and after training using a paired samples t-test revealed a significant reduction (t(23) = -2.08; p = 0.02) in the ERN from pre (M = -1.55, SD = 4.16) to post (M = 0.21, SD = 4.43) training. Thus, this study provides preliminary evidence for the feasibility of ERN neurofeedback training in non anxious individuals.

#### 416 3:00 PM

## The Effect of Speaker Accent on Statements' Credibility: A U.S.-Mexico Border Study Lawson Hardrick III (Undergraduate)

The act of solely listening to an individual's foreign accent can lead to biases that can be subject to negative perceptions and linguistic profiling (Munro, 2013). Acknowledgment regarding the likely sources of biases is critical for eliminating them and enhancing human communication and interactions. This experiment examines whether speaker accent affects listeners' judgments of their statements' credibility when speakers and listeners are of the same non-native English-speaking ethnolinguistic group, Mexican-Americans. Participants were randomly assigned to one of two conditions. They listened to pairs of recorded statements read in English in which two speakers with different accents (standard American vs. Mexican) present arguments (A vs. B). For each pair of statements, participants selected the more convincing argument. Findings revealed that based upon participants' perceptions, they rated the American-accented statements as more convincing. Finally, participants completed a survey on their demographic background information, attitudes toward accents, rating tendencies, beliefs/perceived cultural factors, and a readability/comprehensibility score test based on the statements provided. The goal of this thesis is to examine the effect of speakers' accents on participants' ratings of the credibility of the speakers' statements. More specifically, I will examine whether bilingual Mexican-American participants in Imperial County, a U.S.-Mexico border community, rate the credibility of a speaker's statements with a Mexican accent differently from a speaker with a standard American accent.

#### 417 3:20 PM

#### Customer Experience Management: The Role of Information Systems in Enhancing Marketing Performance Arsham Sanavi (Undergraduate) Marina Wright Jennifer Ly

Customer Experience Management (CEM) is the process of managing the creation and formation of customer experience with the intent to improve customer lifetime value. Customer experience is about how customers interact with their product or service, what they retrieve from their interactions and the overall context of the occurrence. This study is defining and analyzing CEM as an organizational competency in the service industry, specifically the hotel industry, where CEM is growing. This area of knowledge is becoming important in the hotel industry due to the value CEM has with combating marketing challenges that organizations often face, including but not limited to customer lifetime value, turnover rate, and customer loyalty. Marketing performance in the service industry is based on the ability of firms to offer positive experiences. The service industry is missing the full value of CEM due to the lack of context in previous research that accounts for complexity in the service industry. Specifically, in the hotel industry, the most important factor that leads to customer satisfaction depends on how hotels can design, deliver, and enhance personalized experiences. This research was conducted through a written questionnaire utilized by hotel executives to provide objective and qualitative responses that were general and applicable for analysis. The study was designed to understand intentional and methodical experiences that are designed for improved customer experience, not randomized situations. The findings emphasize customer interactions and engagement, instead of changing the service functions. The top criteria for customer engagement are grounded in priming co-creation opportunities. This allows for deeper customer connection, reducing negative experiences, and augmenting the impact on the related business areas. For these experiences to be effective, these criteria must be carried out strategically. The results are a comprehensive topology for CEM tested in the hotel industry, with six dimensions Sensorial, emotional, intellectual, behavioral, relational, and interaction experience management. Considering successful CEM is rather consumer-centric, analyzing the opinions and feelings of the consumer are important when formulating a successful CEM

#### 418 3:40 PM

#### Arterial Characteristics in Chronic Post-Stroke Aphasia Dylan Corliss (Undergraduate) Noelle Abbott

Each year, hundreds of thousands of individuals suffer from stroke, which, when occurring in the left hemisphere of the brain, often leads to language impairment, a.k.a. aphasia (Stroke Facts, 2020). Previous research in our lab suggests that traditional neuroimaging methods, which rely on obvious tissue damage, do not tell the whole story when attempting to determine brain-behavior relationships for language (Brumm et al., 2010; Hillis, 2007). In addition to structural damage, some brain tissue that looks 'normal' may actually have low blood flow (i.e., hypoperfused), rendering it unable to support language function and thus may account for the variability we see in individuals with post-stroke aphasia (IWA). These results have led us to explore the functional capacity of seemingly healthy brain tissue through the measurement of cerebral blood flow (CBF). The current project explores the mechanisms underlying CBF in IWA by observing the integrity of the blood delivery system. Specifically, we are interested in whether hypoperfusion in structurally intact regions of the language network results from the lesion that damaged specific brain regions (e.g., diaschisis) or if it is due to a general reduction of blood flow to the left hemisphere stemming from a narrowing of the main arteries that supply blood to the brain: the internal carotid arteries (ICAs) and vertebral arteries (VAs). We argue that arterial characteristics (i.e., volume) may play an important role in understanding the source of hypoperfused tissue. We collected high resolution structural scans (MRI) and Magnetic Resonance Angiography (MRA) data from 17 participants (11 Male, 6 Female) with stroke-related left hemisphere damage and resulting aphasia. Measurements show differences between the left and right ICAs and VAs, specifically lower left ICA volume relative to the right for 13/17 participants, and lower right VA volume relative to the left for 11/17 participants. We will present measurements across several artery segments for each participant comparing left vs right ICA and left vs. right VA. These measurements will be discussed in terms of their contribution to CBF patterns in aphasia.

### **Session P1-5**

Poster Behavioral and Social Sciences Friday, March 19, 2021, 4:00 PM

#### 419 4:00 PM

Brain Networks Supporting Language Production as Revealed by Verb Generation in Intracranial Electroencephalography Daria Dragicevic (Undergraduate) Anna Panganiban Austin Hahn Connor Sperling

In this project, we have analyzed existing behavioral and iEEG data recorded during a verb generation task in 7 patients with left temporal lobe epilepsy (TLE) at UCSD Medical Center. The iEEG data allows us to precisely identify when brain areas are involved in this task, as electrodes are placed directly inside the brain for pre-surgical monitoring. In particular, we were interested in investigating which brain areas would show activity sensitive to response uncertainty as a proxy into looking into word retrieval difficulty. Our stimuli were nouns associated with varying levels of response uncertainty as related to the number of possible verbs that could be associated with them. Our stimuli ranged from high uncertainty nouns (e.g., "ball" which can lead to verbs like "catch", "throw", "kick", etc.) to low uncertainty nouns (e.g., "kite" which is usually only associated with "fly"). We expected to see more electrophysiological activity in the anterior cingulate cortex, ventrolateral PFC, and insula as a function of increasing uncertainty, supporting a role of these areas in uncertainty resolution during word retrieval. These areas are often monitored, in addition to left temporal areas, during iEEG monitoring prior to surgical removal of the epileptogenic zone in patients with TLE. We used statistical methods to identify patterns of brain responses sensitive to uncertainty measures in word retrieval. The uncertainty measures we focused on were Entropy (i.e., related to the lack of order or predictability) and Name Agreement (i.e., related to the proportion of time a similar response is given to a stimulus), as in Bourguignon et al. (2018). As expected, we are observing longer naming latencies associated with higher levels of entropy and vise-versa with name agreement values. As far as the iEEG results, we are observing significant local field potential activity that is modulated by response uncertainty in the expected direction in several regions including the right supramarginal gyrus, right superior temporal, bilateral insula, and bilateral posterior middle frontal gyri. These results are providing a clearer understanding of which regions of the brain are involved in supporting response uncertainty resolution in word retrieval and when.

#### 420 4:20 PM

## Attachment Styles and the Motivation to Use Social Media to Decrease Loneliness **Phoebe Shorter (Undergraduate)**

Social media has changed how people communicate and connect with one another. Additionally, an individual's personal characteristics influence the way they use social media. While there are studies that address the relationship between attachment styles and social media usage (Worsley et al., 2018) and others that examine how loneliness can impact how social media is utilized (Teppers et al., 2013), there are few studies that examine attachment, social media, and loneliness in a holistic manner. It is hypothesized that individuals who exhibit anxious attachment styles are more likely to use social networking sites (SNS) to decrease their feelings of loneliness when compared to other attachment styles. Data were collected using the Experiences in Close Relationships Scale - Revised (ECR), the UCLA Loneliness Scale (Version 3), and a questionnaire observing the motives for social media use. Participants (n = 162) completed the measures through Qualtrics. A One-Way ANOVA showed that there is a significant main effect of attachment style on the likelihood of using SNS to decrease loneliness, F(2, 159) = 13.22, p < .05. A Tukey post-hoc test revealed that the likelihood to use SNS to reduce loneliness was higher in participants with anxious-attachment tendencies (M = 12.60) compared to those with avoidant (M= 10.14, p = .001) and secure attachment styles (M = 9.69, p = .000). Additionally, another One-Way ANOVA revealed that there is a significant main effect for loneliness severity on the likelihood to be motivated to use SNS to reduce loneliness severity on the likelihood to be motivated to use SNS to reduce loneliness severity on the likelihood to be motivated to use SNS to reduce loneliness severity on the likelihood to be motivated to use SNS to reduce loneliness severity on the likelihood to be motivated to use SNS to reduce loneliness severity on the likelihood to be motivated to use SNS to reduce loneliness severity can affect the way social media is used today.

#### 421 4:40 PM

## The Effects of Religiosity on Resilience Scores in Young Adults Following Adverse Childhood Experiences Haley Freeth (Undergraduate)

As adolescents navigate the transition to early adulthood, their personal development and continuation of resilience becomes a crucial factor in growth. Many adolescents undergo adverse childhood experiences (ACEs) without being aware of their impact, leaving them less prepared to face life's stressors. While there are many studies exploring the processes and "buffers" that aid in the development of resilience (Bitsika et al., 2013; Marriott et al., 2013; Balgiu, 2017), there are few that explore a relationship with God as an agent. The current study was designed to measure resilience scores, and used adverse childhood experience (ACEs) scores and general religiosity as potential predictors. Participants (N = 111) consisted of a sample of undergraduate students enrolled in a large southwestern university. Participants completed a self-report questionnaire containing items from the Brief Resilience Scale (BRS), the Adverse Childhood Experiences Scale (ACEs), the Centrality of Religiosity Scale (CRS), and the Emotionally Based Religiosity Scale (EBRS). It is hypothesized that religiosity, particularly having a close relationship with a God, will predict higher levels of resilience in young adults who reported a history of significant ACES than those who report little to no religiosity, or close relationship with God. Preliminary analysis using a multiple regression showed no significant effects between BRS, ACEs, CRS, and EBRS scores, however, additional data is being collected. It is the hope that these findings will be able to better direct the need for future research on religiosity as it relates to resilience development.

#### 422 5:00 PM

Content Popularity and User Age on Social Media Credibility Perception Danielle Nezer (Undergraduate) Irwin Sandovall

Social media is emerging as a powerful news source for many Americans, with 67% reporting that they get at least some of their news on social media (Pew Research Center, 2017)- making the task of assessing source credibility online more pertinent than ever. Although previous studies exist addressing the perceived credibility of social media posts, few examine an age range that is generalizable to the public. The current study sought to address this gap by observing the possibility that age and content popularity could influence the perceived credibility of social media posts. The participants (N = 291) answered questions from Appelman & Sundar's Credibility Scale (Appelman, A., Sundar, S., 2015) after viewing either a "popular" or "unpopular" mock Instagram post and were split into one of three age categories (18-29, 30-49, 50+). The results indicated a main effect for content popularity, with participants scoring the unpopular posts as more credible than the popular posts. However, there was no main effect for age or an interaction between variables. This was an inverse effect from what was hypothesized, which may serve as proof that Instagram users are growing wary of hidden commercialism on the platform. Findings from the study may contribute to knowledge surrounding the heuristic approach that users take toward assessing credibility on social media.

### **Session P1-6**

Poster Behavioral and Social Sciences Saturday, March 20, 2021, 9:00 AM

#### 423 9:00 AM

Characterization of Semantic Impairment in Aphasia Maxine Kelley (Undergraduate) Noelle Abbott

Semantic deficits are common in individuals with post-stroke aphasia (a language impairment that arises after neural trauma) and consist of a large range of possible difficulties such as impairment in semantic organization, impaired activation of concepts via semantic features, or interference from semantic competitors that share features (e.g., animacy, gender, shape/size, etc.). As any number of these areas can be impaired in individuals with aphasia (IWA), it is important to characterize the way in which semantic processes are disrupted before determining treatment protocols. It is also critical in neurolinguistic research to understand intact or impaired semantic abilities as investigations of language processing employs methods that can rely on the semantic network. The current study was aimed at ensuring the images used in a semantic categorization assessment, The Sesame Street Assessment (TSSA; see Figure 1A), were easily identifiable and categorized for the intended task. There were two parts to this study, picture naming (Pretest-1) to ensure that each image represented a target object, and categorization (Pretest-2) using those same stimuli. For both

studies, participants included two control groups, unimpaired college-age controls (YNC, n=135, Mage=21.6) and older individuals matched in age to the IWA (AMC, n=21, Mage = 57.6). This allowed us to explore any effects of aging. The 64 items tested were black and white line drawings representing high frequency nouns. All data were collected through Google Forms. Figures 1B and 1C show examples for Pretest-1 and Pretest-2. Pretest-1. Naming responses (exact/semantic match) from 70 YNCs revealed a mean agreement of 98% across all items (SD=8%). Results from 21 AMCs show a similar pattern (99% agreement, SD=2%). One item that was difficult for YNCs, but not AMCs, was electric can opener, with overall agreement among YNCs=39%. Pretest-2. Results from a separate group of 65 YNCs confirmed that items were correctly designated within a category (mean=4.75,SD=0.3) and the unrelated items were not (mean=1.3,SD=0.3) t30=36.23,p<.0001. AMC data collection is currently in progress. Conclusion: These results provide confirmation that the stimuli used in TSSA can evaluate semantic processing as the stimuli represent the intended objects and were categorized as intended.

#### 424 9:20 AM

## Machine Leaning and Decoding Analysis: Word Processing using Event-Related Potentials **Emily Akers (Undergraduate)**

Masked priming has been a widely used technique to isolate early processes involved in visual word recognition, which is an important first step in reading. Combining this with event-related potentials (ERPs), known for having excellent temporal resolution, they can reveal the exact time course of the rapid low-level processes happening in the first 500ms of word processing. Normally, an ERP experiment has trials that are pseudorandomized in order for the participants to not catch onto the experiment. To test that participants were unable to detect the masked priming, a preliminary experiment was ran to test if there are differences between pseudorandomizing the entire experiment verse having groups of the same types of trials. In an earlier experiment (Akers et al., 2020) we tested the feasibility of blocked masked priming in an ERP experiment contrasting repetition priming (repeated vs. unrelated target words) in a blocked versus the typical random mixed design. In that study we reported a very similar patterns of ERP masked priming effects in both conditions. In the current study we reexamined the ERP data from the 20 original participants using decoding analysis. The output of the decoding analysis was then evaluated using a permutation procedure. This approach allowed us to directly test single trials of ERPs using a machine learning procedure that attempts to classify each trial into its appropriate type (e.g., repeated or unrelated). Each list (blocked and mixed) was ran separately to determine if there were any differences in the decoding analysis of each list. We looked at three main areas for significance in the decoding program, around 150ms, 250ms, and 400ms. Interestingly, both mixed and blocked trials did not find significant decoding for the N/P150 component, but the analysis did show sensitivity around the N250, and only the blocked showed significant results for the N400. This suggests that the data had similar patterns but, that the mixed data proved more difficult for the decoding software to accurately guess the trials. This may indicate a pattern that the software picked up for the blocked trials and could not find for the mixed.

#### 425 9:40 AM

## Supporting Intervention Research in Speech-Language Pathology: A Focus on Transcription Reliability **Savannah Verret (Undergraduate)**

In speech-language pathology, there is a need for reliable transcription of spoken language to support assessment and treatment of children with speech sound disorders (SSDs), a developmental difficulty with producing, perceiving and/or representing speech sounds. Transcription requires trained individuals to represent speech sounds using the International Phonetic Alphabet (IPA), a standardized set of symbols designed to capture all possible speech sounds, but this process is challenging. Transcribers' linguistic backgrounds instill perceptual biases (Cousse et al., 2004), and transcription is especially difficult when speech diverges from mature, canonical forms (Oller & Ramsdell, 2006). Accordingly, two transcribers will often transcribe spoken language differently. When the sounds represented by the IPA symbols are considered sufficiently similar, the transcriptions are described as in agreement; high agreement indicates reliable transcription (Shriberg & Gregory, 1991). Once agreement criteria are decided, determining reliability requires meticulously comparing each IPA symbol used by each transcriber. Presently, we aim to investigate our own practices of speech sound transcription for children with SSDs. First, we ask: are we successful in implementing reliability protocols? Second: how can we improve our protocols to better account for the difficulty of transcription? Data was collected from an ongoing, NIH-funded intervention study. Twelve children with SSDs produced approximately 300 words as part of a speech sound probe. Children's responses were transcribed and evaluated for reliability using lab protocols. Here, we re-examined those reliability judgments for two participants Research assistants were highly successful in implementing existing reliability procedures, with 98% of transcriptions correctly judged as in agreement or not in agreement. However, agreement rates were approximately 80%, revealing how difficult reliable transcription is. The detailed analysis conducted as part of this project highlighted opportunities to improve agreement criteria, particularly with respect to vowels used by speakers of California English. By evaluating our reliability practices, we identified

contexts that lead to greater disagreement between raters that stimulated discussions about how to improve reliability in future speech evaluations. This work, and our revised protocols, will improve our ongoing speech sound intervention study and add to a relatively small literature base addressing reliability practices.

#### 426 10:00 AM

# Does Proficiency or Age Influence Grammar? A study with Spanish-English Bilingual Children Juliana Salazar (Undergraduate) Belinda Gomez

Language sampling is considered a less biased assessment tool compared to standardized tests as it captures how children use language in a natural context (Gutiérrez-Clellen & Simon-Cereijido, 2007). Analyzing language samples is also useful for understanding bilingual language development. For bilinguals in the US, English rapidly develops with schooling, whereas Spanish development depends on the level of support available. Thus, grammar can develop differently in each language. English grammar develops with age and proficiency: Older bilinguals are more proficient and grammatical in English than younger children (Castilla-Earls et al., 2019). In contrast, grammatical accuracy in Spanish may be related to maturation (age), Spanish proficiency, or both. This research project seeks to understand Spanish grammatical accuracy of Spanish-English bilingual children by analyzing the language samples of 60 participants, ages 6-9 years old. Language samples were collected using the Multilingual Assessment Instrument for Narratives (MAIN; Gagarina et al., 2012), where participants looked at a picture sequence, heard a model version of a story, and retold the story. We examined grammaticality and language proficiency. Grammaticality measures whether a participant follows the syntactic rules of the target language and is calculated by dividing the number of grammatically correct utterances over the total number of utterances in a language sample (Jackson-Maldonado & Maldonado, 2017). We measured language proficiency with mean length of utterance in words (MLUw), calculated as the sum of words in a language sample divided by the total number of utterances (Rojas & Iglesias, 2009). Specifically, we ask: (1) Is Spanish grammaticality related to proficiency (MLUw) or to age? and (2) If Spanish grammaticality is related to both MLUw and age, then which one is stronger? We hypothesize that older children will have higher grammaticality than younger children. In addition, children who are more proficient in Spanish will have higher grammaticality. There is a possibility that Spanish grammaticality is only related to MLUw, which would suggest that grammatical development depends on proficiency and not necessarily on maturation.

#### 427 10:20 AM

An Experimental Approach to Evaluating Explanatory Models of HIV/AIDS at the US-Mexico Border Ana Jauregui (Undergraduate) Shyann Ayon Samantha Estrella Linda Osuna Haley Freeth

The relationship between scientific and other explanatory systems is a central question for cognitive psychology. A common assumption is that scientific knowledge eventually replaces intuitive beliefs (e.g., Piaget, 1954). A growing body of evidence, however, shows this is not the case (Legare et al., 2012). The co-existence of seemingly incompatible beliefs is particularly common when individuals are confronted with a life-threatening illness such as HIV/AIDS. In the present study, we examine how cultural and structural factors shape how people evaluate different causal explanations and treatment choices related to HIV/AIDS among individuals residing near the US-Mexico border in the Imperial Valley, CA. This binational context, where people frequently cross the border for healthcare services, provides an ideal location to examine how cultural and structural factors might interact to influence people's healthcare beliefs and practices. To address these questions, we took an experimental approach, testing 20 adults online using Qualtrics. We created ten vignettes in which an individual is diagnosed as HIV+. In each vignette, however, we varied the contextual factors to try to prime different types of causal beliefs. The vignettes were classified into five conditions with two vignettes in each condition Supernatural (the will of God, witchcraft), Psychosocial (trauma, stress), Lifestyle (sexual orientation, lifestyle practices), Biological correct (sexual contact, blood transfusion), Biological incorrect (physical contact, saliva) and Neutral (no prime). The vignettes were presented in random order using a within-subjects design. After each vignette, participants were asked to rate their level of endorsement of different types of possible causes and treatments for the protagonist's illness, including biomedical, psychosocial, lifestyle, and supernatural, using a 5-point Likert scale. We also collected demographic information and had participants complete the ARSMA-II acculturation scale. Our analysis revealed that participants highly endorsed biological beliefs across all conditions. Psychosocial and lifestyle beliefs were also strongly endorsed but to a lesser extent, depending upon condition. Supernatural beliefs were the least endorsed. We will discuss the interaction between these beliefs and demographic and cultural factors and the implications for healthcare practitioners and educators.

### **Session P1-7**

Poster Behavioral and Social Sciences Saturday, March 20, 2021, 10:40 AM

#### 428 10:40 AM

A Review of Systematic Reviews Examining Structural Drivers of Health Disparities Among Sexual and Gender Minorities and Racial Minorities Sarah Correa (Undergraduate) Karen Tuazon

Research has shown that sexual and gender minorities (SGM) experience higher rates of adverse health effects compared to non-SGM individuals. This theorized to be partially a result of structural drivers of health disparities (eg. public policy, school policy, neighborhood conditions) that influence the health of these individuals. The goal of this research was to explore which of these structural drivers may be compounded on those with multiple minority statuses, with an emphasis on youth. To examine this, this project used the databases ProQuest, EBSCOhost, and Google Scholar to review systematic reviews. The systematic reviews were limited to those in English that included SGM status or race, health, youth, and a focus on structural drivers. This review found that while there are many systematic reviews evaluating health disparities amongst SGM individuals (n=4) and racial minorities (n=6), there is a lack of systematic reviews evaluating health disparities at the intersection of these identities (n=0). Further, the structural drivers that were most often found were community factors, and the least published structural drivers were school factors, neighborhood factors, and public policy. Based on this review, further research on health disparities at the intersection of SGM status and race is necessary.

#### 429 11:00 AM

Differences in Cortical Anatomy and Function are Associated with Anxiety Symptom Severity in Adults with Autism Ryan Tung (Undergraduate) Annika Linke Jiwandeep Kohli

In anxiety disorders, alterations of underlying brain anatomy have been linked to anxiety severity and to treatment response. Behavioral evidence shows high prevalence of anxiety in autism spectrum disorders (ASD). We previously examined adults with ASD finding atypical functional connectivity of anxiety-related brain regions which also correlated with anxiety symptom severity. The current study examined whether these adults also show changes in the anatomy and function of those regions. Twenty-three adults with ASD (40-63 years; 19 males) and 24 typical controls (TC: 40-64 years; 20 males) completed the Beck Anxiety Inventory, a T1-weighted anatomical MRI scan, and a functional MRI, with groups matched on age, handedness, sex, total brain volume (TBV), image Contrast to Noise Ratio (CNR), and in-scanner head motion (RMSD). Cortical surface area (SA), cortical thickness (CT), and fractional amplitude of low-frequency fluctuations (fALFF) measures were extracted from 16 regions of interest (ROIs). Group differences in SA and CT were examined using independent samples t-tests, while differences in fALFF were examined using a general linear model. Partial correlations (controlling for age, CNR, and TBV) tested for relationships between SA, CT and anxiety symptoms in the ASD group and separately for relationships between SA, CT, and fALFF (controlling for Age, CNR, TBV, and RMSD) and between fALFF and anxiety symptoms (controlling for Age, and RMSD). As expected, anxiety symptoms were elevated in the ASD group (t(42)=-4.11,p=.0002) compared to TC. In the ASD group, SA was significantly reduced in the Left Middle Insula, Left Posterior Insula-1, Right Anterior Ventral Insular Area, and Right Anterior Agranular Insular Complex; while CT was increased in the Left Middle Insula. SA of the Left Insular Gyrus was positively correlated with anxiety symptoms and Left Insular Gyrus fALFF in the ASD group. fALFF was negatively correlated with Left Parainsular Cortex SA in the TC group. Bilaterally, Parainsular Cortex fALFF was positively correlated with anxiety symptoms in the ASD group. These results suggest that some of the same insular regions that previously showed atypical functional connectivity in adults with ASD also have atypical structure and activation and that this is related to anxiety symptom severity.

#### **430 11:20 AM** Effects of Prenatal Cannabis and Nicotine Exposure on Open Field Activity Antonio Ruiz (Undergraduate) Kristen Breit

Prenatal exposure to drugs can have detrimental effects on a developing fetus. Two of the most common substances in use among pregnant women are cannabis and nicotine. Despite the well-known damaging effects of prenatal nicotine, women continue to use during pregnancy, with a sharp increase in consumption via e-cigarettes. Interestingly, cannabis use among pregnant women is also increasing, as cannabis legalizations rise across the nation with a parallel increase in the public perception that cannabis is safe to use when pregnant. In fact, cannabis is one of the most common drugs co-used among women who consume nicotine products. Thus, there is a public need to better understand the effects that cannabis, nicotine, or the combination may have on behavioral development in the child. To assess the potential behavioral changes, we used an animal model and exposed pregnant rats to e-cigarette vapor to deliver the key psychoactive agent of cannabis ( $\Delta$ 9-tetrahydrocannabidiol (THC)) and/or nicotine. Using a four-group design, pregnant dams were assigned to receive either THC (100 mg/mL), nicotine (36 mg/mL), the combination, or vehicle (propylene glycol). The pregnant dams were exposed from gestational day 5-20 via vapor inhalation. Nicotine, THC, or the combination were administered via e-cigarette with six-second puffs every five minutes for a total of 40 minutes each day. Activity levels were measured in one sex pair from each litter using an open field test on postnatal days 31-34. The open field test can provide information on locomotor activity, fine movements, emotionality, and explorative behavior. Prenatal nicotine, alone or with THC, increased fine movements, which indicate an increase in behaviors such as grooming and stereotypy. In contrast, prenatal nicotine significantly reduced locomotor and exploratory behaviors. Although there were no main effects of prenatal THC, there were complex interactions between nicotine and THC and sex. This research may prove essential in answering safety concerns of e-cigarette use of nicotine, THC, or the combination among pregnant women.

#### 431 11:40 AM

Evaluating Explanatory Models of Cancer at the US-Mexico border: An Experimental Approach Fernanda Espinoza (Undergraduate) Angelica Landeros Stephanie Rivera Meghan Santos Ilce Taboada

The relationship between scientific and other explanatory systems is a central question for cognitive psychology. A common assumption is that scientific knowledge eventually replaces intuitive beliefs (e.g., Piaget, 1954). A growing body of evidence, however, shows this is not the case (Legare et al., 2012). The co-existence of seemingly incompatible beliefs is particularly common when individuals are confronted with a life-threatening illness such as cancer. In the present study, we examine how cultural and structural factors shape how people evaluate different causal explanations and treatment choices related to cancer among individuals residing near the US-Mexico border in the Imperial Valley, CA. This binational context, where people frequently cross the border for healthcare services, provides an ideal location to examine how cultural and structural factors might interact to influence people's healthcare beliefs and practices. To address these questions, we took an experimental approach, testing 20 adults online using Qualtrics. We created eight vignettes in which an individual is diagnosed with cancer. In each vignette, however, we varied the contextual factors to try to prime different types of causal beliefs. The vignettes were classified into four conditions with two vignettes in each condition Supernatural (the will of God, witchcraft), Sociorelational (abandonment, resentment), Biological (genetics, contaminants), and Neutral (no prime). The vignettes were presented in random order using a within-subjects design. After each vignette, participants were asked to rate their level of endorsement of different types of possible causes and treatments for the protagonist's illness, including biomedical, sociorelational, and supernatural, using a 5-point Likert scale. We also collected demographic information and had participants complete the ARSMA-II acculturation scale. Our analysis revealed that participants highly endorsed biomedical beliefs across all conditions. Sociorelational beliefs were more strongly endorsed for the sociorelational primes but were also endorsed to a lesser extent across all conditions. Supernatural beliefs were endorsed to a much lesser extent except for belief in the power of prayer, which was highly endorsed. We will discuss the interaction between these beliefs and demographic and cultural factors and the implications for healthcare practitioners and educators.

### **Session P1-8**

Poster Behavioral and Social Sciences Saturday, March 20, 2021, 12:40 PM

#### 432 12:40 PM

Cultural Explanatory Models of HIV/AIDS among HIV+ Individuals in the Mexicali/Imperial Valley Region Participating in an HIV/AIDS Education Program

#### Dario Reyes-Gastelum (Undergraduate)

Our study is focused on the US-MX border region between the Imperial Valley and Mexicali. It explores the cultural explanatory models (CEMs) or cultural beliefs and explanations about the causes and nature of an illness. More specifically, we examine the CEMs regarding HIV/AIDS, how does living at the border shape these beliefs and how has participation in an HIV education program affected these beliefs and practices. As described by Legare et al. (2012), we expect participants to endorse a biomedical model, as well as a cultural specific one, and that other structural factors such as social economic status and access to healthcare will also affect participants' CEMs. We conducted semi-structured interviews with 17 adults (15 male, 2 female) from both Mexicali (n=15) and the Imperial Valley (n=2) who are HIV+. Participants were recruited from Programa Amigo, an HIV education program in Mexicali, Mexico. Our findings showed that all participants viewed getting HIV as having brought a positive change to their life. Prior to engagement in Programa Amigo most had a limited knowledge and misconceptions of HIV/AIDS including HIV being a "death sentence". A common source of infection was through unprotected sex practices, believing their sexual partner was "clean", without HIV. Most participants reported health barriers at an institutional level, complaining of: long wait lines, discrimination from doctors and other challenges they face. Having more, similar, programs will help more patients create resilience and change their perceptions of risk and improve their interpersonal relationships.

#### 433 1:00 PM

### The Effects of Adverse Childhood Experiences on Depression and Anxiety **Tea Stephenson (Undergraduate)**

Many people have experienced an adverse childhood experience (ACE). These ACEs have been connected to depression and anxiety. In the present study, the effects of ACEs on the likelihood of experiencing depression and anxiety were examined by asking participants to complete the ACE questionnaire, State-Trait Anxiety Inventory for Adults (STAI), and Beck's Depression Inventory (BDI) via Qualtrics. It was predicted that at least half of the participants will have experienced an ACE and of that half, the majority will have anxiety and/or depression. Secondly, it was predicted that the most commonly experienced ACE among participants (N=242) recruited through San Diego State University psychology courses. Participants were predominantly female (82.4%) and White (35.2%). Approximately 65% of participants indicated that they had experienced at least one ACE in their lifetime, with the most commonly experienced ACE being household member mental illness/suicide attempt. Preliminary analyses indicate there were significant interactions between state anxiety and an adult swearing, insulting, and making one fearful. There was a significant relationship between depression and items related to failures to meet physiological and safety needs, as well as the mental health of caregivers. By narrowing down the effects of ACEs on mental health, and specifically the effects of each individual ACE, professionals can adjust treatment to better serve their patients.

#### 434 1:20 PM

The Effects of Distance Education on Student Wellness: A Pilot Study Christian Cordon-Mulbry (Undergraduate) Jenna Lewis Francesca Rodriguez Aleigha Binda

In response to the COVID-19 pandemic, stay-at-home mandates required universities to transition to online learning through a platform known as Zoom, which has allowed for academic instruction to continue. However, research on the use of Zoom may not be able to keep up with the potential increases in burnout and stress in college students. Therefore, this study analyzed how time spent on Zoom affects student wellness by measuring levels of burnout, stress, and differences in academic performance in undergraduate students from San
Diego State University. Participants (N=72) completed an online survey administered through Qualtrics. The survey utilized the Maslach's Burnout Inventory (MBI), which measures three levels of burnout: depersonalization, lack of personal achievement, and exhaustion, and the Student Stress Inventory (SSI), which measures physical, emotional, and behavioral manifestations of stress, student distress, and academic problems. The collected measures were compared the average time spent on Zoom and the students' GPA. No significant correlations were found between time on Zoom and scores on the MBI and SSI (p > .05). However, a significant positive correlation was found between scores on the SSI and MBI, r(70) = .823, p < .01. Additionally, when the data was ranked according to severity level, a significant correlation was found with moderate to high scores on the MBI associated with a decrease in GPA, r(70) = .289, p < .01. While relationships between Zoom and student wellbeing require further evaluation, these results inform the institution about potential effects on the wellbeing of their students. Furthermore, this study draws attention to the possibility that student burnout is being exacerbated by an increase in time spent on Zoom and guides future research to evaluate this suggested impact further.

#### 435 1:40 PM

#### Assessing Family-Based Intervention Strategies Targeting Obesity Among Latinx Subgroups Cristina Rios (Undergraduate) KenJonae Wallick Victoria Telles

Childhood obesity rates continue to rapidly increase throughout the United States particularly for the Hispanic/Latinx population. The disproportion in obesity risk for Latinx children can be attributed to many predisposing factors including parental education in nutrition-based practices and family incorporation of physical activity within the home. By conducting a literature review, we sought to identify if various Latinx sub-groups are impacted differently from family-based obesity prevention. We conducted a literature review in PubMed using PRISMA guidelines and a protocol that outlined a specific search strategy including inclusion and exclusion criteria. Inclusion criteria was as follows: Intervention is focused on obesity prevention, reduction, and may include related topics (e.g., sleep, sedentary behaviors); Participants includes at least 50% or more Latinos (or less if stratified); Participants include children from 5-12 years old; Intervention evaluates obesity-related measures; All interventions include a control and comparator; and intervention was conducted in a family-based context. The initial review included screening of the title and abstract for each article. Literature that met the first criteria was further stratified by Latinx sub-group and mention of documentation status and will be used for further full-text analysis. We identified N=67 PubMed articles that met the initial inclusion criteria. Among those, only N=11 specified in their abstracts which Latinx sub-group their study involved. All N=11 studies included Mexicans or Mexican Americans. Additionally, only N=4 of the PubMed articles mentioned participants were also immigrants but had no information on documentation status. Our preliminary results show a misrepresentation of Latinx sub-groups outside of Mexicans and Mexican Americans. We anticipate that through the full-text analysis we'll identify the composition of the study participants better including their demographics and ethnic groups. By identifying different Latinx sub-groups we expect to observe differences in the effectiveness and efficacy of family-based methods for reducing obesity rates. Through this literature review approach, we intend to provide information on effective strategies for reducing childhood obesity in various Latinx sub-group families

#### 436 2:00 PM

### Examining the Association Between Adverse Childhood Experiences and Need for Closure in a Sample of Undergraduate Students Maria Luisa Gontijo Gouveia (Undergraduate)

# The leading causes of morbidity and mortality in the United States are related to health behaviors and environmental factors. An insidious environmental issue is maltreatment or exposure to abuse during childhood, which can seriously impact cognitive development. In addition, individuals who experienced trauma may have a heightened reaction to uncertainty. The need for closure (NFC) refers to a desire for a definitive answer to a question and aversion toward ambiguity. Several authors propose that individuals who live in a complex reality need to simplify these demanding situations. This study examines the association between Adverse Childhood Experiences (ACEs) and Need For Closure (NFC). Our primary hypothesis is that ACEs predict high NFC as an adaptive strategy to deal with chronic vulnerability after several traumas. Data from 237 undergraduates from a large California university were used. The following scales were administered: Adverse Childhood Experiences Questionnaire (Felitti et al., 1998); Need for Closure Scale (Webster & Kruglanski, 1994); and demographics. Simple bivariate correlation was conducted to explore the relationship between the first two scales' total score. In order to assess the contribution of each subtype of ACEs to a high or low NFC score, $\chi^2$ for independence was used. The results show that the most prevalent ACE was Familial Mental Illness (N = 90) while the least prevalent was Mother Treated Violently (N = 15). Pearson correlation coefficient obtained by the Bivariate Correlation revealed no significant

correlation between ACE's Total Score and NFC's Total Score. Results from  $\chi^2$  for independence indicate that two categories of childhood exposure had a significant results For Sexual Abuse  $\chi^2(1, N = 66) = 5.242$ , p = .022 and for Familial Mental Illness  $\chi^2(1, N = 66) = 3.882$ , p = .049. Our results demonstrate that the NFC was not equivalent for all ACEs as only the sexual abuse group showed an enhanced need for closure. Results obtained using a  $\chi^2$  for independence indicate that, given those who reported at least one ACE, the great majority were low in NFC, which contradicts our hypothesis. Additional analysis would provide researchers and practitioners insight as to respond to these patients.

#### Poster Education Saturday, March 20, 2021, 2:20 PM

#### 437 2:20 PM

Development of an Education Instrument Categorization and Organization System for the Chemistry Instrument Review and Assessment Library (CHIRAL)

Tina Marcroft (Doctoral) Paulina Cortez Sharai Mendez

Educators and researchers are often interested in quantifying immaterial human constructs in classroom environments such as conceptual understanding, self-determination, and science identity. These constructs, however, can only be measured indirectly in the form of assessments, surveys, and questionnaires (instruments). The inherent imprecision of language and the diversity of human experience may make different individuals interpret items differently, so instrument creators and users must ensure that their instruments apply to their intended contexts by establishing reliability and validity. Reliability ensures that instruments measure constructs consistently over time and across different contexts, while validity ensures that appropriate constructs are measured. Establishing this fit between instrument and data can convince readers that their instrument is credible. Moreover, instrument consumers, i.e., other educators and researchers, should rely upon the evidence provided by these studies to determine which premade instruments are appropriate for their classrooms. To address these issues in the chemistry education literature, we are assembling the Chemistry Instrument Review and Assessment Library (CHIRAL). This online repository of instruments will help researchers and practitioners find instruments more easily. CHIRAL is also intended to help users learn more about methods appropriate for assessing instrument credibility. As part of the first phase of CHIRAL's development, we used snowball sampling to find publications and instruments from an initial set of four seed publications. Unfortunately, we found that the literature can be quite ambiguous and compiling this database was challenging. Authors, for example, would refer to instruments with incorrect names or use instruments in ways not intended by the original creators. Alternatively, authors would utilize or evaluate multiple instruments in different ways within the same publication meaning that simple categorization methods that only track instruments or publications would not account for such complications. We therefore developed an intricate method for coding, sampling, and organizing both instruments and publications to address this ambiguity. We created a referential database that tracks and codes instruments, publications, and the relationships between the two. We present this methodology in detail and describe its development. We also discuss the current state of CHIRAL as an outcome of these methods.

#### 438 2:40 PM

#### Toward Cataloging Critically Reflective Practices in Dual Language School Libraries: A Pilot Study Tracing Program Alignment Ed'd Bhagwandeen (Master's)

Ed'd Luna Bhagwandeen, MA candidate in San Diego State University's Department of Dual Language and English Learner Education, presents preliminary findings from a pilot study investigating the alignment of elementary school libraries to the bilingual education goals of bilteracy and sociocultural competence in California dual immersion schools. A mixed methods, interdisciplinary approach drawing on collection analysis methodologies of library science and qualitative DLP document analysis explores how the school library can be an important resource for and indicator of program alignment to existing mission statements and bilingual education frameworks. The embedded overview of structural pressures and facilitating factors for public school libraries in numbers-driven environments may prove useful for librarians/educators struggling to plan and manage new or existing dual language school library collections and services to meet the needs of emerging bilingual student cohorts. Implications for DLP coordinators, site supervisors, and school library media personnel are discussed. Solicitation for volunteer programs/sites for subsequent studies to follow presentation.

#### 439 3:00 PM

Qualitative Assessment and Revision of the Undergraduate Research Student Self-Assessment (URSSA) for Use With Chemistry and Biochemistry Students

### Sharai Mendez (Master's)

#### Sloan Hill-Lindsay

The Undergraduate Research Student Self-Assessment (URSSA) instrument has previously been used to evaluate outcomes from undergraduate research experiences (URE) in biology. Using a combination of quantitative and qualitative items, the URSSA was designed to measure five constructs: (1) Satisfaction, (2) Thinking and Working Like a Scientist, (3) Personal Gains Related to Research Work, (4) Skills, and (5) Attitudes and Behaviors. Prior work by Weston & Laursen (2015) investigated validity evidence for URSSA data using factor analysis and qualitative coding of question responses. Their results indicated potential issues with wording of some items and recommended future work address these problems. The current study sought to investigate how undergraduate chemistry students interpreted the URSSA items to aid in potential revisions. Three initial response process interviews were conducted with undergraduate students to understand their interpretation of the items so that items could be revised and reorganized. The interviews were transcribed for analysis. Two research assistants examined the transcripts for themes related to student responses and coded until consensus was reached about types of student reasoning and whether they matched the intention of the question. Students had difficulties with vaguely worded items or survey language that did not match their experiences. Problematic items were revised based on the initial interview data. Three additional response process interviews were conducted and analyzed to ensure revised items were interpreted as intended. Overall, results indicated that some of the URSSA items were problematic and revisions were needed to better contextualize the questions and improve organization of the survey. Additionally, some items were revised to address COVID-19 impacts on UREs using open ended questions to gather information about UREs pre- and post-pandemic circumstances. Examples of student reasoning codes and revised URSSA items will be presented.

#### 440 3:20 PM

Families of Black Children Perspectives on American Education Discipline Practices and the Cause and Effect of the School-to-Prison Pipeline **Elizabeth Efird (Master's)** 

This study examines the school-to-prison pipeline, the process where students are tracked formally and informally into the criminal justice system. Specifically, this study sought to understand the relationship between Black childrens' experiences in their classrooms bolsters the school-to-prison pipeline. The school-to-prison pipeline is known for its use of zero-tolerance policies, which uses suspension, expulsion, and student arrests as punishment for both violent and nonviolent offenses alike. These discipline practices often target marginalized populations, specifically African-American students. Historically, there has been a reoccurring pattern of removing Black children from education, which has contributed to creating the school-to-prison pipeline. Within classrooms, many students are subjected to teacher biases and abuse of power, which lead to the disproportionate targeting of Black students for punishment and removal. Participants will be interviewed in order to gather perspectives on the school-to-prison pipeline, education, and school discipline. This study will employ narratives written by seven parents of Black children. In this context, it is offered that education systems could benefit from counter-storytelling, and hearing accurate accounts of African-American experiences and thoughts. Participants will be interviewed in order to-prison pipeline, education, and school discipline to use counter-storytelling to amplify Black voices in the literature about discipline practices of the American public education system.

## Abstracts of Presentations

## **Poster Sessions 2**

1 2 3 4 5 6 7 8 9



### Session P2 -1

Poster Biological and Agricultural Sciences Friday, March 19, 2021, 9:00 AM

#### 500 9:00 AM

Raf Activation Regulated by its N-Terminal Domains Andres Jimenez Salinas (Doctoral) Kelly Hyun

Raf kinases are proteins that are found in the MAPK pathway, this pathway is responsible for many cellular events such as differentiation, cell division and cell death. Dysregulation of this pathway has been seen in a wide variety of cancers and disease, and some of them can be attributed to mutations on Raf kinases. The first step of Raf activation is recruitment to the membrane bilayer by a small active GTPase, Ras. This step has important regulatory properties for the activation of Raf, but its molecular mechanism is not properly understood. Oncogenic activation of Raf also uses this recruitment pathway but its molecular details still remain ambiguous. It is important to better understand these molecular details to understand normal activation of Raf and provide insight for cancer therapeutics. The N-terminal of Raf is thought to have regulatory properties which contains a Ras Binding Domain (RBD) and a Cysteine-Rich Domain (CRD) which interacts with the lipids on the membrane. Both of these domains help to regulate and modulate Raf activity. In this research, we measure and analyze the kinetics of Raf Kinase using single molecule fluorescence microscopy. To simulate membrane-like environments, we construct supported lipid bilayers in which we can easily manipulate lipid composition and Rad concentration. Our measurements will focus on the RBD and CRD domains and how the recruitment of Raf may be modulated by the membrane composition as well as different Ras isoforms, H-Ras and K-Ras. Different Raf constructs will be used, RBD and CRD alone as well as RBD-CRD in tandem. These measurements will provide essential information on how these domains may work synergistically for Raf recruitment on the membrane bilayer.

#### 501 9:20 AM

## The Role of Puberty in the Maturation of the Gut Microbiome Laura Sisk-Hackworth (Doctoral)

Evidence from numerous studies of human and animal models have revealed that the intestinal microbiome influences health, from immunity and metabolism to reproduction. Discovering the potential role that puberty plays in the maturation of the gut microbiome is key to a deeper understanding of many facets of human health. Particularly, this is knowledge is important for improving our understanding of microbiome-associated diseases that often manifest during puberty, such as inflammatory bowel disease, diabetes, and polycystic ovary syndrome. Though puberty is a major physiological transition between childhood and adulthood, the role of puberty in the maturation of the sex-specific gut microbiome is not well understood. I hypothesize that puberty drives sex-specific maturation of the gut microbiome. To investigate this, I compared the composition of pre-pubescent gut microbes and metabolites shifts after puberty in female mice. The alpha diversity of the microbiota increased after puberty, while the alpha diversity of the metabolites decreased. The between-sample variation of the gut microbiome. These results indicate that puberty may drive maturation of the sex-specific gut microbiome. Future studies contrasting the development of the gut microbiome of mice that do and do not undergo puberty will show whether these changes in the gut microbiome before and after puberty are in fact due to puberty, and not to other factors, such as growth or weaning.

#### 502 9:40 AM

#### Optimization of Untargeted Lipidomics in U87-MG Glioma Cells Grace Chao (Doctoral) Ellen Kuang

Isocitrate dehydrogenase 1 (IDH1) catalyzes isocitrate (ICT) to  $\alpha$ -ketoglutarate ( $\alpha$ -KG) in the cytosol and peroxisomes. Catalysis of ICT to  $\alpha$ KG is the primary source of NADPH in peroxisomes, which are intracellular organelles found in virtually all eukaryotic cells. Peroxisomes are involved in  $\beta$ -oxidation of very long chain fatty acids,  $\alpha$ -oxidation of phytanic acid, degradation of H2O2, and biosynthesis of ether lipids. Mutations in IDH1 drive a variety of cancers, most notably gliomas and glioblastoma, and lead

to production of D-2-hydroxyglutarate, an oncometabolite, and decreased NADPH levels. We hypothesize that cells expressing mutant IDH1 have dysregulated lipid levels due to NADPH deficiency in the peroxisomes. Using U87-MG glioma cells, we extracted lipids using the Bligh and Dyer liquid-liquid method with chloroform/methanol separation, and analyzed fractions using liquid chromatography/mass spectrometry (LC/MS). Samples from the separated phases were run on a C18 column for reverse phase separation or a HILIC column for normal phase separation, and then analyzed on the Bruker Impact II UHPLC-QTOF instrument. Data were converted to mzXML files and uploaded to XCMS Online, a widely used metabolomic and lipidomic database. These runs will help us optimize cell density, solvent solutions, and lipid extraction methods to improve metabolite and lipid separation profiles. U87MG cell lines stably expressing mutant IDH1 will be analyzed to determine lipid level differences.

#### 503 10:00 AM

Defining the Role of CG11617 in the Transcriptional Control of Muscle Development in Drosophila melanogaster

#### Elizabeth Trujillo (Doctoral)

My research studies the mechanistic roles of transcription factors, conserved from flies to humans, in regulating muscle cell identity.

### **Session P2-2**

Poster Biological and Agricultural Sciences Friday, March 19, 2021, 10:20 AM

#### 504 10:20 AM

Analysis of the Role of the  $\alpha$ 10 Helix in Catalysis and Inhibition of Isocitrate Dehydrogenase 1 Kaitlyn Sabo (Master's) Alexandra Strom Vinnie Widjaja

Mutations in isocitrate dehydrogenase 1 (IDH1) are the drivers of most low-grade gliomas and secondary glioblastomas and many cases of chondrosarcoma and acute myeloid leukemia. These mutations reduce the ability of IDH1 to oxidize isocitrate to  $\alpha$ -ketoglutarate ( $\alpha$ KG) and can cause the enzyme to acquire a neomorphic activity in which it converts  $\alpha$ KG to D-2-hydroxyglutarate (D2HG). In previous work, the  $\alpha$ 10 helical domain of IDH1 was shown to play a role in substrate and inhibitor binding in the enzyme. To further investigate the role of this section of the protein, mutations were designed and introduced to either stabilize or destabilize this helix. Using UV-Vis spectroscopy, we determined the kinetic parameters of these mutants. We predict that stabilizing the  $\alpha$ 10 helix will help disrupt inhibitor binding and facilitate catalysis by further structuring the active site, while destabilizing the helix will either completely disrupt protein folding and prevent catalysis from happening. These findings will give new insights into drug design for cancers driven by IDH1 dysfunction.

#### 505 10:40 AM

Automatic Clustering of Phylogenetic Trees Adrian Ortiz Velez (Master's)

Phylogenetic analysis of amino acid or translated DNA/RNA commonly gives rise to a sample of inferred evolutionary trees in which proteins with similar functions cluster together. These clusters can be viewed as subfamilies. Clustering phylogenetic trees usually require inter and intra-specific threshold, leading to an ad hoc problem. We propose a new distance and bootstrap phylogenetic clustering algorithm that identifies sets of sequences resulting from short/similar evolutionary distance, thus lending easily interpretable clusters, without using any ad hoc distance or confidence requirement. The algorithm introduced used uniform manifold approximation and projection (UMAP) as a dimension reduction technique as well as Gaussian mixture model as a k-means like procedure to group sequences together into sub-families. Implementing both distance and bootstrap methods, a more powerful

#### 506 11:00 AM

Expression of Heterologous Polymerase n (PolN) Using Fusion Partner Protein Maltose-Binding Protein Ngoc H Huynh (Master's)

Polymerase n (PoIN) is a poorly understood error-prone polymerase that is involved in DNA repair pathways. PoIN-deficient cells are more sensitive to intrastrand cross-links (ICL) agents, suggesting that PoIN is involved in repairing ICL. PoIN has also been linked to cancer, including amplification in neuroendocrine prostate cancers, but its role is unknown. One of the challenges that hinders PoIN studies is the poor heterologous expression of PoIN. Here we seek to systematically improve the expression and purification of PoIN heterologously expressed in E. coli. Plasmids with fusion partners that enhance high expression of insoluble proteins have been widely used. We employed the maltose-binding protein (MBP) as a solubility-enhanced protein tag and His-tag to facilitate bacterial expression and purification. The Gateway plasmid was transformed into BL21 DE3 bacterial strain, with incubation and induction parameters such as time, temperature, and inducing agents carefully optimized. For example, expression was optimized further to increase soluble protein production, including addition of arabinose and varying concentrations of both arabinose and isopropyl

- d-1-thiogalactopyranoside (IPTG). The induction temperature was maintained at 37°C for up to 10 hours. Finally, the cells were harvested and analysed by gel electrophoresis to assess expression levels. The highest expression levels were achieved at cold temperature in the presence of both IPTG and 1% of arabinose. In the future, we will increase the volume of cultures that will be expressed and purification will be done using affinity chromatography.

#### 507 11:20 AM

## Evaluation of pollution in the San Diego River from Homeless Encampments During Dry Weather Conditions Mireille Garcia (Master's)

The beneficial uses of water from the lower San Diego River and its tributaries include, but are not limited to, swimming, wading, surfing, fishing, picnicking, hiking, and camping. Yet, the lower San Diego River is considered an impaired water body due to contamination from enterococcus and fecal coliforms. In June 2019, the San Diego Regional Water Quality Control Board issued an investigative order to ten public agencies to identify the sources and transport pathways of human fecal pollution in the San Diego River, and discharges from homeless encampments was listed as one of several potential sources of fecal contamination to the San Diego River. However, little is known about the relationship between riverine homeless encampments and microbial water pollution. This study aims to measure and characterize the presence of microbial pollutants were quantified in the upstream and downstream sample locations of active homeless encampments. River water samples are also being sequenced to investigate changes in the 16S rRNA bacterial communities upstream and downstream of the active homeless encampments. This study found indications of fecal pollution in the San Diego River tributaries, but limited evidence of human-associated fecal pollution. E. coli and enterococcus concentrations were higher downstream of the active homeless encampments, but the human-associated fecal marker, HF183, was not detected in the upstream or downstream sample locations. Future work for this study will analyze if there are significant shifts in the relative abundances of bacterial species between the upstream and downstream sample locations.

#### 508 11:40 AM

## NF-kB and MAPK signaling pathways coordinate in supporting ovarian cancer relapse Jacqueline Lara (Master's)

Ovarian cancer is the most lethal gynecologic malignancy in the US. Most patients initially respond to platinum-based chemotherapy; however, 70% of advanced stage tumors relapse. Recent studies suggest a minority population of primitive cells, termed tumor-initiating cells (TICs), resist chemotherapy and re-create heterogeneous tumors to cause relapse. Identifying the mechanisms that support this elusive population will be critical for preventing relapse. Our lab has identified a critical role for classical and alternative NF-kB transcription factors in supporting ovarian cancer progression. We have found that alternative transcription factor, RelB, maintains quiescent ovarian TICs, whereas classical transcription factor, RelA, maintains a proliferative subpopulation that may depend on MAPK/ERK. Presumably, both populations are required for efficient relapse. Here, we investigate activation of RelA in TICs and non-TICs to distinguish its role in maintaining proliferation and whether this process requires co-activation of MAPK/ERK.

In RNA-Sequencing pathway analysis, we found that relative to TIC cultures, non-TIC cultures had increased proliferation pathways, which included MAPK genes: ERK2 and MEKK. To further investigate RelA and RelB transcriptional regulation in TICs and non-TICs, we recently completed CHIP sequencing experiments and found that RelA exclusively regulated 1/3 of the total genes in non-TIC cultures, whereas RelB exclusively regulated 1/3 of the genes in TIC cultures. This data supported our previous findings implicating RelA in proliferation and RelB in quiescence and further implicate MAPK/ERK. Preliminary western blot data suggests an upregulation of the MAPK/ERK pathway in non-TIC cultures with RelB upregulation in TIC cultures. Additionally, we have established 100% RelA and RelB knockout CRISPR lines and stable RelA-RFP lines in OV90, OVCAR8, and ACI23 ovarian cancer cells and studies are underway to validate the role of these factors in TIC maintenance and in our established relapse model, where relapse occurs on average 21 days post-treatment. We expect that although only quiescent TICs will be remaining following chemotherapy, efficient relapse will also require a proliferative population dependent on RelA and MAPK/ERK. A better understanding of NF-kB signaling in TICs will guide the design for more effective therapies to overcome chemoresistance and relapse, and improve survival of women with ovarian cancer.

### **Session P2-3**

Poster Biological and Agricultural Sciences Friday, March 19, 2021, 12:40 PM

#### 509 12:40 PM

Investigating the Diversity of Bacteria Involved in Stimulating the Animal Development Process of Metamorphosis

#### Xavier Deogaygay (Master's)

Animal development has and continues to be a commonly studied topic in science. Bacteria-animal interactions in the context of animal development is one area of current significant focus. These interactions are found in many marine invertebrates such as corals and tubeworms. Although it is known that bacteria stimulate the developmental transitions of many invertebrates, it is still yet unknown the diversity of bacteria able to mediate these beneficial bacteria-animal interactions. To address this gap in understanding we have shown via an assay involving single bacterium biofilms and larvae of a model marine animal, Hydractinia symbiolongicarpus, that there are numerous bacteria belonging to different classes that are able to stimulate metamorphosis in Hydractinia symbiolongicarpus. We further identified three novel bacteria belonging to the Phaeobacter and Leisingera genera via bacterial DNA sequencing, assembly, and annotation. These bacterial species were able to induce a high rate of metamorphosis in Hydractinia which further highlights the diversity of bacteria that play a role in animal development.

#### 510 1:00 PM

A Course in Marine Bacterial Genomics Sama Michael (Undergraduate) Alpher Aspiras Amanda Alker

Determining the genome sequence of an isolated strain of bacteria can help with the identification and understanding of the organism based on its unique sequence. Because different genes represent different characteristics and functions of the organism, future gene manipulation can be conducted for biotechnology purposes. During an upper division molecular biology lab course (BIOL567L), we will assist 22 students through the process of obtaining genomic information from 12 newly isolated marine bacteria in the spring semester of 2021. We hypothesize that we can isolate novel marine bacteria and help a class of students obtain, analyze and write scientific manuscripts on the genomic information of these bacteria. In Phase 1, we will begin by collecting marine bacteria and isolating a specific colony to purify a single strain to undergo genome assembly. Once the strain of bacteria is isolated, it needs to be grown in a liquid bacterial culture to proceed in the next steps. After successfully isolating the colony, Phase 2 will begin by attempting to identify the bacteria we collected and categorize them using the 16S ribosomal RNA sequence. Phase 3 will focus on summarizing the data and understanding the genome sequence statistically. We will then analyze the genome sequence using different methods to further understand the characteristics and the function of those genes. Finally, Phase 4 will be writing the manuscript based on what is found, to later submit it to the American Society for Microbiology for publication. We expect to create several scientific publications on the genomic information of novel marine bacteria isolates.

#### **511 1:20 PM** Decay and Coinfection of Viruses of Bacteria Neilsen Lu (Undergraduate) Caitlin Bartels

Phages are viruses that infect bacteria and are the most abundant biological entity on the planet. Their ability to kill bacteria makes phage a promising tool to fight the increase of antibiotic resistant bacteria. However, phages can also make bacteria become more resistant by integrating in the host genome, forming a lysogen. We initially studied the decay rate of tailed phages using the molecular information of the capsid protein sequence, hypothesizing that a larger capsid surface mass leads to a slower phage decay time. The preliminary model and data analyzed supported this hypothesis, but more experimental and structural experiments are needed. Alternatively, we studied how phages form lysogenic bacteria through coinfection--the main molecular mechanism triggering lysogeny. The main goal of the model was to understand what conditions would help form and maintain lysogens. A dynamical system was developed to explore this question mathematically. The model included sensitive bacteria, infected bacteria, phage-producing bacteria, temperate phages, and lysogens. Preliminary results of the dynamics were obtained for different combinations of initial sensitive bacteria and temperate phage concentrations. As shown in the figure attached, typical phage and bacteria concentrations (~106 particles/mL) lead to a recurrent formation of lysogens.

#### 512 1:40 PM

The Role Inflammatory Signaling Crosstalk on Human Exocrine and Beta Cells Kouta Lee (Undergraduate)

There is a high correlation between people with diabetes and pancreatitis, but there is not enough research to know exactly how both diseases influence each other. In this project, I will be assisting Duc Tran and Dr.Itkin-Ansari in understanding the cross-talk between endocrine and exocrine tissues of the pancreas using live human pancreatic tissue that has both the islets and exocrine tissue intact. In previous research, islets and exocrine tissue were investigated independently to one another, but now there is enough evidence to hypothesize that exocrine and endocrine compartments work together in response to stress. Using the human pancreatic tissue, we will induce caerulein into the acinar cells and examine the exocrine and beta-cell functions (such as BMP signaling, transcriptional repressors ID1 and ID3, and inflammatory cytokine/chemokine expression). Caerulin has a similar structure to CCK and is the primary way of modeling pancreatitis. We will also induce cytokines IL-1beta and IFNgamma into the beta cells and examine the exocrine and beta-cell functions (such as the expression of chemokines in the beta cells). Both cytokines act as diabetogenic agents (agents that contribute to an increase in blood glucose, or diabetes) and are released during an inflammatory response. We will also examine if caerulein or cytokines IL-1 beta and IFNgamma induce dedifferentiation of acinar cells into a ductal stem-like state, also known as acinar-to ductal metaplasia. This will allow us to further examine the early progression of cancer development in the pancreas. The human pancreatic tissue slices will be incubated with EDU in four different conditions: caerulein, BMP2, cytokines IL 1 beta, and IFNgamma, vehicle. We will be using immunohistochemistry to examine BMP signaling effects, transcriptional repressors ID1 and ID3, and replication markers. We will use BRDU labeling to examine insulin, proinsulin, amylase, and other markers. We will also be using western blot and ELISA to detect intracellular proteins and enzymes. Learning about the interaction between the exocrine and endocrine tissues will allow us to understand the association between diabetes, pancreatic cancer, and pancreatitis on a molecular level.

#### 513 2:00 PM

Developing In Vitro Models of Brain Development in Kleefstra Syndrome and Other Forms of Syndromic Autism Jessica Octavio (Undergraduate)

ASD (Autism Spectrum Disorder) affects approximately 1 in 55 children. While the etiology of ASD is complex and largely idiopathic, ASD is often associated with altered expression of neuronal, synaptic, or chromatin genes (Rubeis, He, 2014). Kleefstra Syndrome (KS) represents one syndromic form of ASD with epigenetic dysregulation of neuronal development (Kleefstra, 2012). KS is often caused by deletion of the 9q34 chromosomal region or more rarely by a loss of function (LOF) mutation in EHMT1, a eukaryotic histone methyltransferase found within the 9q34 locus (Willemsen et al., 2012). EHMT1 catalyzes methylation of H3 at lysine 9 (H3K9me) to inhibit transcription of several downstream genes, which underlie healthy cognitive development. Since epigenetic disruptions to neuronal and synaptic gene expression are suspected to underlie ASD, this study aims to elucidate the functional consequences of altered epigenetic landscapes in KS, a genetically defined form of ASD with EHMT1 LOF using in vitro models of brain development. The purpose of this study is to generate isogenic iPSCs with mutations in EHMT1 using CRISPR Cas9/sgRNA

mediated genome editing with iPSCs obtained from both patients with KS and from unaffected control groups. Neurodevelopmental phenotypes in cellular models will be characterized using various gene expression analyses. In addition to comparing the expression and post-translational modifications of neuronal and synaptic proteins by immunoblotting, we will perform both bulk and single cell RNA-seq analyses of KS brain development in vitro. Additionally, a multielectrode array (MEA) will be used to compare electrophysiological differences in neuronal activity and synchrony of KS cellular models. The present study also includes the development of NGN2-iNeuron models of KS for sophisticated imaging-based comparisons of neuronal morphology and synaptic maturity, observing features such as the length of the axon initial segment. The study will illuminate whether or not altered EHMT1-methylation profiles of neuronal and synaptic genes underlie cognitive dysfunction in KS. The comparison of chromatin landscapes could be significant in observing how loss of function in EHMT1 as well as the loss of "hub regions" and changes in chromosomal contact points in 9q34.3Del/+ could contribute to cognitive dysfunction in KS as well.

### Session P2-4

Poster Biological and Agricultural Sciences Friday, March 19, 2021, 2:20 PM

#### 514 2:20 PM

Arthropod Community Responses to Bison and Prescribed Fire Management in Tallgrass Prairies Maricela Alaniz (Undergraduate)

#### Samantha Padilla

Disturbance events can play consequential roles in determining the abundance of species within an ecological community and are important drivers of ecosystem function. In the central U.S., fire and grazing by bison are disturbance events which historically shaped tallgrass prairies. These disturbances have been greatly disrupted but remain important management tools in the little prairie habitat that remains. The interaction of fire and grazing creates variation across a landscape, increasing plant heterogeneity that may affect arthropod assemblages. Fire and grazing have been well studied as management tools for plants, but few studies have focused on the effects of these disturbances on arthropod communities. We assessed how fire and grazing affect arthropod communities by analyzing abundances of 16 arthropod groups from restored and remnant prairies that differed in the presence and absence of bison and prescribed fire. Total arthropod abundance was increased by grazing and prescribed fire and was greatest where both management disturbances were combined. However, individual arthropod groups differed in their responses to both disturbances. Our results suggest that application of both fire and grazing can increase the overall abundance of arthropods and potentially support the ecosystem functions to which these animals contribute.

#### 515 2:40 PM

#### Role of Obesity in Progression of African-American Ovarian Cancer **Christina Jackson (Undergraduate)**

Ovarian cancer (OVCA) is the most lethal gynecologic malignancy in the United States, with 70% of advanced cases leading to chemoresistance and tumor recurrence. Compared to Whites, African-American (AA) OVCA patients present with more aggressive disease and worse survival rates (38% vs 45%), and this difference is only partially accounted for by differences in access and guality of care. We have previously found that tumor initiation and progression significantly increase with a high ratio of adipocytes to cancer cells, a condition reflective of obesity. Furthermore, obese AA women have higher levels of circulating inflammatory adipokines (CRP, leptin, IL-6, TNF) than obese white women. Given the differences in circulating adipokines between AA and white women, we hypothesize that adipokines, such as IL6, are enriched in the obese setting of AA OVCA, as compared to White OVCA, and activate survival pathways to enhance chemoresistance. Studies are underway using White and AA OVCA co-cultured with or without White or AA omental adipocytes, respectively. We will assess cell survival in response to chemotherapy (chemoresistance), spheroid formation, and secretome analysis. In our preliminary studies, the AA primary cell line A2780 grew the fastest over 48hrs in both 2-D and 3-D conditions, as compared to white primary line OV90 and metastatic line CAOV4. When treated with carboplatin, A2780 were also the most chemosensitive, with an IC50 of 4.461 uM compared to 49.95 uM for CAOV4 and 119.8 uM for OV90. Interestingly, A2780 grew two-fold more spheroids and had two-fold more stem cells (CD117+) than any other cell line. This data suggests that AA OVCA cells are able to activate pathways important for both proliferation and spheroid formation, and ongoing studies are being conducted to discern the role of adipokines in these processes. Completion of this project will provide a mechanistic understanding of how obesity contributes to chemoresistance and tumor recurrence in African-Americans and may uncover new biomarkers or targeted therapies.

#### 516 3:00 PM

Characterizing the Role of Filamentation in the Cell-to-Cell Spreading of a New Bacterial Pathogen, Bordetella atroposiae

### Munira Ali (Undergraduate)

#### Tuan Tran

Studies on mammalian system infections have mainly been performed using in vitro cell culture which may not reflect hidden biological aspects of host-pathogen interactions. To fully understand the microbial interaction taking place in the host epithelia, we use in vivo nematode models such as Oscheius tipulae to follow the different stages of infection and visualize their effects. We have discovered a new intracellular bacterial pathogen of O.tipulae called Bordetella atroposiae that drastically reduces host fitness. Fluorescent microscopy shows that B. atroposiae traverses through multiple host intestinal cells by dramatically expanding bacterial length through a morphological process called filamentation. To better understand the role of filamentation in the spread of infection, we isolated a filamentation mutant strain of B.atroposiae, called LUAb7. This strain displayed shorter filaments and lower filament frequency compared to the wild type (WT) strain. Spreading data confirmed that on average, LUAb7 spread between 2-3 intestinal cells, compared to the WT control, which spread on average between 3-5 intestinal cells. Multiple lifespan and broodsize experiments found, however, that although LUAb7 showed a reduced capacity for filamentation, it did not have any significant impact on the health or reproductive extent of the worms. Furthermore, testing different infection conditions such as a 24-hour infection compared to a continuous, multiple-day infection also yielded similar results, implying that filamentation by B. atroposiae may not affect genetic fitness. Collectively, we discovered a new species of facultative intracellular pathogen, B. atroposiae, that is highly pathogenic to O. tipulae. While we were able to show that B. atroposiae uses filamentation as a unique mechanism for disseminating throughout the host intestinal tissues, this phenotype appears to display no significant role in host genetic fitness. This data could suggest that the infection doses (24 hr.) were too high to see differences in host fitness or the bacterium has other virulence mechanisms (like toxins) that cause the worms to die. In the future, we will continue optimizing infection conditions for the lifespan assay to tease apart these possibilities. Additionally, we will perform a colony-forming unit (CFU) assay to determine if filamentation affects the bacterial burden on host animals.

#### 517 3:20 PM

## Examining Differences in Human and Non-Human Primate Brain Organoids **Davis Klein (Undergraduate)**

The goal of this project is to elucidate the evolutionary differences in brain development between humans and non-human primates. To study these differences, we will develop 3D brain-like structures called brain organoids from human embryonic and induced pluripotent stem cells (iPSC) and compare them to organoids generated from four different primate iPSC lines. The primate lines are derived from chimpanzees, rhesus monkeys, bonobos, and gorillas. We will use immunohistochemistry to validate the identity of the generated brain organoids and compare early structures of brain development recapitulated in organoids at several time points. We will also use multi-electrode array (MEA) analysis to monitor spontaneous neuronal activity at different developmental stages and will investigate differences in neural progenitor cell proliferation rates within the subventricular-like zones of generated brain organoids.

#### 518 3:40 PM

## FOXG1 Syndrome Characterization on Brain Organoids Veronika Mikhaylova (Undergraduate)

FOXG1 syndrome is a rare and debilitating childhood neurological disorder caused by a spontaneous de novo mutation in the FOXG1 gene. This gene encodes the transcription factor, forkhead box G1 protein, which plays a pivotal role in brain development and function. Depending on the severity of the incurred mutation, children with this condition develop seizures, motor disorders, stereotypies, cognitive impairment, mood and sleep disorders, as well as speech delays. In addition, FOXG1 syndrome is classified as an autism spectrum disorder (ASD) because of the associated social impairment often observed in patients. Unfortunately, incomplete characterization of FOXG1 gene and limited knowledge of its range of function hinder the development of potential therapeutic solutions. Given the fundamental role of FOXG1 in brain development, elucidating its function would also provide insights into the pathophysiology of neurological conditions such as autism, schizophrenia and Alzheimer disease. AIM 1: Human stem cell derived brain organoids developed in vitro mimic early stages of fetal development. Our first aim will be the characterization of FOXG1 from a molecular, cellular, and electrophysiological perspective by developing brain organoids from patient-derived induced pluripotent stem cells (iPSC) based on our laboratory's established protocols. AIM 2: Based on information in our studies, regarding downstream targets and binding partners of the FOXG1 protein, and the cellular pathways that it is involved in, we will identify potential therapeutic solutions for the FOXG1 syndrome. The testing of the designed therapies on the organoid model would determine the efficacy of the treatment in vitro and its potential for clinical trials.

### **Session P2-5**

Poster Biological and Agricultural Sciences Friday, March 19, 2021, 4:00 PM

#### 519 4:00 PM

Investigation of the Translational Dynamics of the ALS Associated Protein Ataxin-2 **Steven Decker (Undergraduate)** 

Amyotrophic Lateral Sclerosis (ALS) is a fatal adult-onset neurodegenerative disease characterized by progressive motor neuron death in the brain and spinal cord. Disease prognosis is severe, and the average lifespan for an ALS patient is between 3-5 years following diagnosis, and there are no known cures (Taylor et al., 2016). Recently, trinucleotide (CAG) repeat-expansion mutations in the poly-glutamate (polyQ) domain of the RNA binding protein ataxin-2 have been linked to both familial and sporadic cases of ALS, as intermediate-length (27-34) polyQ repeats are enriched in ALS populations. In vivo fly and mouse models have shown ataxin-2 to exacerbate ALS symptoms by acting as a toxic modifier of TDP-43, a protein most commonly associated with motor neurons death in patients with ALS (Elden et al., 2010). Despite this link, the neuron-specific regulatory functions and mechanistic role of ataxin-2 in ALS pathogenesis remain widely unknown. Due to the known role of ataxin-2 in regulating protein translation, as well as the connection between misregulated protein expression and neurodegenerative disease, we decided to investigate how ataxin-2 expression affects the expression of downstream target genes. Using neuroblastoma cell lines that have been depleted of ataxin-2, we observe several neuronal genes which are disrupted following gene knockdown. We use molecular and biochemical techniques such as western blotting and RT-PCR to validate protein and transcript-level abundance following ataxin-2 depletion, as well as assays such as SUrface SEnsing of Translation (SUnSET) to assess perturbations global levels as translation in a neuronal background. Additionally, we have also used CRISPR-Cas9 to generate a set of both immortalized (293T) and induced pluripotent stem cell (iPSC) lines containing polyQ repeat mutations matching those found in ALS. By differentiating these iPSCs into motor neurons, we can assess both the general and neuronal changes in regulatory function introduced by these polyQ repeat expansion mutations.

#### 520 4:20 PM

## Rethinking Plastic: New Microbes for Production of Biodegradable Polymers **Dena Yaareb (Undergraduate)**

Poly-Hydroxy-Butyrate (PHB), a class of Poly-Hydroxy-Alkenoates, are natural polymers produced by various microorganisms. PHBs have high melting points, a high degree of crystallinity, a linear structure free of brunching, and are generally easily processed for plastic production. In many respects, PHBs are similar to fossil-derived polyesters, but the PHB-polymers are completely biodegradable. Plastic-grade PHB production is an expensive process that requires a robust microbe and an efficient two-stage fermentation process. The high-cost of fermentation feedstocks (i.e.sugars), low conversion of carbon sources to PHA's, poor microorganism growth rates complicates the implementation of biodegradable PHBs as a plastic alternative. For example, 34,000 tonnes of PHAs are produced from 126,000 tonnes of corn. The numbers here don't align, which pushed higher consumption into the PHAs production venue, leaving food production venues deprived. As such, raising the cost of food-based PHAs. Alternatively, to lower the cost of PHB production, methane can be used as a feedstock. Methane, as biogas, is a cheap and waste-derived carbon source. The integration of methane fermentation into PHBs can make the waste utilization a sustainable platform. Several methanotrophic strains have been tested and used to accumulate PHB using methane. One such example is Methylocystis sp. GB 25 DSMZ 7674, which produced PHB content of biomass as high as 51%, and the PHB made was of high quality as analyzed by the study performed. In this study, we tested a set of methanotrophic cultures to identify robust and effective microbes for PHB production. Strains were tested based on the growth rate, methane consumption, and PHB production. We also carried out a number of genetic tests to identify microbes which could be further improved for PHBs production via metabolic engineering.

#### 521 4:40 PM

Soil microbial community diversity and composition differ seasonally among restored grasslands, remnant grasslands, and agricultural lands

#### Fernanda Terrazas (Undergraduate)

Grassland ecosystems around the world have faced substantial degradation and destruction due to disproportionate human consumption and exploitation, but habitat restoration activities can assist in the recovery of these ecosystems. Soil microorganisms play fundamental roles in ecosystem processes and may be effective indicators of restoration success, but their response to restoration management is poorly known. Further, the structure of temperate soil communities changes through the growing season. We examined soil bacterial and archaeal communities using 16S rRNA amplicons. We compared alpha diversity (Shannon diversity, species richness, and Faith's phylogenetic diversity) and taxonomic composition from four sites (remnant prairie, agricultural field in soy cultivation, and old and young restored prairies) in spring, summer, and fall over one year. Remnant prairies were the most diverse of all sites in spring, and their diversity declined in summer. The soy field maintained relatively high diversity throughout the year, followed by the young restoration site, and the old restoration which had the lowest diversity. Taxonomic analyses revealed 38 bacterial and 3 archaeal phyla across all samples. Proteobacteria were the most abundant bacteria across all samples, followed by Actinobacteria, Acidobacteria, and others. The most abundant archaea were Crenarchaeota. Agricultural sites were found to have the most Proteobacteria, while remnant sites had the most Actinobacteria. Results of microbial community measurements suggest that restoration may improve diversity in soil microbial communities, however, unlike remnant prairies, restored grasslands seem to lose diversity over time. While all sites appear to be comparable in composition, differences in diversity may be alluded to differences in species distribution and nutrient availability between all sites.

#### 522 5:00 PM

Structural Flexibility of Regulatory Domain Found in IDH1 Danielle Caliger (Undergraduate) Kate Sabo Nalani Coleman Alexandra Strom Ella Thornberg Vinnie Widjaja

Isocitrate dehydrogenase 1, also known as IDH1, plays a particular role in the TCA cycle in glucose metabolism. Specifically, IDH1 catalyzes the reversible oxidative decarboxylation of isocitrate to alpha-Ketoglutarate (aKG). However, mutations in this enzyme can occur leading to the catalyzation of a neomorphic reaction: the reduction of aKG to D-2-hydroxyglutarate (D2HG). D2HG is an oncometabolite and therefore leads to the accumulation of cancer cells. The majority of these mutations involve amino acid substitutions on residue 132, which is found in the active site of the IDH1 enzyme. Various cancers such as leukemias, gliomas, and chondrosarcomas have been found to be caused by Isocitrate dehydrogenase (IDH) mutations. This further makes these mutations important targets for potential therapeutic solutions. A regulatory domain has been identified in IDH1 that affects catalysis and inhibitor binding, but the structural flexibility of this domain is not well understood. In order to better understand the structural features of this domain, all available structural data on wild type (WT) and mutant IDH1 in substrate-bound and apoenzyme forms will be surveyed in order to identify any changes undertaken by this domain. I expect that the hydrogen bonding patterns will vary between both mutant and WT IDH1, as well as between apoenzymes and holoenzymes. The programs PyMol and RCSB's protein data banks will use in order to compare and contrast bonding patterns in this domain to better understand its stability and intermolecular interactions. By better understanding this regulatory domain and its structural features, various tools for patient prognosis and therapeutic targets can be developed to combat cancers caused by IDH mutants.

### **Session P2-6**

Poster Biological and Agricultural Sciences Saturday, March 20, 2021, 9:00 AM

#### 523 9:00 AM

Visualizing Metabolites in Cellular Models of IDH1-Driven Gliomas Using Cytoscape Nalani Coleman (Undergraduate) Grace Wells Mikella Robinson David Scott An Hoang

Gliomas are the most common and aggressive brain cancer in humans. Isocitrate dehydrogenase 1 (IDH1) is an enzyme found commonly mutated in grade II and III gliomas and secondary glioblastomas. Normally, IDH1 catalyzes the conversion of isocitrate to  $\alpha$ -ketoglutarate ( $\alpha$ KG). However, in mutated form, IDH1 converts  $\alpha$ -ketoglutarate into D-2-hydroxyglutarate, an oncometabolite. D-2-hydroxyglutarate is toxic to cells and drives a number of pro-tumorigenic pathways. In addition to changes in concentration of D2HG and  $\alpha$ KG, other metabolite concentrations change when IDH1 is mutated. We quantitatively analyzed the concentration of 31 metabolites in in vivo wild type (WT) and mutant IDH1 backgrounds. While these experiments shed light on how the metabolite concentrations changed, it was not clear how the metabolites were connected and influenced one another. This research aims to illustrate the connection between metabolites, allowing visualization of metabolite concentration values as node color, and visualization of deviations as node shape. Using Cytoscape, an online data visualization platform, and an add-on application called Metscape, we were able to picture the connections between metabolites. With the exception of some metabolites, while higher concentration metabolites have more connections to other measured metabolites. By elucidating metabolic networks, we can better understand how IDH1 mutations can affect the concentration of metabolites in vivo to help drive aggressive brain cancer.

#### 524 9:20 AM

### Utilizing Capillary Isoelectric Focusing to Detect for Blood Doping

#### Adrian Colazo (Undergraduate)

Performance enhancing methods in competitive sports are not a new phenomenon, but instead a recurring problem in competitive sports as our ability to prevent these practices is limited by our ability to detect them. Autologous blood doping is a method that has remained largely uncontested in competitive sports because there is currently no reliable method to detect it. In autologous blood doping, an athlete extracts their own blood and reinfuses that blood after a period of 40 days. During this waiting period, the athlete's blood count will return to its original state and the reinfusion of the extracted blood will lead to increased red blood cell (RBC) count and oxygen carrying capacity. Since no foreign substance ever enters or leaves the body, there are no easily detectable compounds to identify the process. During the storage period the RBCs undergo several identifiable changes within their chemical composition, namely the non-enzymatic glycosylation of surface proteins due to the high sugar content within their storage solution (CPDA-1). The non-enzymatic glycosylation reaction results in RBCs that have fewer cationic terminal amines on the surface proteins, which results in RBCs that have a different isoelectric point (pl) than those RBCs that stayed in the body. Capillary Isoelectric Focusing (cIEF) is a technique commonly used to separate molecules based on their pl's with great resolution and reproducibility, and if successful will serve as a reliable method to detect for autologous blood doping. In this poster I will present my results on cIEF's ability to separate between fresh and stored RBC's and discuss the factors that influence the success/failure of the separation.

#### 525 9:40 AM

In Silico Screening for Novel Inhibitors of SARS-CoV-2 Replication Complex Sophia Alvarado Hernandez (Undergraduate) Esteban Mora Grace Kim Casey Hearny

SARS-CoV-2 has caused a worldwide pandemic of a scale not seen since the 1918 influenza pandemic. With over 100 million cases and 2 million deaths, SARS-CoV-2 has devastated the world's population and economy. As the virus continues to spread, and new strains emerge, the necessity is greater than ever for a cure to treat coronaviruses and deter future outbreaks. Our research consists of

computational studies to identify leads for potential inhibitors of the replication complex of SARS-CoV-2. We hope that this research will lead to a development of a new class of drugs that target SARS viruses. With the use of Molecular Operating Environment (MOE), a chemi-/bioinformatics software package, we are investigating a library of small molecules that might inhibit the replication complex. By screening compound databases containing over 100,000 molecules, we have identified multiple groups of small molecules or "clusters" of potential inhibitors for further investigation. These clusters have similar scaffolds that contain varying functional groups, allowing us to hypothesize a structure–activity relationship between the compound structure and the inhibition complex. Using these clusters, we will continue to test binding in the replication complex as we search for possible drug leads.

#### 526 10:00 AM

## Shark and Tapeworm Co-Phylogeny Analysis through Machine Learning Algorithms Eduardo Charvel (Undergraduate)

Pathogens and their hosts are known to introduce selective pressures to each other, causing them to coevolve. The purpose of this project is to evaluate the evolutionary connection between shark species and their tapeworm parasites. This will be done through machine learning algorithms applied to the co-phylogenies of sharks and tapeworms. This project will create a machine learning pipeline to identify systems in which the co-phylogenies have been informed by historical biogeographical relationships. That is, we want to detect whether or not the relationships between shark hosts and their tapeworm parasites are influenced by their shared geographical history. This way we will be able to see under which circumstances biogeography does indeed play a role in the evolution of sharks and their tapeworm parasites.

#### 527 10:20 AM

The Expression and Purification of Recombinant Human LAG-3 Receptor Extracellular Domain Protein as a Potential Target for Immunotherapy

#### Lillian Cooke (Undergraduate)

#### Sally Luong

Lymphocyte Activation Gene 3 (LAG-3) is an inhibitory receptor on activated and regulatory T cells. LAG-3 binds Major Histocompatibility Complex II to manage T cell activation. Due to its similarity to other T cell specific membrane receptors, LAG-3 is a proposed checkpoint inhibitor that could be a useful target in the treatment of cancer. The aim of this project is to aid in the development of potent small molecule inhibitors of the LAG-3:MHC II complex interaction to understand the effect that LAG-3 activity has on T cell activation. I will develop an insect cell expression system for high level expression of a soluble form of LAG-3. This protein will be used in in vitro binding assays with soluble MHC-II to characterize the binding and test the activity of inhibitors. I will conduct crystallization studies of sLAG-3 and sLAG-3:MHC II to determine the structure of the complex by x-ray crystallography as well as prepare recombinant baculoviruses encoding for the extracellular domain of human LAG-3 with an N-terminal Gp64 signal peptide and TEV protease-cleavable hexa-histidine tag under control of the insect cell polyhedrin promoter to evaluate the expression of soluble LAG-3 and CD4. CD4 will be used as a control because it helps to bind to CH3, has homology to LAG-3, and has been successfully expressed in eukaryotic cells before. Viral titer and infection conditions will then be adjusted to optimize the levels of sLAG-3 secreted from Sf9 insect cell suspension cultures. Media containing the secreted proteins will be filtered and applied to Ni Sepharose chromatography columns to affinity purify the histidine tagged recombinant sLAG-3 protein. This research will comprise an extensive literature review, experimental design, training, and discussion with peers. This is a novel project because no one has been able to fully comprehend all of the functions of this relationship and its impact on human health. Additionally, it could lead to the development of lead compounds and potential novel therapies.

### **Session P2-7**

Poster Biological and Agricultural Sciences and Interdisciplinary Saturday, March 20, 2021, 10:40 AM

#### 528 10:40 AM

Assessing the Therapeutic Potential of Cannabinoids and Terpenes using a Drosophila-Based Longevity and Traumatic Brain Injury Model Alec Candib (Undergraduate) Natasha Sam Eddie Cho Nicholas Lee Miles Melamed

The legalization and use of cannabis derived products (+500 biologically active) has become increasingly popular. Indeed, one compound, cannabidiol (CBD) is being widely used to treat a wide range of ailments. However, limited research has been done that clarifies the safety, effectiveness and potential molecular mechanism of cannabinoids and terpenes for these therapeutic roles, or investigates how cannabinoids and terpenes interact to modulate the safety and effectiveness of each compound. Drosophila melanogaster (fruit fly) is an effective model used to study genetic factors impacting longevity, neural aging and traumatic brain injury (TBI). We have developed an integrated drug testing platform using Drosophila to examine the potential impacts of treatment with cannabinoids and terpenes on aging and TBI. These studies focus on the oral administration of several cannabinoids: cannabidiol (CBD),  $\Delta^9$ -tetrahydrocannabinol (THC), and cannabinol (CBN); and terpenes:  $\beta$ -myrcene,  $\alpha$ -pinene, and D-limonene; to adult flies. Initial studies focused on treatment with cannabinoids. Treatment with CBD and CBN promoted longevity and helped to slow the age-dependent decline in locomotor behaviors (negative geotaxis response, NGR). In addition, treatment of CBD, THC, and CBN helped slow the decline in NGR and promoted longevity when administered both before and after TBI. In contrast, THC treatment without TBI resulted in a modest decrease in lifespan and worsened the decrease of the NGR. Of particular interest was the finding that cannabinoid treatment altered the basal expression profiles of downstream targets of NF-KB signaling. When administered before trauma, CBD, THC, and CBN lowered expression of these downstream targets. Overall, flies showed unique responses to CBD, THC, and CBN. Dosages of CBD and CBN improved the age-dependent decline to neural function, and dosages of CBD, THC, and CBN improved the response to TBI. Follow-up studies focused on treatment with terpenes alone and in combination with cannabinoids. The impact of these treatments on longevity, NGR, and NF-kB signaling were determined with and without TBI. These findings demonstrate the versatility of Drosophila as an aging and neuro-therapeutic model system and highlights future transcriptomic studies designed to examine the molecular underpinnings of cannabis's impact on complex biological systems.

#### 529 11:00 AM

## A new Enterobacteriaceae species that binds to the intestinal epithelial cells in the lumen of C. elegans and C. briggsae **Emily Morgan (Undergraduate)**

From ecological sampling, we find that wild Caenorhabditis nematodes are commonly associated with a diverse array of microbes, including bacteria, viruses, fungi, and microsporidia. In Bangalore, India, a wild C. briggsae strain (JU3205) was found with an unknown microbe adhering to the intestinal epithelial cells in the lumen of the gut. Phenotypically, this microbe appears to grow perpendicular along the internal sides of the intestinal lumen, giving it a bristle-like appearance. We see a near 100% penetrance with this microbe in the wild C. briggsae strain, and the microbe can easily be transferred to the wild-type N2 C. elegans through growth on the same plate. In order to identify this intestinal-adhering microbe, we extracted a section of the C. briggsae intestine and verified that the adhering bacteria were still present and intact. Then, we conducted PCR using a universal 16S bacterial primer and identified a new species of bacteria in the Enterobacteriaceae family. To verify this identification, we created a unique fluorescence in situ hybridization (FISH) probe to this Enterobacteriaceae species and found it bound to bacilli in the lumen of the intestine, while a control wild C. elegans strain with a different adhering bacteria showed no signal. Furthermore, we used a series of cleaning protocols to remove other contaminating microbes from strain JU3205 and verified via FISH that the Enterobacteriaceae species is still present while other bacteria species appeared to be absent. Finally, we found that this adhering bacteria is pathogenic to its host due to a severe decrease in lifespan and brood size. Altogether, we have discovered and identified a new species of Enterobacteriaceae bacteria that can bind to the apical side of intestinal epithelial cells in C. briggsae and C. elegans. As proof

of principle for a forward genetic screen, we used an intestinal GFP C. elegans strain to validate a visual phenotype for bacterial adherence to the intestine. Given the pathogenic phenotype in the animals and their near 100% penetrance, we believe it can be established as a model system to study natural host-bacteria interactions in the intestine.

#### 530 11:20 AM

Utilizing Molecular Biology, Multi-Omics, and Metabolic Modeling to Bioengineer Methylomicrobium Alcaliphilum 20ZR (a Methanotrophic Bacteria) for Production of Polyhydroxybutyrate **Dennis Krutkin (Undergraduate)** 

Anthropogenic greenhouse gas emissions are the major contributing factors to rising temperatures worldwide. Global warming has intensified dramatically in the last several decades, with methane being the most potent of all greenhouse gasses. As more of the world becomes increasingly aware of the projected trajectories, contemporary solutions are being sought to mitigate the effects from sources such as energy-producers, industry, transportation, and agriculture. Bioengineering, biofiltration, and bioremediation are potential solutions which are at the forefront in the field of renewable energy. A large array of microbes are actively studied with an overarching goal of manipulation towards capturing and utilizing greenhouse gasses. The efficiency of bacteria, in tandem with readily available molecular and computational tools, makes them particularly appealing options for bioconversion of gasses into products of interest. Methanotrophic prokaryotes are bacterial and archaeal species which utilize single-carbon compounds, such as methane or methanol, as their sole carbon sources. Their unique ability allows them to be used as biocatalytic platforms with two main functions: recycling greenhouse gasses and synthesizing compounds with high-added value. Methylomicrobium alcaliphilum 20ZR is an example of such a methanotroph; analysis of high-throughput multi-omics - transcriptomics, proteomics, and metabolomics - has established 20ZR as a versatile biological system capable of growth on a variety of substrates and different conditions. A well-developed, whole genome metabolic flux-balance model allows for in silico simulations which depict cellular energetics and predict theoretical yields of metabolites. The intersection of multi-omics, metabolic modeling, and bacterial physiology has been fine-tuned to bioengineer 20ZR for production of polyhydroxybutyrate (PHB), a biodegradable polyester. 20ZR does not produce PHB naturally; a recombinant operon, phaACB, has been constructed on a high copy number vector and conjugated into 20ZR containing the genes necessary for PHB synthesis - acetyl-CoA C-acetyltransferase, poly(R)-hydroxyalkanoic acid synthase, and acetoacetyl-CoA reductase. Model simulations were evaluated to propose optimal growth conditions for maximized production of PHB. A transcriptomics, differential gene expression, and functional enrichment pipeline has been developed and employed to streamline all computational analyses. Taken together, we demonstrate a multi-faceted approach of bioengineering a non-canonical microbe for optimal production of PHB using an eco-friendly feedstock.

#### 531 11:40 AM Self-Monitoring During Speech Production Katherine Andrade (Doctoral) Conner Sperling Olivia Toohey

Speakers are consistently monitoring their speech. When an error is detected, they may interrupt themselves and repair their utterance. According to the conflict-based monitoring account1, self-monitoring during speech production occurs through the detection of conflict between opposing responses subsequently resolved by domain-general cognitive control. The present study investigates a neural correlate, known as the error negativity (Ne), functioning as a general-purpose response monitoring mechanism2 associated with, but independent, of error detection. Previously, this component has been shown to be present in both correct and error trials, though larger in errors, and onsetting prior to the onset of articulation in studies using scalp electroencephalography. In the study, stereotactic electroencephalographic (SEEG) data was acquired from sixteen patients undergoing clinical monitoring for intractable epilepsy. Patients performed various language tasks, including a picture-naming task which this study focuses on. We have identified eight patients that have verbally produced sufficient speech errors (more than 5 true errors) during the picture-naming task to be included in our analysis. Brain activity associated with speech monitoring was investigated by focusing on the High Frequency Band (HFB- 70-150 Hz) and Local Field Potential (LFP- 0.1-30Hz) activity. To further examine brain regions eliciting the Ne component, localization of SEEG electrodes was performed using overlaid magnetic resonance imaging (MRI) and computerized tomography (CT) scans. Preliminary results show larger activity in errors than correct trials on activity peaking around vocal onset in the right middle-temporal gyrus across multiple subjects. This suggests a role of the right middle-temporal gyrus in response monitoring. Previous studies have identified several regions of the cortex, such as the anterior cingulate cortex and the superior-temporal gyrus, as being associated with speech monitoring. Our next steps are to finalize the localization of the electrodes and to conduct statistical analysis to identify reliable result patterns across patients.

### **Session P2-8**

Poster Interdisciplinary Saturday, March 20, 2021, 12:40 PM

#### 532 12:40 PM

Cognate Word Knowledge and Metalinguistic Awareness in Bilingual Adults with a History of DLD: A Quantitative-Qualitative Approach Halie Doan (Undergraduate) Alexia Aranda Jonathan J.D. Robinson Anthony

Developmental Language Disorder (DLD), affecting approximately 7% of children (Tomblin et al., 1992), progresses into adulthood and contributes to achievement gaps in word comprehension. For bilinguals, two languages that are active at the same time facilitate word comprehension. For example, cognates (e.g., English-Spanish pear-pera) are recognized more accurately than noncognates (e.g., English-Spanish dog-perro). The purpose of this study is to determine whether crosslinguistic overlap within bilingual language systems promotes word comprehension for adults with a history of DLD. We hypothesize that quantitative results will show that cognate word accuracy will be greater than non-cognate word accuracy, especially for participants with a history of DLD. We hypothesize that gualitative themes will emerge from interviews on cognate awareness that will complement the guantitative data. Three Spanish-English bilinguals (21 vo) were recruited: one participant self-reported a history of DLD and two participants without a history of DLD. Using multiple choice, participants read a set of isolated words, some being Spanish-English cognates, and chose their meanings for quantitative analysis. Then participants were Introduced to cognate word properties and participated in phenomenological interviews to gualitatively explore their thought processes. Cognate accuracy was high for all participants, ranging from 93% to 100%. For participants without a history of DLD, noncognate accuracy ranged from 88% to 92%. In contrast, one participant with a history of DLD scored 72% correct on noncognates. Cognate effects (cognate-noncognate accuracy) ranged from 5%-24%, with the participant with a history of DLD showing the largest cognate effect. All participants demonstrated cognate awareness via explicit description of crosslinguistic connections, even if they didn't know what the term "cognate" was. Crosslinguistic overlap of cognate words promotes word comprehension for bilingual adults with and without a history of DLD, as cognates were more accurately recognized than noncognates and gualitative themes of cross-linguistic connection emerged that Mirrored guantitative findings. Furthermore, larger cognate advantages for the participant with a history of DLD supports that bilingual language interaction can facilitate word comprehension in populations at risk for a language disorder. Continued data collection is planned to confirm these pilot results.

#### 533 1:00 PM

## Trends in Stage at Diagnosis for Breast and Colorectal Cancers by Insurance Types and Neighborhood Socioeconomic Status

#### Helen Nguyen (Undergraduate)

Background: Breast and colorectal cancers, which can be detected early through recommended screening, have low mortality when diagnosed at early stages. Two measures that have consistently been associated with attendance to breast and colorectal cancer screenings in the states: insurance types (public vs. private) and neighborhood socioeconomic factors. In recent years, the Affordable Care Act (ACA) helped expand insurance coverage to uninsured Americans and Medicaid eligibility to people under age 65. The aim of our research is to describe recent trends in early vs. late stage female breast and colorectal cancers by insurance types and socioeconomic status. Methods: Data from breast and colorectal cancer patients was extracted from national cancer registries. Using the Census-Tract Level SES and Rurality database from the Surveillance, Epidemiology, and Ends Results (SEER) program; patients with breast and colorectal cancer were classified into tertiles based on their socioeconomic status of their neighborhoods. Cancer stage at diagnosis was defined as early (In situ/localized) or late stage (regional/distant). In addition, we used an insurance recode variable that included patients who were insured, any Medicaid, and uninsured which includes Medicare. Results: Uninsured and Medicaid breast cancer patients were diagnosed at later stages on average (40.3% & 36.5% respectively) compared to privately insured patients (24.2%). For colorectal cancer patients, uninsured and Medicaid patients were more often diagnosed at later stages (62.9% and 57.4%), than privately insured patients (51.0%). Trends in stage by insurance types appeared to be stable over time with the exception of early stage breast cancer in Medicaid patients (increasing slightly). Across tertiles of neighborhood socioeconomic status, differences in later stages at diagnosis were less remarkable. Conclusion: Individual measures of patient poverty (especially Medicaid eligibility) explains far more variation in proportion of later stages at diagnosis than context measures of patient poverty (e.g. neighborhood socioeconomic status). Uninsured patients, or patients with poor health insurance like Medicaid, are more likely to be diagnosed with screenable cancer at later stages. Overall, screening programs should target Medicaid patients to improve cancer burden in low income populations.

#### 534 1:20 PM

#### Prediction of Palmyramide A Activity in Comparison to Novel Marine Compounds Derivatives Melody Matthe (Undergraduate)

Many marine natural products possessing powerful anticancer activities have been found around the world. Specifically, one of the most recent findings is Palmyramide A, a highly cytotoxic cyanobacterial metabolite. It was found on an island in the Northern Pacific Ocean. After getting extracted, it was processed to find that it is a cyclic depsipeptide. It is composed of three amino acids (L-Val, L-Pro, and D-N-MeVal) and three hydroxy acids (L-Pla, L-Lac, and R-Dmhha). Palmyramide A is found to be an attack against colon cancer. However, there aren't any findings on how reactive the compound is against colon cancer. Recent studies of other marine cyclic compounds, which are also found to attack various cancer cells, will seek to compare and contrast their structures to Palmyramide A and to predict where the activity against cancer is in the molecule. The findings of the structure-activity relationship (SAR) are found from changing the chirality and conformation of the different marine compounds and seeing its connection to Palmyramide A. The different derivations of the molecules will result in isolating the main activity of the entire cyclic molecule. In continuing, we plan to further investigate the absolute location of the main activity by removing or changing the R group of the carbons where activity changes. The data seems to indicate that the main activity changes are from the conformation and chirality changes at carbons where the hydroxy acids are. In synthesizing the compound, there has been excellent progress to its completion. Currently five out of the size monomers have been made and progress is currently being made towards the remaining fragment prior to assembly of the main molecular chain.

#### 535 1:40 PM

#### Factors Affecting Adapted Sport Participation-a Survey for Parents of Children with Disabilities **Tania Dutra (Undergraduate) Khoa Vo**

Youth sports participation has a number of benefits, including developing peer relationships, improving fitness, and increasing self-efficacy. However, children with disabilities are less likely than children without disabilities to participate in sports. Our aim is to understand the barriers and facilitators for adapted sports from the parents' perspective. We hypothesized that household income and parent sport participation/history would impact their child's participation in adapted sports. Methods: We developed an anonymous survey, deployed via Qualtrics, to assess beliefs and attitudes towards adapted sports in parents of children with physical or sensory disabilities while looking at barriers and facilitators of participation. Individuals were eligible to participate if they were at least 18 years of age, and had a child between the ages of 5 and 17 with a physical and/or sensory disability. Data was summarized using frequency and proportions (%) and medians and interquartile ranges. Chi-square tests were used to compare the frequencies of household income or education level with sport participation. Results: Children of respondents had a range of diagnoses Spina bifida (29.87%), autism (16.88%), cerebral palsy (11.68%), cognitive impairments (11.68%), spinal cord injuries (3.89%), vision impairments (2.59%), limb amputation (2.59%), and others (14.28%). 73.67% of the respondents stated their children participated in adapted sports. Household income was not related to sport participation in this sample (p=0.838). Most parents who took the survey had previously participated in organized sports (92.69%). For parents whose children did not participate in adapted sports, the reason was not due to concern for their risk of injury (p-value = 0.476). Parents commented that lack of access to facilities or programs, as well as trained personnel, was a barrier to participation. Conclusions: Our pilot study showed that income and parents' previous sports participation was not related to children's adapted sports participation. We also noted that an environmental barrier for some parents was the lack of access in their area to adapted sports programs, making participation for disabled youth increasingly difficult.

### **Session P2-9**

Poster Interdisciplinary Saturday, March 20, 2021, 2:00 PM

#### 536 2:00 PM

Quantitative Analysis of the Methyl, Ethyl, Propyl and Butyl Parabens in Georgian Cosmetics Market Nino Tabagari (Undergraduate)

The safety of the cosmetics is highly important for its consumers. There are different types of substances which are actually preserving the cosmetics for a long time in order to interrupt the bacteria from growing. In Georgia, there are many affordable cosmetic products. Many women due to the affordability of these cosmetics buy it with high demands. This research is dedicated to examine and develop the method of quantitative analysis of four species of parabens: Methyl, Ethyl, Propyl and Butyl. Recently there was a suspicion about paraben toxicity and relation with cancer and cardiovascular diseases (1,2). This research is dedicated to investigate levels of parabens in different cosmetic products on Georgian market. It was hypothesized that, there may be more preservatives used in cosmetics or there will be a chance that more harmful once like Butyl paraben is in high concentrations unlike other parabens. The samples of the low budget of cosmetic products were chosen because the majority of the Georgian citizens buy cheaper products. It was allayed up to 8 cosmetic products such as acne cream, hand cream, eyeshadow, concealer, blush, Moisturizing cream etc. The samples have been dissolved in methanol and extracted with standard methods in order to purify parabens out of each sample. We have optimized High Performance Liquid Chromatography (HPLC) method (3) and have determined contents of parabens in different samples. We have investigated and made an easier and cheaper method investigating the parabens concentration using HPLC. It was decided that an external standard method would be universal to quantitatively calculate concentration of parabens for the samples. Fortunately, the sample products that have been examined, have not high content of parabens. The harder oily compounds were difficult to extract because of the emulation. The methods of separation and quantitative analysis of parabens are precise, fast and affordable. The method and the sample examination must be tested for further research. It is important to mention, we could detect and determine parabens which were not in the list of products' ingredients. It is needed to work cosmetic's products should be investigated to approve safety of cosmetics in Georgian cosmetics market

#### 537 2:20 PM

Quantitative Analysis of the Methyl-, Ethyl-, Propyl-, and Butyl-Parabens in Self-Care Products on Georgian Market Nata Tchitchinadze (Undergraduate)

Parabens are a group of controversial preservatives chemically known as a family of synthetic esters of p-hydroxibenzoic acids (PHBAs) including methyl-, ethyl-, propyl-, butyl-, isobutyl-, pentyl-, phenyl-, and benzyl-paraben. Over the years, these organic compounds have been widely accepted as low toxicity, antimicrobial ingredients and have successfully been used as preservatives in cosmetics, food production, pharmaceutical industries, etc. Obviously, parabens, due to their low cost and longer shelf-life, are the perfect opportunity for the companies to increase the profit margin on their products. Over the past few years, however, some researchers have been concerned with the effects parabens might have when systemically absorbed into the skin - starting from mild allergic reactions to cancer. Due to the controversy accumulated around parabens, the European Union declared a regulation #1004/2014, stating that the maximum concentration limits of 0.14% for Butylparaben or Propylparaben (single esters and their salts), 0.4% for Methylparaben or Ethylparaben (single esters and their salts) is permissible. The use of other parabens in cosmetic products was banned. Throughout this research, the goal was to develop a method for conducting both quantitative and qualitative analysis of methyl-, ethyl-, propyl-, and butyl parabens in 8 self-care products, including skin-care and cosmetics that are widely sold on the Georgian market due to their low prices. The analysis was done via the High Pressure Liquid Chromatography (HPLC), using a rather cheap and easy method that was derived for this experiment. Standard solutions were prepared for each paraben - methyl-, ethyl-, propyl-, and butylparaben. In order to find concentration of parabens in samples, external standards were used. The mobile phase in HPLC was composed of Methanol and water in proportions of 65:35, respectively. 10 µL of each standard was injected twice to ensure accuracy. Results of the HPLC analysis were used to set calibration curves needed for quantitative characterization of the products. Fortunately, only one product exceeded the EU limit of Propyl-paraben by 0.03%. Thus products on Georgian market appear to be more or less safe. Another major problem exposed by this study is inaccurate labeling or the absence of labeling.

#### 538 2:40 PM

Determining E3 Ligase and E3 Ligase Recruiter Activity in Proteolysis Targeting Chimera Induced Degradation Using a Cell-Based Bioluminescence Assay

#### Ronnesha Johnson (Undergraduate) Isaac Marquez Sean Toenjes

Proteolysis targeting chimera (PROTACs) are small dual-ligand molecules that target a protein of interest (POI) for degradation. One portion of the PROTAC specifically binds to the POI while the other recruits an E3 ligase to form a complex. After this complex is completed, the E3 ligase polyubiquitinates the POI, which signals proteasomal degradation. This recent chemical biology strategy led to the generation of numerous PROTACs targeting previously deemed undruggable targets. However, the potential of PROTAC application is greatly limited. With over 500 E3 ligases encoded in the human genome, only a few have been successfully implemented for PROTAC induced degradation. Herein we propose a cell-based assay to ascertain the degradation activity of a known E3 ligase recruiter as a method of discovering novel E3 ligase recruiters. To construct this assay we engineered HEK293 cells via transfection of NanoLuc luciferase (NanoLuc) reporter gene with HaloTag7 fusion protein (HT7- NanoLuc) and a known promoter to generate the expression of HT7- NanoLuc within the cells. NanoLuc operated as the POI and the luminescent expression of NanoLuc indicated the relative quantity of the protein being transcribed and translated in the cells. The HaloPROTAC covalently bound to HT7-Nanoluc to induce degradation whereby a decrease in luminescent signal indicates active E3 ligase recruiters. This assay serves as a platform to determine the degradable ability of novel PROTACs with varying E3 ligase recruiters. If this procedure is effective, this platform can be utilized as a high-throughput screen to discover novel ligands of E3 ligases via a 'non-E3 biased approach'. In essence by appending the HaloTag7 recognition moiety (a chloroalkane tag) to libraries of small molecules, we can screen for potential degraders. This can lead to a library of novel PROTACs that can be used to increase the specificity of inhibitors currently on the market and reduce the expression of previously deemed undruggable targets within patients.

#### 539 3:00 PM

#### Contamination Project Leona Garabedian (Undergraduate)

The greatest challenge when identifying compounds of interest, is understanding the source of unknown background signals. Most of our time is spent trying to confirm where these interferences come from. There are reasons to believe contaminants are present in our very own sampling containers like microcentrifuge tubes. In Dr. Forsberg's lab, an N-acetyl-L-tyrosine stimulant study in Bacteroids fragilis was conducted and a considerable interference was noticed. Data showed an unknown fragment at 274 m/z. The same m/z value was identified in another study. Chai et al. (2019) determined the ion peak is N-lauryl diethanolamine and the compound has been detected in plastic tubes from two suppliers. Furthermore, their experiments confirm interferences were found to be leached from the plastic tubes. This gave us reason to further test if plastic microcentrifuge tubes are a source of contamination. In order to determine contaminates sourced from plastic sampling containers, we compared the spectra of a mixture prepared in plastic microcentrifuge tubes versus glass autosampler vials. A set of five plastic microcentrifuge tubes were vortexed, sonicated, and centrifuged containing a 2:2:1 acetonitrile: methanol: water mixture. The other set of five samples were glass autosampler vials containing the same mixture. The goal was to compare the spectra of each tube and see if antistatic agents were present in only the treated microcentrifuge tubes. The initial analysis of the MCT extracts did not show any significant plasticizer peaks that could cause substantial contamination to our samples. Therefore, we are choosing to look at various pipette tips. Identifying the source of contamination will be the best way to eliminate background noise in untargeted metabolomics. We strive to develop a contamination database to reduce time spent analyzing data and ensure more accurate analysis results.

## Abstracts of Presentations

## **Poster Sessions 3**

1 2 3 4 5 6 7 8 9



### **Session P3-1**

Poster Creative Arts and Design and Visual Performing Arts Friday, March 19, 2021, 9:00 AM

#### 600 9:00 AM

Art Direction for The Hudsucker Proxy Adam Parrocha (Master's)

Art Direction for Television and Film (TFM552) is a course designed to introduce students to the practical, analytical and artistic skills required to design sets for a film or television production. Throughout the semester, I was able to build upon and ascertain new skills to be successful in design departments in Hollywood. Objectives included breaking down a script by defining key design elements, researching the look and style of a film, and how to present the design concept to the production team. I chose to design sets for Joel and Ethan Coen's The Hudsucker Proxy (1994). I designed the settings for the foyer and two executive offices in the fictional Hudsucker Industries skyscraper, taking inspiration and researching art deco landmarks such as the Empire State Building, Rockefeller Center, 70 Pine Street and the Niagara Mohawk building. A requirement of the script included having an immense gear room for a giant clock that adorns the upper reaches of the skyscraper. This space is full of turning gears, steel beams, spiral staircases and catwalks, and is located between the two executive offices. This set is industrial and gritty, providing a contrast to the elegance of the art deco offices. Rather than creating separate sets for the foyer, offices and gear room, I created one giant inter-connected set on one of the largest sound stages in Los Angeles. Other important objectives included determining the budget. This is achieved by approximating how long it will take to build the set, how many people and their pay rate are needed to construct the set, and how much raw material will cost to create the set. A set of this size would require a large crew to construct over many weeks and the budget could surpass \$500,000. Every production presents its own set of design challenges, but the process of creating a unique visual concept through research, discovery and pure imagination is always creatively fulfilling. Learning the entire creative life cycle of a production makes us better designers and prepares us to garner employment with many marketable skills in a highly competitive field.

#### 601 9:20 AM

#### Twitter Bot Poetry: How Poetry Evolves to Serve Humanity Brent Ameneyro (Master's)

In February 2020, I created an automated bot that writes a new micro poem every hour on Twitter. The bot was first given sets of words which were organized at random by an algorithm. It was then altered to reimagine the poetry of William Carlos Williams, and its current iteration is pulling words at random from Jenny Holzer's art. The goal of this Twitter poetry bot is not to render myself a poet, obsolete, but rather to use it as a tool for self-reflection. The poetry bot's often nonsensical compositions have prompted me to think about how poetry has been redefined throughout the generations and how, as readers, we place our own meaning into poems. The bot has prompted me to question the definitions of words like poetry, poet, and reader, but only to find that asking these questions is part of the history of poetry. Poetry is always responding to the world around—it adapts, changes, and its meaning is shaped so that it can be of value to the society that surrounds it. Poetry is a collaborative art that involves more than just the writer; it is defined by context and exists to serve the needs of the readers. I will explore the history of poetry to show that it is constantly in flux and that Twitter bots are just another phase in its never-ending evolution.

#### 602 9:40 AM

An Alternative Vire Jennifer Ousey (Undergraduate)

On behalf of the Interior Architecture department at SDSU, my mentor and I took an interest in the stretch of Montezuma Road adjacent to campus. This street in particular contains an interesting balance between students/staff and the surrounding population. Students walk, bike, and skate down the street on their way to class, and it is also right by the freeway as well as part of the commute to work for many city residents. Because of this location, Montezuma offers an opportunity to redefine public space in such a way that encourages a more symbiotic relationship between San Diego State University and her city. My research began with reading a selection of foundational texts from my mentor, such as The Death and Life of Great American Cities (1961) by Jane Jacobs and Building and Dwelling (2018) by Richard Sennett, which investigate the concept of public space and how it can or should be used.

I drove through my city of Woodland and the neighboring cities of Sacramento and Davis, taking note of which street elements encourage different types of human behavior, both consciously and subconsciously. Elements such as: the width of sidewalks and car lanes, the color and paving of the road, the height of curbs, or just the presence of other pedestrians, all influence human behavior. Pedestrians may feel out of place when these elements combine in such a way that gives the drivers the advantage over people on foot. In the case of Montezuma Road, the street is painted with the standard street elements that give drivers this advantage, such as wide car lanes, black asphalt, skinny sidewalks, and bold lines that demarcate cars from people. While San Diego State buzzes with active students and staff, they'll feel out of place if they walk an extra block away from class. On the other hand, Montezuma also contains the entrance to the school where it intersects with Campanile Dr., but drivers unfamiliar with the area may not even notice as they pass. With these concerns in mind, I chose this specific intersection where Montezuma meets Campanile as my site of focus. The multiple types of traffic, in terms of pedestrian flow, include those coming from the residential housing and apartments, those on their way to the campus restaurants and stores, those headed towards the SDSU Transit Center, etc. Despite this activity revolving around the Montezuma/Campanile intersection, students often take a different route to class, wanting more to look at. Montezuma Road is 80' wide; a flat hike to cross; pedestrians are shooed across the street, quick to cross four wide car lanes to get to their next destination. My conceptual priorities in this project were: to give people on foot a better advantage in this public space, expel the time used while waiting for the turn to cross a street, to offer a route to class with newer views, create space to take a pause and look around, and to elevate a view of the perfect symmetry down Campanile Dr. towards Hepner Hall. During my design process I became familiar with Sketchup, AutoCad, and the Adobe Creative Cloud. I practiced reiterating my research in words as well as sketches. I explored different ways to frame space, and how it can influence the way people think. Throughout this summer I've learned to notice consistent design details in space and the unique atmospheres they can sculpt. Using a newer perspective of my surroundings, I fleshed out a few structural ideas but settled on a simpler one: an organic bridge that reaches over the Montezuma/Campanile intersection, serving as an overpass for people on foot.

#### 603 10:00 AM Technical Direction: Pippin Cynthia Bloodgood (Master's)

Technical direction is theatrical project management. The technical director interprets a scenic designer's plans, translates them into drawings for buildable, actor-safe scenery, "specs out" and orders supplies to build what's necessary, and fits everything within budget. She then instructs crew members and arranges for the order of projects, keeps everyone on schedule to complete the build and load in schedule, secures scenery safely overhead, and leads the team to get everything ready for the actors and designers. This quite literally "sets the stage" for the actors, directing team, and designer to do their work. I will technically direct the show Pippin, performed by a distanced-and-masked, small cast of MFA actors at San Diego State's Don Powell Theater, scheduled for performance in April 2021. The questions I answer with my research are: What is required for this design? What is its structure, the materials it's constructed with, and how does it need to function? How do I make it safe, with scenery they must act (and sometimes dance on), and with scenery that needs to move up and down over their heads? How do I supply this scenery to the team within my budgeted time and money? How do I schedule, organize, and instruct the work of the crew to build and install pieces so different departments (particularly painting and lighting) have access when they need to do their work? How can I get the actors, director and designer what they need, when they need it, to help tell the story of this show? To accomplish these tasks, I will analyze the designer's drawings and stage model, ask follow up questions for unclear items, and track change as the designers and director adjust the scenic design. The construction and installation drawings I create will guide the build team. I will schedule and prioritize the projects that need to be built, for efficient work flow. We move forward on this project, even as the possibility of further lockdown looms, knowing that we may need to pivot to a completely different kind of set for a different kind of production.

### **Session P3-2**

Poster Engineering and Computer Science Friday, March 19, 2021, 10:20 AM

#### 604 10:20 AM

Transcriptional Analysis of Microbial Electrosynthesis in Bioelectrochemical Systems at Different Starting Potentials Tyler Myers (Doctoral)

Bioelectrochemical Systems(BES) are a technology capable of methane(CH4) production via the reduction of CO2. A key step in this process is the uptake of electrons due to the role of electron transfer in electrotrophic methanogenesis(i.e. electromethanogenesis). The mechanism of electron uptake in microbial communities within BESs still lacks understanding, although this mechanism is crucial for the development of these systems. This research will investigate a range of starting potentials(-0.7, -0.8, -0.9, -1.0, -1.1V vs Ag/ AgCl), focusing on cyclic voltammetry(CV) measurements to determine electron transfer behaviors in the biocathodes. Additionally, transcriptional analyses will be conducted to investigate the key metabolic processes within the microbial community associated with electron transfer.

#### 605 10:40 AM

#### Persistence of SARS-CoV-2 in Natural Waters

#### Alma Rocha (Master's)

The unprecedented COVID-19 pandemic has led to the discovery that the novel coronavirus SARS-CoV-2, which causes the disease, is excreted in the feces of infected individuals and detected in sewage. This has sparked questions regarding the persistence of the virus and its genetic signal in polluted waters. Previous studies have shown that untreated wastewater introduced to surface water through sanitary sewer overflows (SSOs) or sewer exfiltration is an important source of microbial pollution to an urban river and its tributaries. Given that SARS-CoV-2 is present in untreated wastewater and may be introduced to coastal environments via sewer exfiltration, SSOs, illegal discharges, and ocean sewage outfalls, there is an immediate need to better understand its persistence in wastewater and surface water. Composite (24-hr) wastewater samples were collected biweekly from two wastewater treatment plants in San Diego County, CA from April to October 2020. These samples were used to compare the efficiency of variations of the adsorption-extraction method for concentrating viruses in sewage and polluted waters. Preliminary results showed that the RNA concentrations in raw wastewater varied from 8.72-16.7 µg/mL, with up to 106 copies/L of SARS-CoV-2 based on the CDC N1 and N2 assays. Additionally, SARS-CoV-2 was detected in the Tijuana River on two occasions at concentrations as high as in untreated wastewater influent. These results will serve as a comparison to laboratory spiked samples, which will simulate impaired natural waters like the Tijuana River. Further studies are needed to quantify the virus in a wastewater-surface water matrix. Experiments to evaluate persistence of the genetic signal under solar exposure will be performed using sewage-spiked river and ocean samples subjected to solar irradiation under controlled conditions. Non-destructive sampling and analysis of fluorescence intensities over the experimental period will be measured to provide estimates of photolysis rates. We hypothesize the persistence of the SARS-CoV-2 genetic signal in surface water will be longer under dark conditions than with sunlight exposure, and that the virus signal will experience a 90% reduction with a solar exposure in the range of 0.1 – 10 MJ/m2.

#### 606 11:00 AM

#### Predicting Critical Bicycle-Vehicle Near-Crashes at Signalized Intersections Alireza Darzian Rostami (Master's)

Continuous development of urban infrastructure focusing on sustainable transportation has led to a proliferation of vulnerable road users (VRUs), such as bicyclists and pedestrians, at intersections. Intersection safety evaluation has primarily relied on historical crash data. However, due to several limitations, including scarcity, unpredictability, and irregularity of crash occurrences, quantitative and qualitative analyses of crashes may not be accurate. Intersection safety can be proactively evaluated by quantifying near-crashes using alternative measures known as surrogate safety measures (SSMs). This study focuses on developing models to predict critical near-crashes between vehicles and bicycles at intersections based on SSMs and kinematic data. Video data from ten signalized intersections in the city of San Diego were employed to train logistic regression (LR), support vector machine (SVM), and random forest (RF) models. A variation of time-to-collision called T2 and the post encroachment time (PET) were utilized to specify monitoring

periods and to identify critical near-crashes, respectively. Four scenarios were created using two thresholds of 5 and 3 s for both PET and T2. In each scenario, five monitoring period lengths were examined. The RF model was superior compared to other models in various scenarios and across different monitoring period lengths. The results also showed a small trade-off between model performance and monitoring period length, identifying models with monitoring period lengths of 10 and 20 frames performed slightly better than those with lower or higher lengths. Sequential backward and forward feature selection methods were also applied that enhanced model performance. The best RF model had recall values of 85% or higher across all scenarios. Also, RF prediction models performed better when considering just the rear-end near-crashes with recalls of above 90%.

#### 607 11:20 AM

## Evaluating Fecal Pollutant Inputs From an Urban Watershed During Wet and Dry Weather Margot Mueller (Master's)

Urbanization has significantly degraded the water quality, habitat, and hydrology of urban waterways. Distinguishing anthropogenic fecal pollutant inputs to streams is currently one of the most pressing environmental challenges for urban water managers. Although stormwater enters urban waterways from municipal separate storm sewer systems (MS4s) rather than from combined sewer systems (CSSs), streams and rivers in Southern California often exceed water quality targets for fecal indicator bacteria. Pathogenic microorganisms and other pollutants may be introduced to streams from both surface and subsurface sources, and the relative importance of different sources is not yet well understood. In this study, long-term field-based measurements were used to evaluate fecal indicator bacteria (FIB) loadings at an upstream and downstream location of Alvarado Creek, an urban creek in Southern California which drains to the Pacific Ocean. Monthly dry weather samples and storm samples were collected and analyzed for Enterococci and E.coli between October 2018 to January 2021. Evaluation of watershed FIB contributions and any removal that may have occurred between the upstream and downstream sites aims to determine the significance of anthropogenic fecal pollutant inputs in Alvarado Creek. Initial trends indicate the highest Enterococci and E.Coli loadings occur during the first flush (first storm) of the wet season.

#### 608 11:40 AM

#### Trajectory Prediction at Intersections Using Inverse Reinforcement Learning Mohammad Sadegh Jazaveri (Master's)

It is necessary for automated vehicles to be able to predict the path of other vehicles in their environment to be able to properly plan their own movements. It is important that these predictions be accurate because errors may lead to accidents. This is of particular importance at intersections where the environment is more complex and the risk of collision is higher. Between 2014 and 2018 around 40 percent of all crashes and 24 percent of fatal crashes happened at intersections according to the National Traffic Safety Administration. In this work we have developed a method for trajectory prediction based on spline curves, neural networks, and inverse reinforcement learning (IRL). For our work we used the New Generation Simulation (NGSIM) dataset. Trajectory data from three signalized intersections was extracted from the dataset and each of these trajectories were represented using two spline curves. A neural network was then trained to predict the parameters of these curves given features including the x and y positions of the vehicle, average and final speeds and acceleration before the turning movement, vehicle heading before the turning movement and the movements permitted for the vehicle's lane. This model was then used to generate multiple candidate trajectories which were then ranked using an IRL model with respect to the interactions with the other vehicles present at the intersection to find the trajectory most likely to be taken by a human driver.

### **Session P3-3**

Poster Engineering and Computer Science Friday, March 19, 2021, 12:40 PM

#### 609 12:40 PM

Testing and Validation of Synthetic Jet Actuators on Airfoils April Thongrivong (Undergraduate) Spencer Hartmann Reyno Renolayan Keegan Dirks

Flow separation occurs when a flow no longer follows the streamline of the airfoil, causing an increase in drag, and in the case of compressors, surge occurs. Synthetic jet actuators are devices used for flow control and there are several ways synthetic jet actuators can be applied. The focus of the research has been to analyze the effectiveness of piezoelectric disks as synthetic jet actuators, in addition to how the disks affect the flow over the compressor blade airfoil, NACA 65(2)-415. As airfoils are rotated to higher angles, flow separation can occur. Synthetic jet actuators function through the injection of air along the flow path, aiding in the prevention of flow separation by reenergizing the boundary layer. The current design is an airfoil containing two synthetic jets on the convex side of the airfoil. Wind tunnel testing and PIV (particle image velocimetry) testing is performed to obtain real-world data for the application of synthetic jet actuators in the prevention of flow separation. The wind tunnel data is then compared with the CFD (computational fluid dynamics) data in order to validate accuracy within the computational solutions. The validation of the CFD solutions confirm that the synthetic jets can successfully be tested computationally, reducing the amount of wind tunnel testing required. Lastly, computational solutions are obtained for the specific case of synthetic jets being applied on compressor blades with the presence of an adverse pressure gradient.

#### 610 1:00 PM

Impacts of Wildfires on Coastal Discharges in the Amazon River Basin Sophia Jorge (Undergraduate) Nicole Sierra Michelle Peters

The vulnerability of coastal areas to terrestrial watershed disturbances, such as wildfires, remains unknown and unquantified. In 2020 alone, there was an unprecedented amount of wildfires, causing damage and disruption throughout the world, with Australia experiencing its largest bushfire in history and the Amazon continuing to battle unusually high numbers of fires. As many coastal waterways are downstream of terrestrial areas that are susceptible to wildfires, it is critical to evaluate the impacts of wildfires on vulnerable marine environments. This study sets out to identify and quantify the impacts of wildfires on coastal regions. Large spatial datasets are utilized to interlink spatial and temporal dynamics of terrestrial processes and disruptions from wildfires with coastal runoff and ecosystem shifts in the Amazon River Basin. This work will focus specifically on the area within the Brazilian state of Roraima where a large number of fires have been observed in recent years upstream of the coast. The extent and magnitude of previous wildfires was characterized using satellite-based products, Enhanced Vegetation Index (EVI), Normalized differential vegetation index (NDVI), and differenced normalized burn ratio (dNBR), to compare pre- and post-fire biomass and estimate the burn severity of plant material and soil. Discharge flows and water quality data were obtained from multiple data repositories available through the Brazilian government, with the majority of the river gauge stations being actively managed by the Geological Survey of Brazil (GSB). This data was compiled for fires which occurred between 2010 to 2020 to evaluate post-fire water quality response. A subset of fires concentrated along the Branco River and Rio Negro, two large tributaries to the Amazon River, was examined in further detail to identify trends in water-quality response. Assembling this extensive dataset provided the unique opportunity to determine the most common post-fire water quality changes in the Branco River, Rio Negro, and Amazon River. Results from this study will further be used to identify shifts in water quality in and impacts of the coastal discharge of the Amazon River post fires

#### 611 1:20 PM

Optimal Drone Fleet Landing Congested Urban Airspace Xikai Xie (Undergraduate)

As a new but popular delivery carrier, autonomous vehicles such as self-driving cars and drones are expected to perform vast-range transportation work. During the COVID-19 global pandemic, the demand for autonomous transportation vehicles increased sharply

because its non-contact delivery method secures the personal health safety of customers. The goal of this research project is to develop a method to optimize the route for drones to execute landing tasks within an open urban environment in case of any emergencies such as extreme weather conditions. Therefore, the focus of this project is to build an algorithm that can navigate a group of drones to land on desired landing pads in an efficient way. In order to fulfill this task, we designed a distributed planning algorithm that will assign each drone to its nearest landing pad by considering drone traffic congestion. To evaluate this algorithm, we build a multi-agents system simulation in Airsim, which is an open source 3D simulation environment. We test multiple real-life scenarios with randomly distributed drones. The result demonstrates the success of our algorithm which is well shown in our video.

#### 612 1:40 PM

#### Comparison of California Irrigation Management Information System Evapotranspiration across California Moises Espinoza (Undergraduate)

Evapotranspiration (ET) is the process by which water is lost into the atmosphere from either soil or an open water surface and by plant transpiration. It is important to have estimates of ET in California for predicting and managing the amount of water needed for irrigation. In particular, reference ET or ETo is the rate of evaporation from an idealized grass surface. ETo assumes well watered and shaded conditions, fixed crop height of 0.12 m, fixed surface resistance of 70 s/m, and an albedo of 0.23. Understanding ET conditions may also help with assessing drought conditions or serve as an indicator for future droughts. This is especially critical in California, which has been severely impacted by droughts, which can impact the agricultural economy. The goal of this work is to analyze ET rates obtained from the California Irrigation Management Information System (CIMIS) database across different regions of California, which will be used to validate satellite-based data in future work. CIMIS consists of 155 weather stations throughout the state of California and provides publicly available estimates of weather and reference evapotranspiration on an hourly and daily basis. CIMIS provides meteorological variables such as total precipitation, solar radiation, vapor pressure, air temperature, relative humidity, and hourly ET. ECOSTRESS ECOsystem Spaceborne Thermal Radiometer Experiment in Space Station is a thermal radiometer that measures thermal infrared radiation and provides estimates of ET at 70 m spatial resolution every 1-5 days. A previous study of ECOSTRESS potential ET with CIMIS found a relatively high correlation; however, building upon the gaps identified, this work will utilize land cover land use (LULC) and ecoregion maps to select CIMIS stations to augment the study. Data will be collected from four CIMIS weather stations from June 2018-July 2020 for different ecosystem types and climates. Evapotranspiration is expected to vary by ecoregion and improve our understanding of the regional capabilities of ECOSTRESS. Further, land heterogeneity will affect the rate of ET, as well as differences in time, place, and season. This project will provide a better understanding of ET by ecoregion in California, which can benefit effective planning for irrigation practices.

#### 613 2:00 PM

### Analysis of Contractual Scheduling Requirements in Different Delivery Methods

#### Manuel Martinez (Undergraduate)

Collaborative scheduling in construction provides benefits that range from improved productivity to effective communication between multiple stakeholders including clients, contractors, designers, and workers. In collaborative environments, team members engage with the development of the project schedule and consistently contribute with their knowledge to better execute their tasks. However, construction projects are designed and built by teams assembled using delivery methods, which have different commercial, organizational, and operational systems, outlined in contractual clauses, that might or might not be conducive to collaboration. The objective of this study is to identify how schedules and the scheduling task are addressed within construction contracts for different project delivery methods. The working hypothesis is that schedules are treated in static and prescriptive ways by less collaborative delivery methods and in more dynamic ways by collaborative delivery methods. The author developed a qualitative analysis of construction contracts for different delivery methods including design bid build, construction management, design build, and integrated project delivery. A search for words starting with "schedule" was conducted to identify clauses in which schedules and the scheduling process were addressed. These clauses were analyzed considering the contracts for the different delivery methods investigated and categorized regarding their intent: promote compliance to rules and requirements or support collaboration. Results support the working hypothesis by demonstrating that the contracts for less collaborative delivery methods might have higher numbers of mentions of the "schedul" root but they are not necessarily associated with collaborative practices. Instead, they are associated mostly with performing an action, assigning timing to a task, and creating or referring to a document. While contracts associated with more collaborative delivery methods also have prescriptive schedule-related clauses, they also have additional mentions of the "schedul" root referring to collaborative tasks and processes which require participation of multiple project stakeholders. Analysis of the clauses and different delivery methods supports the hypothesis where schedules are treated as living documents and in dynamic ways by more collaborative delivery methods.

### **Session P3-4**

Poster Engineering and Computer Science Friday, March 19, 2021, 2:20 PM

#### 614 2:20 PM

BLE Beacon Tracking: A Quantitative Report on Distance Estimation from RSSI **Reed Rohlfing (Undergraduate)** 

Bluetooth Low Energy (BLE) beacons are a relatively new type of IoT device. Their main purpose is to broadcast messages, within a short range, to other Bluetooth enabled devices with low power consumption. This enables them to be useful in a variety of scenarios, such as pushing marketing content, gathering data, and location tracking. The purpose for the beacons within this project is to track chimpanzee locations in Congo, Africa. Primatologists at a chimpanzee sanctuary want to understand how wounded chimpanzees interact to help them determine their survival probability outside of the sanctuary. To do this, a mobile BLE beacon will be placed on the forearm of each chimpanzee. The beacons will continuously broadcast the time, their Received Signal Strength Indicator (RSSI) value, and their unique identifier. Static BLE beacons, scattered throughout the sanctuary, will collect and store the broadcasted data. Periodically, scientists will retrieve the data and use machine learning to correlate the RSSI values to relative location over time. Thus, they can determine chimpanzee behavior with respect to proximity and interaction. This method of tracking was chosen for its small size (the beacon is roughly the size of a quarter), low power consumption, and minimal amount of human interaction. In this project, baseline tests were performed to establish an understanding of how RSSI correlates to distance. Then, various tests were completed to simulate the intricacies of an animal sanctuary, such as object interference.

#### 615 2:40 PM

The First Comprehensive Model of Bioelectrochemical Systems Jake Hester (Undergraduate) Mark Anthony Relon Tyler Myers

Bioelectrochemical systems (BES) may be used to convert carbon dioxide (CO2) to methane (CH4), a carbon-neutral energy source, as well as a number of other redox-based processes that can be applied to wastewater treatment and resource recovery. However, current BES models do not consider both bioanode and biocathode compartments, or the transport of gases across the proton exchange membrane. Therefore, the objective of this research was to develop the first comprehensive model of a BES (BESM1), to be employed in the fields of energy and nutrient recovery, groundwater monitoring, or chemical/pharmaceutical production. To establish a foundation for BESM1, data that was collected in a laboratory for over six years from multiple BES reactors was utilized in an adapted modeling framework from the anaerobic digestion model 1 (ADM1). The collected data was used to incorporate initial conditions, along with kinetic rates and organic compound production/transportation differentials, to display a graphical visualization of the dynamic processes occurring in the system. Developed in Matlab, this model can be used as a mathematical optimization tool to predict outcomes based on various conditions (i.e., different gas compositions, applied potential, etc.). As a result, BESM1 can be used to determine ideal conditions for peak efficiency within BES technology and to predict the performance of BESs for scaled-up applications.

#### 616 3:00 PM

## Failure Analysis of Transition Regions in Hybrid Laminates Between Regions with and without Metal Ply Reinforcements

#### Itzel Salgado (Undergraduate)

Composite materials, such as carbon fiber reinforced polymers (CFRP), have properties which are highly sought after in the aerospace industry due to their high strength and stiffness to weight ratio. However, due to the low bearing strength of these polymer matrix composites, metal fasteners cannot be used to join parts unless the bearing strength is increased. Therefore, to use metal fasteners composite parts are made thicker to increase the bearing strength which reduces their potential and leads to an increase of weight, cost and load eccentricity introducing additional bending loads when joining. Due to the high bearing strengths of metal, local metal hybridization with CFRP can provide an increased localized bearing strength in the region where the metal fastener is needed. However, in creating a localized bearing strength increase, a transition region would be introduced as the plies transition from the

composite fibers to the metal foils. Previous research has been conducted on the failure of this transition region; however, there have not been studies focusing on designing this transition region to reduce the concentration of strains produced from the stiffness mismatch. In this study, the results of a computational finite element analysis on the transition region is presented. The finite element model uses continuum shell elements to model the composite layup and continuum shell elements for the adhesive regions to understand the progressive damage during static bending tests. This analysis can further be used in understanding the load-carrying behavior of the transition region in hybrid laminates as well as develop design specifications for the transition region to maximize the localized bearing strength without failing at this region.

#### 617 3:20 PM

#### ESRGAN Upscaling for Video QoE Improvement in Wireless Multimedia Communications Kaliyah Johnson (Undergraduate) Michael McCullough Krishna Kattiyan Ramamoorthy

Multimedia Quality of Experience (QoE) is a prominent factor that drives customer satisfaction and user experience in wireless communications. With multimedia communications transitioning from high definition to 4K resolution, new techniques need to be explored to accommodate for this significant change without hindering the end user QoE. In this work, we propose an Enhanced Super Resolution Generative Adversarial Networks (ESRGAN)-based upscaling and multimedia transmission pipeline over a lossy wireless channel. The pipeline is exploited to simulate the transmission of raw ultra-high-resolution videos. Then, the QoE achieved through novel ESRGAN upscaling is then assessed against the industry standard bi-cubic interpolation technique. The Multimedia QoE perceived has been measured objectively in terms of throughput and latency, until recently, emphasis has been on subjective metrics such as smoothness and depth of video. In this work, we use subjective metrics: Video Multimethod Assessment Fusion (VMAF) and Peak Signal to Noise Ratio (PSNR) to evaluate the multimedia quality gain. Simulation results demonstrate that ESRGAN based upscaling can be leveraged to achieve superior perceptual visual quality in a lossy wireless channel.

#### 618 3:40 PM

#### Single Barrier Discharge (SBD) Plasma Actuators for Flow Control on an Aerospike Nozzle Engine Jordan Calderon (Undergraduate) Luis Solano Carlos Guerrero

The concept of a rocket nozzle that allows for optimum efficiency at all altitudes is known as an aerospike. However, with this great attribute comes consideration of why most rockets still feature a bell nozzle, which only has an optimum efficiency at a certain range of altitude. One main reason for the unreliability of the aerospike nozzle is the drag created by the recirculation caused by the nozzle itself. This project investigates the drag-inducing wake physics of a truncated aerospike nozzle and the potential effects of integrating single barrier dielectric plasma actuators to the aerospike nozzle, which could minimize the drag that the aerospike experiences, and thus improve the performance of the engine. Currently, a small-scale experimental model is being developed that will use compressed air to simulate the supersonic exhaust of an aerospike nozzle engine. Computational fluid dynamics (CFD) simulations have also begun through ANSYS Fluent, which allows us to understand flow characteristics under different initial conditions and nozzle pressure ratios. Progress on meshing the flow and obtaining a two-dimensional contour from the three-dimensional model are allowing an understanding of what pressures are safe to test our model on. Testing is performed on linear aerospike nozzles with different truncation levels, while base pressure and thrust coefficients are measured under varying nozzle pressure ratios with and without the plasma actuators. Schlieren images will be taken and analyzed, and the data gathered will be compared with the results from the CFD simulations on the test model. Validation of a model that properly captures the physics of wake transition under the effects of plasma actuators can lead to the further understanding of using plasma actuators for flow control and the development of industrial applications.

### **Session P3-5**

Poster Engineering and Computer Science and Health Nutrition and Clinical Sciences Friday, March 19, 2021, 4:00 PM

#### 619 4:00 PM

Water Table Experiment: Interaction of complex geometry with a hydraulic jump Daniel O'Haire (Undergraduate) Brady Johnson Benny Jamie

The behavior of shocked flow around complex geometry in a supersonic environment is difficult to predict theoretically. To better understand shock wave formation and interaction along complex geometry, experimental testing is necessary to provide data which will assist in validating computational models of experiments conducted by past researchers. Traditional supersonic testing through the use of a wind tunnel has a large monetary cost. This can be mitigated by correlating the flow of shallow water to gas dynamics using two-dimensional continuity equations. With this relationship we can use a device that creates hydraulic jumps in shallow water to simulate shock laden flow, known as a water table. Our team is working on calibrating and validating the use of the water table as a simulation for shock laden flow. We are also applying the water table to study shock interaction with complex geometry, such as cylinders with sinusoidal surface patterns. Validating the water table as a testing method for simulating shocked flow, we can then use it to study complex geometry's interaction with shockwaves. The utilization of the water table proves to be a promising method to model the effects of a shock wave interacting with complex geometry. By creating a column of water with a height higher than the flowing shallow water, a hydraulic jump can be created. This hydraulic jump can be used to simulate a shock in supersonic flow, and we can relate the Froude number of the water table to the Mach number of flow conditions. Our team works to validate the results produced by the water table computationally using Ansys Fluent. We have worked on simulations such as laminar pipe flow, flow over an airfoil, and flow over a cylinder in transient case, as well as 2-dimensional open channel simulations. These simulations are leading up to a full multiphase flow simulation of the water table, which will be used to validate the water table.

#### 620 4:20 PM

The Effect of Different Iron Oxidation States on Biocathode Methane Production Christopher Oyuela (Undergraduate) Jake Gio Hester Tyler Myers

As interest in alternative renewable energy technologies increases, more research has focused on developing methods to upgrade biogas from anaerobic digestion by converting biogas carbon dioxide to methane (CH4). This approach can be used to produce energy by utilizing exoelectrogenic bacteria and methanogenic archaea in a bioelectrochemical system (BES). BES technology has many potential uses, from wastewater treatment and electricity generation to biofuel production and carbon capture. Some work has shown that iron addition to a biocathode can improve CH4 production but the mechanism(s) for this improvement is not currently known. Therefore, the objective of this research was to determine the effect of different iron oxidation states (Fe0, Fe2+, Fe3+) on the performance of a BES by evaluating the addition of zero-valent iron (ZVI), ferrous chloride, and magnetite to a biocathode. For this study, four BESs will be developed and the biocathodes will be supplemented with different forms of iron to gain a better insight into the performance of iron supplemented cathodes, the microbial communities, and any potential precipitate formation. Comparisons between BES systems will be achieved through the characterization of gas production and liquid chromatography, iron concentrations, and microbial community DNA and RNA analyses. Understanding the mechanism(s) responsible for iron-enhanced biocathode CH4 production may lead to the design of more efficient energy-recovery BESs.

#### 621 4:40 PM

Crosslinguistic Interference in Word Retrieval in Spanish English Bilinguals – A Large Scale Behavioral Study Anahy Barragan Diaz (Master's) Priscilla Martinez Johnathan Robinson Anthony Alexa D'Heilly

Languages in bilinguals are simultaneously activated, and this cross-linguistic interaction has been shown to have the potential to facilitate or hinder word retrieval. The impact that bilinguals' relative language proficiencies have on resolving cross-linguistic interference during word retrieval has been understudied. This study investigates cross-linguistic interference resolution abilities in a large sample of Spanish-English bilingual participants using a Spanish picture naming task with overlapping written distractor words. The distractor words could be either false-cognates (FC) relative to the picture name (e.g., PLUMA, meaning "feather" in Spanish, on the picture of a plum, "ciruela" in Spanish), identical (ID), or unrelated (UR) to the picture name. In addition, participants answered detailed questions about their language proficiencies, participated in the Multilingual Naming Test (MINT) providing an objective measure of their proficiency in both languages, and participated in a non-linguistic spatial Stroop paradigm to assess their non-linguistic interference control abilities. We hypothesized that, on this Spanish task, English-dominant Spanish-English bilinguals with lower Spanish proficiency levels would experience stronger cross-linguistic interference in comparison to English-dominant Spanish-English bilinguals with higher levels of Spanish proficiency. Participants to date include 6 adult Spanish-English bilinguals with varying levels of Spanish proficiency, 4 of which were English-dominant as determined by their MINT scores. Preliminary results show the expected identity priming effect (better performance in ID vs. UR conditions, ps <.05 for reaction times and accuracy rates), a significant cross-linguistic effect (in FC vs. ID conditions, ps <.05 for reaction times and accuracy rates), and a significant non-linguistic interference effect (better performance in the congruent vs. incongruent condition, ps <.05 for reaction times and accuracy rates). There was a significant correlation between accuracy rates in the UR condition and Spanish proficiency scores (r=.82, p=.046). However, other correlations including correlations between the cross-linguistic interference effect and Spanish or English proficiency scores were not significant. In sum, our results are showing some expected effects, however more participants are needed to investigate relationships between cross-linguistic interference resolution abilities and language proficiency scores in Spanish-English bilinguals. Additional participants are currently completing the study and their results will be presented at the symposium.

#### 622 5:00 PM

## Online Administration of the Comprehensive Aphasia Test Lindsay Hill (Master's)

Aphasia is an acquired language disorder that causes difficulty with understanding and producing spoken and written language [2]. Unfortunately, many people with aphasia (PWA) are unable to access speech-language therapy to improve communication due to a variety of barriers, including lack of access to services in rural areas [1], comorbid physical impairments that make travel difficult and recently, limitations on in-person service delivery in light of the COVID-19 pandemic. Although telepractice may be a viable solution to this constriction of resources, literature supporting the use of virtual aphasia assessment is sparse, and the clinician planning a virtual assessment is left with many unanswered questions. This study seeks to address some of these questions by providing an initial overview of administering the Comprehensive Aphasia Test (CAT) [3] via videoconference. The research questions are as follows: RQ1: Is it possible to administer the CAT remotely via videoconference? RQ2: What is test-retest reliability for remote administration of the CAT? RQ3: How will individual participant attributes influence the feasibility or success of remote administration of the CAT, and what are the implications of these factors for test administration? Participants completed pre-assessment measures to rule out factors that could negatively impact their performance, including vision and hearing impairment and cognitive deficits. Questionnaires were administered to gauge levels of depression and technology use habits. In the following two sessions, 2-3 weeks apart, the participants took the Comprehensive Aphasia Test via videoconference. Data from the first 3 participants suggests that virtual CAT administration is feasible with certain modifications and lends itself well to being adapted to meet the needs of clients with varying severity levels of aphasia, comorbid motor speech disorders, and comfort using technology. Initial data are promising, with average test-retest reliability as follows for each test domain: Cognition Subtests average r = .91 (range r = .79-.99; Receptive Language Subtests average r = .96 (range r = .93-.99); Expressive Language Subtests average r = .94 (range r = .92-.98); Reading Language Subtests average r = .99 (range r = .99=.99). Data collection is ongoing and will provide insight into possible learning effects and test modifications for various client profiles.

### **Session P3-6**

Poster Health Nutrition and Clinical Sciences Saturday, March 20, 2021, 9:00 AM

#### 623 9:00 AM

Joint Impact of Calorie Intake and Pessimism on Insomnia Among Breast Cancer Survivors Cesar Arevalo (Master's)

Breast Cancer is the leading cause of cancer among women, with an estimated prevalence of 2.09 worldwide. (World Health Organization, 2019). There have been multiple studies looking at the risk factors of insomnia among women with breast cancer. Chemotherapy and age were reported to be risk factors for insomnia (Savard et al., 2001). Pessimism has been associated with worsening health issues, including insomnia (Uchino et al., 2017) (Ren et al., 2019) (Schou et al., 2015). Another influence on higher insomnia rates includes calorie intake. Individuals who experienced insomnia had a significantly higher kilocalorie consumption, 35.8 kcal per day, 95% CI (17.4, 51.1) (Cheng et al., 2016). The present study will analyze the joint impact of pessimism and total calorie intake on insomnia scores among breast cancer survivors. This study leveraged the data from a randomized trial among breast cancer survivors called The Women's Healthy Eating and Living (WHEL). The study recruited n=3088 participants, all who recovered from Stage I, II, or IIIA breast cancer, who survived within four years of their diagnosis. The pessimism variable was assessed using the Thoughts and Feelings questionnaire from the Women's Health Initiative. A Generalized Estimating Equation was used to calculate the analysis parameters. Insomnia was dichotomized into two levels. Calorie intake was categorized into four levels based on the calculated guartiles on the continuous variable. Pessimism was categorized into three levels. The joint impact of calorie intake and pessimism was calculated using the bottom two and top two guartiles of calorie intake. Participants were primarily white(85%), stage Il cancer survivors (56%), who had received chemotherapy treatment (69%). Higher pessimism scores were positively associated with higher insomnia scores P<.0001. Higher Calorie intake was also associated with higher pessimism scores P=.04. The Joint impact of higher calorie intake and pessimism scores were positively associated with higher insomnia scores among breast cancer survivors.

#### 624 9:20 AM

Pre vs Post Covid-19: Minority Participation in Research at the CAP Accredited UC San Diego Biorepository **David Anjakos (Undergraduate)** 

The UC San Diego (UCSD) Moores Cancer Center Biorepository (BR) is a College of American Pathologists (CAP) accredited core providing a full array of biological sample services including tissue biobanking. The Minorities Outreach Repository Effort (MORE) was launched in 2018 as an effort to increase the enrollment of minorities in the Biorepository. The MORE initiative showed an accrual increase of 213% compared to previous years. Demographics enrollment data analysis to evaluate effectiveness of MORE study; data analysis of Pre-Covid-19 minority participation from July 2019 to March 2020, compared with Post-COVID-19 pandemic minority enrollment from March 2020 to December 2020. The biorepository identifies and prescreens potential patients from oncology clinics with the help of treatment teams. Eligible patients are interviewed by coordinators to obtain Informed Consent (IC) using an IRB-approved protocol. Post COVID-19 restrictions required protocol amendments to add the possibility of remote IC using video and/or phone teleconferencing. Patients choose to share their donated tissues with either university researchers and/or for-profit organizations. Patient Race and ethnicity data was obtained from the UCSD electronic medical record Epic. Enrollment of patients in Biorepository from 2017-2020 was 33.4% of Cancer Registry patients with non-significant differences in per year enrollment. Hispanic participation increased by 12% from 2017 to 2019, peaking at 39%. All sampled races in 2019 have 20 to 35% representation reflecting increase due to MORE study. Post COVID-19 Patient participation decreased to 30% due to the pandemic, with pre-COVID participation at 107.88 patients/month decreasing to 31.25 patients/month. Pre vs. Post pandemic representation of all races sampled had no significant change (p=0.99). Hispanic representation remained remarkably similar (22% to 22.18 ± 0.18). There are slight increases in the willingness to share specimens with university researchers among Hispanics (30% acceptance to 33%) and a noticeable resistance to share with For-Profit collaborations in non-Hispanics (19% refusal to 30%). The MORE initiative continues to be an effective method of sustaining and increasing the participation of minorities despite COVID-19 research restrictions. The Biorepositories continues to focus on enhancing remote consenting methodologies, increasing subject participation, and sustaining minority involvement in research through biobanking.

#### 625 9:40 AM

## Adult Conversational Styles with Minimally Verbal and Nonverbal Toddlers **Makenna Sine (Undergraduate)**

Autism Spectrum Disorder (ASD) is one of the most widely known developmental disorders. Language abilities in children with ASD span from nonverbal to typical; however, the majority of research is centered around the language abilities of verbal children with ASD. There is a gap in the literature on broader communications skills and interactions in minimally verbal (MV) and nonverbal (NV) children with ASD (MV/NV ASD toddlers). This study reports observations of adult interaction with MV/NV ASD toddlers and examines differences in adult interaction with MV/NV ASD toddlers compared to typically-developing (TD) toddlers. Two groups of participants: 18-24 month old MV/NV ASD toddlers and TD toddlers completed a standardized language assessment (Preschool Language Scale, 5th edition; PLS-5) and participated in a play-based language sample with a researcher. The goal of the language sample was to elicit at least 50 utterances from toddlers while playing with toys that were familiar to the child. Each language sample was transcribed for both the adult and child utterances following widely-accepted conventions. Adult utterances were coded for frequency, form (i.e., statement, question), goal (i.e., eliciting response from child, commenting, requesting), and relation to the child's previous utterance (i.e., related, unrelated, tangentially related). Child utterances were coded for frequency, length, goal, and relation to the adult utterances. Data will be used to describe adult interactions observed with MV/NV ASD toddlers and compare between the two groups (MV/NV ASD and TD toddlers). I predict there will be a greater frequency in utterances when interacting with MV/NV ASD toddlers than with TD toddlers. I also expect that, as linguistic ability in each toddler participant increases, fewer questions will be inquired and more statements will be provided. Therefore, adults will ask TD toddlers less guestions and provide more connected and related statements in comparison to MV/NV ASD toddlers. This data is expected to provide more insight on how adults interact with MV/NV ASD toddlers and TD toddlers.

#### 626 10:00 AM

## Reducing Disparities in Telemedicine Among Cancer Patients During the COVID-19 Pandemic Lara Aziz (Undergraduate)

With the ongoing global pandemic of coronavirus disease 2019 (COVID-19), UCSD Moores Cancer Center has rapidly transitioned its healthcare system to telemedicine, which is the practice of caring for patients remotely. Data indicates that cancer patients are at higher risk of developing COVID-19 with increased risk of adverse outcomes. Telemedicine helps reduce coronavirus exposure while allowing continued remote care and monitoring of their cancer. Unfortunately, COVID-19 widened the existing health disparities among underserved, underinsured, minority, and limited-English proficiency patients. This project proposes to evaluate potential disparities in telemedicine use during COVID-19 and identify actionable barriers that will reduce disparities in telemedicine implementation among minority and underserved cancer patients. The project includes three individual and interconnected aims. The first aim is to define the health disparities linked to telemedicine among cancer patients of different race, ethnicity, preferred language, age, and income linked to patient's zip code. The second aim is to identify the disparities through structured interview questions designed to discover the discrepancies that patients from vulnerable populations might face with telemedicine. The third aim is to define regional barriers with telemedicine by surveying a diverse cohort of individuals. The project is ongoing, though results with the first aim show that telemedicine use increased rapidly in April before declining in later months. Additionally, there are significant differences in telemedicine use by patient race, ethnicity, gender, language, age and insurance status. We found that the fraction of telemedicine use was lowest among Hispanic population and highest among non-Hispanic white patients with Asian Americans and African Americans falling somewhere in between. In terms of gender, we found that female patients were less likely to use telemedicine than male patients. With reference to age however, telemedicine use was lowest among patients that were 85 years of age and older and highest among patients between the ages of 65-84 years old. In regard to insurance status, it was notable that Medicaid populations were substantially less likely to use telemedicine compared to those with Medicare, commercial or other insurance types. Although results are not finalized, there is a substantial difference in telemedicine rates that demonstrate significant disparities among different minority groups. Future steps will focus on developing and evaluating interventions to reduce the risk of COVID-19 exposures and increase health equity among vulnerable underserved cancer patients.

### **Session P3-7**

Poster Health Nutrition and Clinical Sciences and Physical and Mathematical Sciences Saturday, March 20, 2021, 10:20 AM

#### 627 10:20 AM

Using Self-Reported Activities to Contextualize Accelerometer-Measured Sedentary Behaviors and Patterns Among Women with Breast Cancer Desiree Santos (Undergraduate) Benjamin T. Schumacher Blake R. Anuskiewicz Andrea Z. LaCroix Kelly R. Evenson John Bellettiere

Breast cancer is the second leading cause of cancer death among U.S. women, and 44% of the women that die from breast cancer are between the ages of 65-84 years old. Lifestyle factors such as poor diet and excessive sedentary behavior increase the risk of adverse health outcomes, and exacerbates the risk of developing breast cancer and other cancers. The context and patterns in which women with breast cancer accrue their sedentary time is unknown. Overall, 5,141 older women (age range 63-99; mean=78.4) from the OPACH Study were classified into three groups: those with breast cancer (n=350), with any other cancer (n=528), and those without cancer (n=4,263). Participants reported how much time they spent sitting in various sedentary behaviors. Triaxial accelerometers measure sitting time and sitting patterns (mean sitting bout duration). These were displayed in radar plots with pairwise comparisons used to statistically test differences between cancer groups. Mean(sd) hours/day were: watching television=3.1(1.5); reading or doing crafts=1.7(1.2); on the computer=1.0(1.1); in transportation=0.9(0.7); working without a computer=0.8(0.8); and talking on the phone=0.7(0.7)--the only significant difference, adjusting for age and race-ethnicity, was that women with breast cancer watched 11.8 minutes/day more television (p=.02). Women with breast cancer had 15 more minutes/day of sedentary time than women with no cancer (634 vs. 619; p-value <0.001). Women with breast cancer engage in longer sitting patterns than women without cancer (13.2 vs. 12.4 minutes/day; p-value <0.001). Women with breast cancer have more prolonged sedentary behavior patterns than women without cancer. Knowing this can help raise awareness among women with breast cancer of high levels of sitting, particularly while watching television, and can be used to encourage less sitting in shorter bouts, and thereby improve sitting patterns. Future studies should examine the extent to which improved sitting patterns improves the health and well-being of women with breast cancer.

#### 628 10:40 AM

## Examining PD-L1 Expression in Non-Small Cell Lung Cancer Patients Treated with Pembrolizumab Katelyn Negahban (Undergraduate)

Pembrolizumab is an antibody immunotherapy treatment, which is a new treatment for non-small cell lung cancer patients. Immunotherapy uses specific antibodies to prevent interactions between PD-L1 and its receptor PD-12. Being responsible for 85% of lung cancer diagnoses1, it is important to investigate why certain patients respond and do not respond to Pembrolizumab. PD-L1, programmed death ligand 1 is a biomarker protein encoded in the human gene, and its percent of expression can predict how well a patient responds to immunotherapy treatment2. Because PD-L1 is at the genetic level, other genetic factors such as gender, race, and ethnicity could play a role in the PD-L1 expression, and therefore the response to immunotherapy treatment. This study focuses on the factors of demographic factors, cancer diagnosis, and PD-L1 expression. Patients diagnosed with NSCLC and treated with Pembrolizumab were identified through UCSD's electronic medical record system EPIC using Slicer and Dicer. Patients were further verified to meet inclusion eligibility for IRB-approved protocol. 45 patients were verified eligible to conduct the following analysis. From the clinical charts, we extracted demographics and PD-L1 testing results. Our results showed that race and ethnicity may play a role in PD-L1 expression due to the observation that white Hispanic patients appear to have higher levels of PD-L1. Gender comparison showed a higher level of PD-L1 % in females. In addition, particular types of NSCLC that are less common such as sarcomatoid or squamous cells may be linked to higher levels of PD-L1. The preceding data shows preliminary conclusions regarding race, ethnicity, gender, and cancer diagnosis to be contributors towards the PD-L1 expression in NSCLC patients treated with Pembrolizumab. Retrieving more eligible patients for this study is necessary to draw more significant and promising results.

#### 629 11:00 AM

## Implementing Family-Based Interventions to Stimulate Physical Activity in Latinx School-Aged Children KenJonae Wallick (Undergraduate)

It is estimated that 20% of cancer cases are due to obesity; increased risk of malignancies are influenced by diet, weight change, and body fat distribution in combination with physical activity.1 We sought to examine the number of family-based interventions which incorporate the use of physical activity as the primary intervention approach for Latinx youth. We hypothesized that physical activity will decrease the risk of obesogenic behaviors and long-term risk for cancer in children of Latinx descent. Using PRISMA guidelines, a systematic review of the literature was conducted in PubMed. The following criteria to identify literature were used: Interventions with a primary outcome to prevent or reduce obesity, a family-based research design (including one or more parent(s) or guardian(s) and a child), children ages 5-12 years old, samples with 50% or more Latinx individuals, published within the last ten years (2010-2020). Literature was excluded based on interventions designed to treat eating disorders, children with pre-existing health conditions, cross-sectional, longitudinal, qualitative studies, and surgical and pharmacological interventions. Each article was assigned to two reviewers to reduce bias and increase inter-rater reliability. After meeting the initial inclusion criteria, literature was further stratified according to the use of physical activity components (e.g. group exercise or sports). A total of N=1249 records were identified in PubMed with no duplicates identified. After title and abstract reviews, N=67 records were retained for the analysis. After stratification by presence of physical activity component, N=31 studies were included for review. One-third of the studies identified in the review (22.3%) included physical activity as a design element to examine the effectiveness on obesity prevention and/or reduction. Types of physical activity components included dancing, active games, jumping and walking. Interventions that incorporated physical activity also used other obesity reduction strategies like diet monitoring. Forty-six percent of interventions incorporate physical activity in the studies examined. Initial results reveal that physical activity was the most effective at reducing obesity. Populations of color, including Latinx individuals, are at high risk for obesity and are often diagnosed with related diseases such as cancer at advanced stages.

#### 630 11:20 AM

## Sensitive Detection of Heart Failure Biomarkers Using Multi-Photon Laser Wave-Mixing Spectroscopy James Suprapto (Doctoral)

Nonlinear laser wave-mixing spectroscopy is utilized as an ultrasensitive detection method for heart failure biomarkers pro-atrial natriuretic peptide (proANP) and brain natriuretic peptide (BNP). Wave mixing is an ultrasensitive optical absorption-based method, and hence, it can detect both fluorescing and non-fluorescing biomarkers. The biomarkers are detectable in their native form, label-free, without the use of time-consuming labeling steps using a UV laser. The wave-mixing signal beam is intense, collimated and coherent (laser-like) and it can be collected by a simple photodetector with an excellent signal-to-noise ratio (S/N). The wave-mixing probe volume is small (picoliter), and hence, wave mixing can be conveniently interfaced to capillary electrophoresis and microfluidics separation systems to enhance chemical detection selectivity. The wave-mixing signal demonstrates a cubic dependence on laser power and a quadratic dependence on analyte concentration, and hence, it is an ideal sensor (small changes yield big signal changes). In comparison to currently available detection methods, wave mixing offers several inherent advantages such as small sample requirements, ultrasensitive detection limits, and native label-free detection of a wide range of samples including biomarkers, viruses, cancer cells, single biocells, chem/bio agents, etc. Our nonlinear multi-photon detectors can be easily configured as portable battery-powered devices that are potentially suitable for field use.

#### 631 11:40 AM

## Using Machine Learning to Constrain Neutron Star Equation of State **Delaney Farrell (Doctoral)**

The relationship between a non-rotating neutron star's equation of state (EoS) and its macroscopic properties can be successfully described theoretically through the Tolman–Oppenheimer–Volkoff equation, and as such, a wide range of proposed EoS and their corresponding mass-radius curves have been published over the last several decades. Working inversely from macroscopic properties to arrive at a star's EoS (referred to colloquially as the inverse stellar structure problem or ISSP) is less straightforward but has been explored in the literature. Up until very recently, the ISSP could only be tested with theoretical mass-radius relationships due to a lack of observed data. However, observational mass-radius data is growing from novel detection methods and this data should be used to refine working models for EOS. We propose solving the ISSP with deep learning inference for the neutron star EoS trained with simulated mass-radius pairs to eventually use real, novel observational data of the mass and the radius. Our deep learning method consists of a neural network trained on theoretical mass-radius relationships resulting from variations of the GM1 EoS, augmented with uncertainties consistent with those observational uncertainties described by Chondra and NICER X-ray data. The goal of this ongoing project is to extract the most likely EoS from observed data to constrain the existing range of theoretical neutron star EoS.
# **Session P3-8**

Poster Physical and Mathematical Sciences Saturday, March 20, 2021, 12:40 PM

### 632 12:40 PM

Mimetic Modeling of the Seismic Wave Equation in Heterogeneous Media Erik Urzua (Doctoral)

The Corbin-Castillo (CC) mimetic operators provide for high order accurate discrete analogous of the vector gradient, divergence, curl and Laplacian operators that satisfy discrete vector calculus identities, conservation laws, and the Extended Gauss Divergence theorem. We propose to solve a time-dependent acoustic wave equation in one and two dimensions using the CC operators and the mimetic library MOLE. Explicit Runge-Kutta methods are used in all cases to determine the numerical approximate solutions. We present the spatial discretization of these equations over a uniform staggered grid and error analysis of the determined approximated solution. The results determined using the mimetic operators are then compared to results determined using standard finite difference methods.

### 633 1:00 PM

Probing RAF Kinase Conformational Dynamics at the Single Molecule Level Andrew MacLeod (Master's) Andres Jimenez Salinas

Enzymes are dynamic by design and are known to enter conformational states to carry out their various functions. The protein known as RAF (Rapidly Accelerated Fibrosarcoma) is associated with the ERK/MAPK pathway and is thought to undergo large conformational changes when activated on the cell membrane. These conformational changes, spanning multiple domains, may also be involved in inhibitor-induced paradoxical activation which introduces resistance to treatment in cancer patients. Although much has been discovered about its pathways and recent crystallographic and cryo-EM structures show RAF in an inhibited (closed) conformation, there is little experimental data linking these static structures to function. This work presents progress toward exploring the functional structure of the RAF protein complex using conformational dynamics observed through single molecule fluorescence resonance energy transfer (FRET) measurements. First total internal reflection fluorescence (TIRF) microscopy is used to visualize immobilized fluorophore tag RAF kinase at the single molecule level using cell lysate in a pulldown assay. The proteins are biotinylated and bound to a functionalized glass substrate coated with biotin doped PLL-PEG (poly(L-lysine) poly(ethylene glycol)). To accomplish this, the functionalized glass substrate is treated with streptavidin (STV) prior to introducing cell lysate. STV has an extremely high affinity toward biotin and locks the protein in place. Factors such as PLL-PEG, STV, lysate concentrations and incubation times are determined through TIRF observations. Non-specific binding events are reduced with increased salinity ensuring observed molecules are specifically bound to the functionalized substrate. Then with single molecule visualization optimized we move to FRET measurements that correlate the energy transfer efficiency {E} with distance. FRET requires a pairing of fluorophores with compatible emission (em) and excitation (ex) spectra for donor and acceptor relations, respectively. These fluorophores tag various domains of the RAF protein and calculations in the change of {E} are linked to changes of state. To validate the precision and accuracy of our FRET measurements we test against standardized values of paired dyes at set distances. With standardized measurements we can effectively determine conformational states of RAF based on {E}.

### 634 1:20 PM

# Regional Effects of Deforestation on Dry-Season Climate in the Brazilian Amazon William Nicewonger (Undergraduate)

Rainforest in the Brazilian state of Rondônia, an area of the southwestern Amazon, is at risk due to increasing economic pressures and the recent weakening of environmental agencies and legislation by the federal administration. As of 2017, 33% of the state's forested land has been converted to agriculture, pasture, or urban landscape. This research examines the impacts of deforestation on dry-season precipitation and temperature in Rondônia between 1985 and 2017 and evaluates future climate projections for the state. Our findings show that dry-season rainfall has decreased by 0.2mm/year, while average air temperature has increased by 0.05°C/year in Rondônia over the last three decades. The results also indicate that global warming will lead to even warmer and drier conditions, with potentially critical negative impacts on food production and farmers' livelihoods in the region. The significance of this research is to bring awareness to the effect of land use/ land cover change on one of the most important biospheres on the planet.

### 635 1:40 PM

# Effects of Wildfires on the Amazon Kaelia Okamura (Undergraduate)

Wildfires across the world are important disturbances to the Earth's vegetation, which affect soil properties and climate. Despite recent widespread awareness generated by social media, comprehensive wildfire datasets are scarce, especially in remote regions of the planet, where many fires are ignited by anthropogenic activities and go unreported. The area of interest in this research is Tropical South America, more specifically the Amazon Basin, for which our goal is to produce a continuous 20-year dataset of burned area fraction based on Moderate Resolution Imaging Spectroradiometer satellite products. The dataset will then be used to study trends in fire occurrence and in total burned area, and to examine the relationship between fire activity and deforestation in the region.

### 636 2:00 PM

### Machine Learning for Nuclear Scattering Data Juan Ortiz (Undergraduate)

Nuclear scattering data traditionally exhibits an uneven distribution in the energy/scattering angle plane that leaves holes in our knowledge of the nuclear interaction. Recently, machine learning has become an effective tool for identifying patterns and correlations within data sets that are patchy, large, or noisy. The purpose of this research is to evaluate the effectiveness of machine learning in fitting and predicting nuclear scattering data. It could assist students and professionals in filling the gaps within physical data that would conventionally require an entire lab team to generate. We were able to obtain values for specific observables (e.g. differential cross section, total cross section, polarizations, etc.) that matched our training/testing data as well as physical models. All predictions fell within the confidence interval around the average values of available physical models. The Gaussian Process has shown strong potential for fitting and predicting nuclear scattering data produced in a lab.

## **Session P3-9**

Poster Physical and Mathematical Sciences Saturday, March 20, 2021, 2:20 PM

### 637 2:20 PM

### Enhancing Dynamic Mode Decomposition using Autoencoder Networks

### **Opal Issan (Undergraduate)**

Prediction, estimation, and control of dynamical systems remains challenging due to nonlinearity. The Koopman operator is an infinite-dimensional linear operator that evolves the observables of a dynamical system which we approximate by the dynamic mode decomposition (DMD) algorithm. Using DMD to predict the evolution of a nonlinear dynamical system over extended time horizons requires choosing the right observable function defined on the state space. A number of DMD modifications have been developed to choose the right observable function, such as Extended DMD. Here, we propose a simple machine learning based approach to find these coordinate transformations. This is done via a deep autoencoder network. This simple DMD autoencoder is tested and verified on nonlinear dynamical system time series datasets, including the pendulum and fluid flow past cylinder problems.

### 638 2:40 PM

### Quantifying Postnatal Regulation of Colostrum in Gilts Brooke Tyler (Undergraduate) Sashiel Vagus

Colostrum is the first form of milk produced by the mammary glands of mammals upon giving birth. In the first 24 hours postpartum, the amount of colostrum consumed by the neonate determines the survival rate and sets the growth trajectory of the infant. Our research aims to develop a novel approach to combine experimental data with quantitative modeling using image-based analysis to describe gilt's growth patterns in the first week postpartum as a function of the amount of colostrum ingested. In this study, we analyze the presence of proliferating versus nonproliferating cells within gilt uterus tissues as an indicator of tissue growth. To achieve this, we developed two MATLAB programs that process gilt uterus tissue histology with Ki67 staining to indicate cell proliferation. The first program segments a uterus by tissue type and produces three new images. Each image contains one of the main tissue types:

mucosa, connective, and muscle. The second program uses a color threshold application to calculate the area of proliferating and nonproliferating cells within the sample's respective tissue types. By computing the ratio of proliferating to nonproliferating cells, we seek to determine how cell proliferation is impacted at each tissue type as a result of the amount of colostrum ingested. The findings from this study will enhance our understanding of the impact of colostrum on fertility, and ultimately improve the quality of formula and nutritional supplements administered to infants in the first 24 hours after birth.

### 639 3:00 PM

Developing a Novel Fluorescent Nucleoside Probe: A New Tricyclic Cytidine Analog to Examine Structure and Properties Casey Heaney (Undergraduate) George Samaan

Fluorescent nucleoside analogues are important in advancing knowledge of the genetic code, especially in DNA replication, expression, and maintenance. Tricyclic cytidine analogues, such as 8-DEA-tC (characterized by a diethylamino group atop a tricyclic cytidine scaffold), exhibit a range of fluorescent properties and are utilized in a multitude of assays including DNA/RNA polymerase studies, measuring DNA-protein interactions, and FRET experiments. However, differences in the fluorescent properties of these nucleoside analogues, as seen in response to base pairing and stacking, are difficult to explain based on the state-of-the-art of chemical theory. As a free nucleoside, 8-DEA-tC is nearly non-fluorescent  $\Phi em = 0.006$ ) and increases quantum yield of emission up to  $\Phi em = 0.12$  when based-paired with guanosine in double-stranded DNA. We are synthesizing a related compound, the oxygen-containing analog 8-DEA-tCO, to further examine the mechanism for the fluorescence turn-on. The six-step synthesis of 8-DEA-tCO includes the challenging step of adding a protected N4-Boc-O1-TBS-aminophenol (made in three steps) to a protected 5-bromouridine, with activation by POCI3 and 1H-triazole. Once 8-DEA-tCO is synthesized, a phosphoramidite derivative of the nucleoside will be synthesized in two steps to make oligonucleotides for further testing. Finally, a comparison will be made between 8-DEA-tCO to 8-DEA-tC to better examine the photophysical properties as a free nucleoside in single-stranded and double-stranded DNA. These studies provide a greater understanding of the relationship between structural and photophysical properties of analogues and allow for better design of highly predictable fluorescent probes for studies on nucleic acid structure and dynamics.

### 640 3:20 PM

SMEARS (Statistical Modeler of Extended Astrophysical Radio Sources) as a Potential Improvement to EoR Foreground Modeling Kelcey Davis (Undergraduate)

The twenty-one centimeter emission has the potential to trace the ionization of neutral Hydrogen in the early universe and map its structure. Detection of the signal will require a model of the radio bright foreground. The foreground, which is mostly radio galaxies, is 4-5 orders of magnitude brighter than the signal and will therefore play a crucial role in its detection. Previously, most radio sources have been modeled as bright points to be subtracted from the data and used in calibration. Our approach combines observations of various radio-bright objects over multiple nights to build more accurate models of the radio sky. Data was taken at the MWA (Murchison Widefield Array) and is expected to improve analysis at both the MWA and HERA (Hydrogen Epoch of Reionization Array) telescopes. We do this by using a software package called FHD (Fast Holographic Deconvolution), which models objects with complicated internal structures as many points. We combine these point sources over multiple observations by treating individual points as Gaussian surfaces. We believe that using our new models for calibration of the observations could reduce contamination of the reionization signal from foreground emission. Code used to generate these models will be published in the form of a public Github repository, SMEAR (Statistical Modeler of Astrophysical Radio Sources).

### 641 3:40 PM

### High Accuracy Mass Spectrometry of Potassium Organofluoroborates

### R. Diego Perez (Undergraduate)

Potassium organotrifluoroborates (KRBF3) are important reagents used in drug development. These KRBF3 reagents have been successfully employed in the Suzuki reaction and to a lesser extent the Chan-Evans-Lam coupling reaction. High accuracy mass spectrometry of KRBF3 has proven to be difficult, complicating characterization of these important reagents. We found that the trifluoroborates provided a negative mass anion as well as a [2M + K] anion for all samples. In the course of this study we also found the formation of the unexpected adduct [2M + Na]. This adduct indicates an important decomposition pathway of these reagents.

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