WEDNESDAY, FEBRUARY 22

#3 Physical and Biological Sciences Graduate Poster
February 22 — LSU Ballroom A & B
Morning Session: 9:00 – 10:30 a.m.

Paul Dinh

The Effects of Fragment Size and Temperature on Coral Calcification Rates
Research Mentor: Charlene McCord (Biology)

While accounting for less than 1% of the ocean's surface area, coral reefs provide a home for 25% of all marine life. One recent study estimates that over half a billion people depend on coral reefs for coastal protection, food, and their income. Due to excessive greenhouse gas production and anthropomorphic activity, the health of coral reefs is declining rapidly worldwide and is predicted to collapse unless drastic changes occur. Fortunately, there has been a large scale, multidisciplinary and multinational effort to restore the reefs. Generally, coral restoration has focused on fast growing, branching coral and overlooks the more robust but slow growing massive coral species. With water chemistry changing globally due to anthropomorphic climate change, it is imperative that we focus on coral that are more likely to survive extreme disturbances. Microfragmentation is a widely implemented technique used to create multiple small coral colonies from a single adult colony. Fragments are planted in degraded coral reefs in hopes of restoring coral cover in these barren areas. Although microfragments experience elevated levels of mortality largely due to predation by grazing fishes, they do grow faster than unfragmented coral colonies. While prolonged and extreme thermal stress is a known driver of coral mortality, there has been promising research suggesting that exposure to high temperature can positively affect coral growth rates. By identifying factors that affect growth rates, we can refine, upscale and streamline coral restoration efforts to meet the challenges that await. I predict that smaller microfragmented colonies will have a higher calcification rate than their larger counterparts, regardless of heat treatment. Furthermore, fragments in the high temperature group will have higher calcification rates. Finally, I predict that small microfragments exposed to thermal stress will increase coral calcification rates beyond what is found with each factor individually.

Madison Medhat

Stormwater Drains and Oil Storage on the CSUDH Campus
Research Mentor: Parveen Chhetri (Earth Science)

The California State University of Dominguez Hills has oil containers at risk of potentially leaking oil in the storm drains, directly into the LA river and the Pacific Ocean. This project explores the Stormwater drains and Oil containers on campus. The containers contain oil for elevator hydraulics, emergency generators, transformers, elevator hydraulics, emergency generators, gas and diesel tanks, and waste oil. The problems and mitigations are high risk areas. High risk areas

on campus will be identified by the oil containers capacity, and the buffer zones between the stormwater drain. High risk containers for leakage will have minimal to no filters and secondary containment. Listing the problems and mitigations for the campus where the high-risk areas are concerned: filters and secondary containment for the drains and containers.

Armando Garcia

Transportation Ecological Footprint Analysis of CSUDH

Research Mentor: Parveen Chhetri (Earth Science)

California State University, Dominguez Hills (CSUDH) is known as a commuter school. Due to its proximity to multiple freeways, the campus is conveniently located and easily accessible to students, staff, and faculty. CSUDH has made great strides in becoming a much more sustainable and green campus. They have taken the initiative with their zero-waste program, campus urban farm, and outreach. As a result, they have received awards and recognition for their achievements. One of the main campus initiatives is transportation which offers many amenities to students, faculty, and staff. But how much of an ecological footprint does CSUDH have regarding transportation? In this project, we aim to show the transportation ecological footprint analysis (EFA) of CSUDH. This project aims to quantify the transportation EFA of CSUDH and to see how well the public transportation to CSUDH is utilized. As mentioned before, CSUDH offers amenities and initiatives to students, staff, and faculty to reduce carbon emissions but hasn't conducted some EFA. Unfortunately, other campuses across the country have conducted EFA, and CSUDH still needs to. With CSUDH being a commuter school, one of the main goals should be to take a more aggressive approach to reduce the carbon emissions from students, faculty, and staff. But before we get there, we have to understand and quantify our current impact and see if the campus amenities are being utilized.

Luis Lopez

Dietary Regulation of the Intracellular Pathogen Response in C. elegans

Research Mentor: Eillen Tecle (Biology)

C. elegans is a small, genetically tractable nematode model organism that consumes bacteria for nutrients. In their natural environment, they are subject to attack by various pathogens that they consume along with their bacterial diet. Intestinal infection by two natural obligate intracellular pathogens, Orsay virus, and *N. parisii*, has been shown to activate a novel immune response termed the Intracellular Pathogen Response (IPR). The IPR is a transcriptionally-based response that has recently been shown to be negatively regulated by pnp-1, the sole *C. elegans'* Purine Nucleotide Phosphorylase. Like its human ortholog, pnp-1 plays an essential role in the purine recycling pathway that is required for the generation of purine bases for various cellular functions. Interestingly, IPR-activating pathogens depend on the host for purine metabolites to support their growth and replication. Diet and the microbiome are essential factors in intestinal health and impact intestinal infection outcomes. In addition, bacterial species have been shown to have differential effects on *C. elegans* intestinal physiology. Therefore, we hypothesize that altering the *C. elegans* microbiome may regulate IPR activation in pnp-1 mutants, possibly by supplying missing purine metabolites. To modulate the microbiome, I will feed pnp-1 mutants with E. coli strains OP50, HT115, or HB101. OP50 is the standard C. elegans diet, and all

experiments with pnp-1 have been performed with it. pnp-1 mutants fed OP50 display constitutive IPR activation. I will test if this is suppressed when these mutants are fed HT115 or HB101 by visualizing IPR activation using an IPR reporter and quantifying the endogenous levels of IPR gene expression with quantitative reverse transcription-PCR.

Michael Wood, Elizabeth Hernandez, and Christopher Rojas

Zero Waste Compliance and Capabilities on the CSUDH Campus

Research Mentors: Parveen Chhetri and Cheyenne Cummings (Earth Science)

Widespread zero waste initiatives are being implemented in both public and private sectors. These mandates have benchmarks by which universities, government entities, and private businesses must comply within the coming decade. California State University, Dominguez Hills has set a goal to achieve zero waste compliance by 2025. The intent of this case study is to determine the criterion that can be used to evaluate CSUDH on their zero waste efforts thus far, as well as what it will take for compliance by the established goal of 2025. More specifically this study conducts a data collection via multiple waste audits at four different locations on campus over the course of two months. This study finds that California State University, Dominguez Hills does not yet meet the required zero waste criterion to be in compliance. The results of this study may inform campus zero waste coordinators as to where attention should be focused to meet the CSUDH goal of zero waste compliance by the target goal of 2025.

#6 Behavioral & Social Sciences, Humanities, & Education Undergraduate Poster
February 22 — LSU Ballroom A & B
Morning Session: 10:45 a.m. – 12:15 p.m.

Kenneth Perez and Azure Fisher

Should State Land in Southern California be Allocated to Warehousing Goods or Housing People? Analyzing transportation, climate, and unintended consequences of supply chain solutions

Research Mentors: Jian-yu Fisher Ke (Information Systems), Tianjun Lu (Earth Science), Mahmoud Salari (Economics), & Fynnwin Prager (Public Administration)

Highlighted in the COVID-19 pandemic, manufacturing industries faced operational constraints from lockdowns, followed by rapid import demands from U.S. consumers in 2021. Reduced turnovers of vessels in port complexes and slowed and clogged railroad operations impeded the maximum efficiency of these operations, making Southern California a significant bottleneck to California and U.S. supply chains. California's current warehousing availability has not been sufficient to accommodate the rising demand for storing goods and is forecasted to be insufficient for the coming decades. Subsequently, an investigation into short-term warehousing construction has been identified as a potential solution to this growing problem. This study aims to investigate the land-use paradox for warehousing construction to alleviate supply chain constraints while analyzing associated climate and environmental impacts in increased construction (traffic-related air pollution and greenhouse gas emissions) and implications for

public low-income housing development and community effects on often historically marginalized low-income and diverse populations in warehousing municipalities within the South California Association of Governments (SCAG) and CoStar Southern California industrial markets. This study will utilize three-section literature reviews in the identified areas to develop policy recommendations for the California Transportation Commission and Senate. The study will first quantify California's forecasted warehousing deficit from 2022-2040 using different economic and socio-political forecasts post-pandemic and considering present-day policies. Using CoStar, a commercial real estate company, the study will analyze available state-owned properties near congested ports as potential locations for construction and resulting emissions in construction to the local air quality in warehousing municipalities and transportation routes. This study will also investigate the prioritization of state lands for warehousing construction in lands that could be used for public housing infrastructure and the effects this will have on Southern California, which is experiencing a rental and homeless housing crisis.

Kenia Vidal, William Omenwu, & Stephanie Rauda

HIV-1 p17

Research Mentor: Kari Pederson (Chem & Biochem)

The human immunodeficiency virus (HIV), which is transmitted through an exchange of bodily fluids, is a virus that leads to the endangerment of the host as it reduces their quality of life. Although treatments to prevent the HIV-1 virus from cell entry are not yet available, the target of this study, p17, is a structural protein involved in a majority of the stages of the life cycle of the virus, including cell adhesion and viral entry through interactions with heparan sulfate proteoglycans (HSPG), which may present a target for this type of treatment. In order to understand and characterize the protein-heparan sulfate interactions, it is necessary to first develop a reliable and consistent method to successfully express HIV-1 p17. The HIV-1 p17 protein was expressed in E. coli using the pET-16b plasmid. The growth and purification conditions were systematically tested by varying the following: induction points, growth time period, lysis technique, growth/purification temperatures, concentration of the elution buffer, and pH. The protein was then expressed with and without isotopic labeling for nuclear magnetic resonance (NMR) studies, and microarray screening, respectively. A 1H-15N HSQC of HIV-1 p17 was collected on a JEOL 400 MHz NMR and the 1H and 15N chemical shifts were assigned. In parallel, the HIV-1 p17 protein was screened against a microarray of synthetic heparan sulfate tetra-saccharides and ranked by binding strength. Specific heparan sulfate sequence patterns correlated to strong binding were identified. A set of heparan sulfate tetra-saccharides including strong, medium, and weak binding ligands were selected for future studies. NMR titration, STD, and transferred-NOESY will be used to identify structural features needed for strong and specific binding and the protein-ligand complexes will be modeled computationally. Understanding the interactions between HIV-1 p17 and heparan sulfate could be a key factor in the development of potential antiviral drugs.

Alyssa Guerrero

Chinchorro Mummies: The Oldest Mummies in the World

Research Mentor: Jerry Moore (Anthropology)

The main topic of this research is based on the practices of the Chinchorro mummies, the practices that are associated with the Chinchorro mummies and how it is the oldest known mummification in the ancient world. There are multiple different and elaborate ways of modification of the body that makes it seem there was an emphasis on keeping the body intact. There are changes between each class of mummification in Chinchorro traditions, but most include taking the body apart and entering a frame of wood to replace the bones and covering the whole body in clay. It is a fact the first mummies of the Chinchorro tradition were babies and fetuses that had passed due to arsenic poisoning from the water. Though there must be some processes that are common between all of the different classes that have been lost between them over time. In that matter, there is an importance on why their mummification processes are so elaborate. Due to the arsenic poisoning, parents began to preserve the bodies of their children in clay, different pigments from red ochre or manganese paste and animal hide mixed with skin. But other coastal valleys did not have these poisonous streams where preserved bodies have been found for Chinchorro areas. The sources for the manganese paste and the red ochre are very difficult to find anywhere near the Atacama desert as well as the coastline where the Chinchorro culture is mostly found. What one might expect from this research is an understanding of how mummification of bodies is due to the death of children from arsenic poisoning and became a part of their culture over time as a way to preserve the dead.

Fredy Cruz Hernandez

The Future of the Los Angeles Metro Lines, and the Benefits to the Communities

Research Mentor: Parveen Chhetri (Earth Science)

The Los Angeles metro lines have undergone significant changes in recent years, with the addition of new lines and network expansions. The city of Los Angeles has invested in a decades-long program to improve the public transportation system, which includes the metro lines. The future of the metro lines looks promising. Although it may not be enough to reduce the number of cars in the city of Los Angeles. One of the main advantages of the future of the metro lines is greater accessibility for Los Angeles communities. The new lines and extensions will connect neighborhoods where there were no metro stations, which will benefit residents' access to jobs, education and other services. Another benefit of future metro lines is the reduction of traffic congestion on the city's roads. However, the metro lines will also have to connect to areas where people want to travel in order to use the metro. This will also help improve air quality in the city, as fewer cars on the road means less pollution. Although this may take many years to happen as the city of Los Angeles is designed more for cars than public transportation, and most people require their cars to get around. The future of the metro lines will also bring improvements to the existing network, such as more frequent trains and longer schedules. This will make it easier for residents to rely on public transportation for their daily needs, rather than having to own a car. Overall, the future of Los Angeles metro lines can be good, with many benefits for the communities they serve. Increased accessibility, reduced traffic congestion and improved public transportation options will help improve the quality of life for Los Angeles residents. And it will reduce the pollution that cars cause.

Victoria Harris

Shakespeare's Romeo & Juliet in connection with Women's Domestic Art

Research Mentor: Kimberly Huth (English)

Knowledge of women's domestic art in history, especially in needlework and embroidery, can enhance and contribute to the experience of reading William Shakespeare's Romeo & Juliet. During the time of Shakespeare and therefore Juliet Capulet, part of being a good wife, which she was intended to be, included being able to keep herself entertained and learning what women were allowed to learn in the sixteenth century to keep them occupied, such as embroidery, drawing, and painting, especially because she was in an affluent family and as such would have more leisure time. Here we are considering a more in-depth look at what women were permitted to learn and how they spent their recreational time as well as giving them a way to be more independent with these learned skills. The domestic art of embroidery can be seen as an oppression to women in history, because it is seen as a necessary skill for a woman to be a good wife and to keep her busy in her domestic duties rather than receiving an education, and this includes Juliet as she is being oppressed by the marital system in being forced to be married and be the ideal wife. However, I argue that it gave women a way to empower themselves, by being able to take pride in something created by their own hands and learn a skill useful in making an independent living. This presentation will show that embroidery was an important way for women to express themselves on their own through creating works of art that could be worn and displayed, and that they could take pride in a piece that they created individually.

Yoana Esparza and Justin Sears

Journey Through Time in the South Bay: Analyzing the CSUDH Dominguez Rancho Archaeological Artifact Collection

Research Mentor: Ken Seligson (Anthropology)

The objective of this research project is to determine whether excavations completed by the ANT 313: Archaeological Methods and Techniques course over the past decade have recovered material evidence of a series of feasts, specifically, "the big feast" in 1913, that took place on the Rancho Dominguez property. Archival research using CSUDH Library and LA Times databases turned up information about various big barbecues that took place at the Rancho property dating back to 1903 and possibly many years earlier. These annual celebrations were a custom for the Rancho Dominguez property started by George Carson. It is estimated that approximately 200-2,000 members of society, including family, friends, and city and council officials, were in attendance for some of these feasts. In addition to the archival research, we have analyzed materials collected during the ANT 313 excavations. The artifacts include cattle and pig bones, glazed ceramic fragments, tinted glass shards, bits of metal, a small piece of newspaper, and a bit of fabric. Through our careful analysis of these materials, we are able to confirm material evidence of these feasts that occurred over 100 years ago and corroborate some of the claims regarding the size of these gatherings. We are also able to fill in some gaps regarding the materials used to put on the feasts that were not included in the archives, such as the types of stone-, glass-, and metalware used. Our results demonstrate how the tiniest bits of material culture can tell the stories of generations of South Bay residents and the historical eras in which they lived.

Nazareo Gonzalez

Identification of Fungal Secondary Metabolites that Exhibit Antibiotic Activity Towards the Pathogen Pseudomonas aeruginosa

Research Mentor: Erin McCauley (Chem & Biochem)

A major challenge facing the future of human health is the rise of antibiotic-resistant pathogenic bacteria. In 2017 the World Health Organization (WHO) published a list of 12 pathogens that will pose the greatest threat to human health due to resistance to frontline treatments. The need to identify new chemical entities with unique mechanisms of action that can combat these drug-resistant strains is essential. The objective of this research project is to identify secondary metabolites from marine-derived fungi that exhibit antibiotic activity towards one of the strains on the WHO priority list, carbapenem-resistant *Pseudomonas aeruginosa*. This was achieved by growing fungi in five-different media types, extracting the metabolites they produced in screening them in a minimum inhibitory concentration (MIC) assay against the pathogen. For any extract that exhibited activity, the secondary metabolites present in the extract were purified via high-performance liquid chromatography and their structures were determined using mass spectrometry and NMR spectroscopy.

Edlyn Pacheco

Using Computer coding to Create Dynamic Object for improve Physics learning In Virtual Reality

Faculty Advisor: Horace Crogman (Physics)

Coding is everywhere in our life from the things you use to survive in modern life and to things you use for pleasure. Coding is an essential branch in many industries that is growing and expanding into other STEM fields like biology and physics. A major field in computer science that is expanding is Virtual Reality (VR). VR is a great way to engage high schoolers in learning computer science by allowing students to see how each line of code affects certain objects.

#9 Biological Sciences I Undergrad Poster
February 22 — LSU Ballroom A & B
Afternoon Session: 1:00 – 2:30 p.m.

Marco Castañeda Martinez, Carlos Zuniga, and David Saldana

Investigating climate-growth relationships with Pinus jeffreyi *in the San Jacinto mountains*

Research Mentors: Justin Valliere (Biology) and Parveen Chhetri (Earth Science)

Global temperatures have risen 1.2°C as a result of anthropogenic activities. Due to this change the intensity and duration of droughts have increased. The purpose of this study to understand the changing response of California mixed conifer forests to the ongoing effects of a changing climate. We utilized the understudied Jeffrey Pine (*Pinus jeffreyi*) to reconstruct periods of drought in the San Jacinto mountain range. As one of the most abundant species in the

transverse cismontane regions its spatial distribution is within the bounds of various ecotones along the elevation gradient. By analyzing its annual growth using Ring Width Index (RWI) we hope to understand the nature of past drought events and help predict future events. Cores processed using standard dendrochronological methods. Ring width was measured with CoreRecoreder and verified with the Velmex tree-ring measurement system and software (J2X). Visual cross dating and statistical tests (COFETCHA, ARSTAN, treeclim, bootres, and dplR) were used to remove age related noise. Findings from this study will help agencies plan for the upcoming changes to forest biomes due to climate change.

Callum Lapper, Muhammad Nabeel KhanQadri, Daniel Apt, and Michelle Mohr

Ecosystem Services Provided by Campus Trees
Research Mentor: Parveen Chhetri

Trees serve a vital role in both natural ecosystems and urban environments. In order to understand just how many ecosystem services trees provide in a campus community, multiple studies have been conducted to see if there is a relationship between the population of trees on campus to the ecological services provided by vegetation in urban settings. There are several ecosystem services that trees are able to provide to any kind of environment. Trees provide important services to the environment such as fresh and clear air, as well as habitats for some species. Trees also store greenhouse gasses and filter out any air pollutants. For our study, we quantified the ecosystem services such as pollution removal, carbon sequestration, building energy savings, reduction in UV exposure, and amount of shade that trees provide to the campus of CSUDH by collecting individual tree species, as well as location data, DBH (diameter at breast height), and canopy coverage provided by all the trees on campus within the main campus sector (areas with academic or administrative buildings). This data allowed us to understand the services provided by campus trees, as well as calculate the monetary value of trees on campus in regards to energy savings, carbon sequestration, and aesthetic values. Using the i-Tree eco program as well as Geographic Information Systems (GIS) we were able to map and quantify the ecosystem services that trees provide to our urban campus setting.

Ebonie Bennett

Building a Large Library of Fungal Secondary Metabolites for Biological Assay Screening
Research Mentor: Erin McCauley (Chem and Biochem)

Natural products are secondary metabolites produced by living organisms. They have played an important role in traditional medicine for thousands of years and continue to be an essential part of the current healthcare system, as over 65% of all approved therapeutic drugs are either natural product or derivatives of natural products. The success of these compounds and their derivatives as therapeutic agents is largely due to their high structural diversity and specific biological targets. The overall objective of this research was to build a large library of secondary metabolites for marine derived fungi for the purpose of identifying natural products with pharmaceutically relevant biological activity. In particularly, cytotoxic activity towards a brain (U87) cancer cell line or antibiotic activity towards the pathogen, *Pseudomonas aeruginosa*.

Thazin Yee

Effects of TGF-β signaling pathway on Intracellular Pathogen Response in C. elegans
Research Mentor: Eillen Tecle

C. elegans is a model organism used extensively to study epithelial immunity as they lack specialized immune cells and rely solely on their epithelium to combat infections. In response to intracellular pathogen infection, the intestine has been shown to mount a novel immune response termed the Intracellular Pathogen Response (IPR). The IPR is a transcriptionally-based immune response comprised of approximately eighty genes. Further work has demonstrated that proteotoxic stress, induced by chemical or genetic perturbations in proteasomal function, also activates the IPR. To date, two negative regulators of the IPR have been identified and have provided insight into how the IPR is inhibited in the absence of infection or proteotoxic stress. However, we do not understand what genes are required for IPR activation, as positive regulators have yet to be identified. TGF-β signaling may be a positive regulator of the IPR. The TGF-β pathway is evolutionarily conserved from worm of man and has an established role in immunity against extracellular pathogens in *C. elegans*. Interestingly, *C. elegans* mutant for components of the TGF-β signaling pathway display intracellular pathogen loads than wildtype controls, indicating that IPR activation may be compromised in these mutants. Therefore, I plan to systematically test the effects of mutations in genes in the TGF-β pathway on IPR activation. I have generated IPR reporter strains containing mutations in two key genes of this pathway. I am currently submitting them to IPR activation induced by Bortezomib treatment. Bortezomib is a potent IPR activator, generating proteotoxic stress through proteasomal inhibition. I will investigate Bortezomib-induced IPR activation in the absence of TGF-β signaling with the IPR reporter and by quantifying IPR gene expression using quantitative reverse transcription-PCR.

Kekoa Nelson

The Negative Effects of Thermal Heat Stress on Plant's Chlorophyll Production
Research Mentor: Justin Valliere

White sage (*Salvia apiana*), Toyon (*Heteromeles arbutifolia)*, and California brittlebush (*Encelia californica)* are plant species native to California. As California is primarily arid and dry during most of the year, these plants possess adaptations to withstand long periods of water limitation. However, as global temperatures continue to increase due to the impending threat of climate change, more is needed to know about how much heat these plant species can tolerate. Here, we aim to elucidate a variable affecting these species' physiological response to thermal heat stress, chlorophyll fluorescence. This research will help predict the success of the native Californian species: *Salvia apiana*, *Heteromeles arbutifolia, Encelia californica*, and more under potential future climate conditions. Each species underwent thermal heat stress at 18 different temperature treatments at 15- minute intervals, with a 24-hour cold/dark incubation period. Using the chlorophyll fluorometric measurements in addition to the visual and olfactory responses produced by each species as an indication of plant health, we saw a drop in photosynthetic activity around 46°C-48°C in *Salvia*, 50°C-52°C in *Heteromeles*, and 38°C-40°C in *Encelia*. This suggests that some plant species may be more susceptible to extreme heat waves than others.

Melissa Estrada
Identification of Fungal Secondary Metabolites with Cytotoxic Activity
Research Mentor: Erin McCauley (Chem and Biochem)

The National Institute of Health Surveillance, Epidemiology, and End Results Program estimates there will be a total of 24,530 new cases of brain cancer diagnosed in 2022 and an estimated 18,600 deaths. The overall goal of this research is to identify fungal natural products that exhibit cytotoxicity towards a brain cancer cell line. Natural products are secondary metabolites produced by living organisms and they make excellent therapeutic drug leads as over 65% of all approved therapeutic drugs are either natural products, natural product derivatives, or their pharmacophores are inspired from natural products. To initiate this research over 50 fungal strains were cultured and the metabolites they produced were extracted. The natural products were screened against a brain cancer (U87) cell line using the sulforhodamine B (SRB) assay cytotoxicity assay. If an extract exhibited activity in the SRB assay, the metabolites present in the extract were purified using high performance liquid chromatography and their structures were determined using mass spectrometry, NMR, and circular dichroism spectroscopy.

#14 Behavioral & Social Sciences, and Education
Grad Poster
February 22 — LSU Ballroom A & B
Evening Session: 6:45 – 8:15 p.m.

Taylor Duffy, Denise Y. Aguiluz, Antonio Romero, and Yesenia Gonzalez
Gender, Disease-threat, and Self-efficacy as Predictors of Exercise Behaviors Among Diabetes At-risk Latinx College Students
Research Mentors: Silvia Santos and Maria Hurtado-Ortiz (Psychology)

The present study investigated if gender, threat appraisal for type 2 diabetes (genetic risk, perceived risk of disease, illness threat, and relatives' illness severity/comorbidity), and exercise self-efficacy beliefs predict Latinx college students' engagement in three forms of exercise (vigorous, moderate, and strength training). According to the Health Belief Model, disease threat appraisal as well as health-related self-efficacy beliefs, are expected to prompt individuals to engage in protective behaviors such as exercising. The sample consisted of 156 Latinx college students who were at-risk for diabetes due to family history (66% female and 44% male; 58% classified as overweight). Three simultaneous regressions were conducted with gender, threat appraisal, and exercise self-efficacy as predictor variables and moderate, vigorous, and strength training exercise as the outcome variables. The three models were significant (F tests, p values < .006) and gender and self-efficacy were found to be significant predictors of exercise. Threat appraisal variables were not found to be significant predictors. Based on these findings, three binomial logistic regressions were conducted to ascertain if gender and exercise self-efficacy distinguished between those who "met" versus "did not meet" federal guidelines for each type of exercise. The overall regression equations were significant and provided a good fit for each model

[Chi Square, p values < .001] with Nagelkerke R Squares ranging from .139 to .303. Exercise self-efficacy was a significant predictor that distinguished whether participants met or did not meet federal guidelines for each type of exercise. Every one-unit increase in self-efficacy was associated with a greater likelihood of meeting the federal guidelines for moderate exercise (2.3 times greater), vigorous exercise (3.5 times greater), and strength training (2.9 times greater). These findings suggest that interventions focused on enhancing self-efficacy beliefs are vital for predicting engagement in exercise at a level required for achieving long-term health.

Lauren Jensen, Zoe Allyson, Will Kellett, and Sara Merlock

Perception of Mobility Assistive Devices

Research Mentors: Julie Werner (Occupational Therapy), and Jennifer Lučarević, and Mojtaba Kamyab (Orthotics and Prosthetics)

Background: Mobility assistive devices (MAD) are commonly used devices to help individuals walk safely and comfortably. Due to the use of MADs being more common in people with chronic disabilities and among the geriatric population, there may be a social stigma surrounding the use of MADs. This social stigma could make the general population assume that individuals using MADs have significantly impaired function compared to individuals who do not need MADs. The purpose of this study is to investigate if there is a social stigma associated with the use of MADs and if certain MADs have more of a stigma associated with them than others. Hypothesis: We predict that as the burden of the device increases, the perception of the person's mobility will decrease. Methods: This study was conducted using an online survey distributed to the general public and asked them to answer a series of questions regarding an image shown. The images were pictures of individuals using different MADs such as canes, walkers, crutches, wheelchairs, etc. There were three questions for each image to assess the perceived functionality of the individual in the image using Likert scales. This data was analyzed to find significant differences between the use of different MADs. Results: Participants had a lower perception of mobility for all of the devices compared to no device. There was a trend that increasing the burden of the device decreased the rating of mobility. Discussion/ Conclusion: The results indicated that there is a perception of lesser mobility for an individual using a MAD, although not significant.

Sheena Adolphus and Juana Hernandez-Jaime

Differences in the Use of Protective Behavioral Strategies Between Help Seekers and Non-Help Seekers Who Drink Heavily

Research Mentor: Kevin Montes (Psychology)

Differences in the Use of Protective Behavioral Strategies Between Help Seekers and Non-Help Seekers Who Drink Heavily Sheena Adolphus, Juana Hernandez Jaime, Kevin S. Montes Protective behavioral strategies (PBS) effectively reduce alcohol consumption and negative alcohol-related consequences. Few studies have examined the differences in PBS use between individuals who are actively seeking help to reduce/stop their drinking and individuals who are not seeking help to reduce/stop their drinking. Therefore, the purpose of the current study was to examine differences in PBS use among help-seekers and non-help seekers who drink heavily. A total of 364 adults who self-reported drinking heavily and reported either seeking or not seeking help for their drinking completed an online survey study and the Protective Behavioral Strategies Scale

(Martens et al., 2005). Participants were predominantly White males with a mean age of 34 years. Findings from the study indicated no differences between help seekers and non-help seekers in overall PBS use, t(362)=1.46, p=.072. However, differences in Manner of Drinking (MOD) PBS use between help seekers (M=3.82, SD=1.03) and non-help seekers (M=3.64, SD=.90), t(362)=1.78, p=.038. In addition, there were differences in PBS use at the item level, with help seekers (M=3.92, SD=1.35) reporting the use of the strategy that involved avoiding drinking games to a greater extent than non-help seekers (M=3.51, SD=1.29), t(357)=3.17, p=.001. Findings from the current study may help guide future alcohol prevention efforts that address heavy drinking in clinical and non-clinical populations.

Jennifer Baker

Supporting Positive Mother-Infant Interactions among Adolescent and Young Adult Mothers
Research Mentor: Irene Tung

Maternal caregiving behaviors play a critical role in children's development of neurobiological, psychological, and socioemotional well-being. During infancy, mothers can vary widely in caregiving behaviors, such as responsivity to infant cues of distress and displays of warmth. Early caregiving behaviors are linked to secure attachment and positive developmental outcomes for offspring. The current study aims to assess the intergenerational continuity in positive parenting behaviors in a sample of adolescent and young adult mothers. We will examine the impact of a close and trusting mother-daughter relationship during pregnancy on young mothers' early caregiving behaviors with their infants. Participants include a subsample of 268 young mothers (age 14-23) from the longitudinal Pittsburgh Girls Study, a sample of girls assessed annually starting in childhood. Participants reported experiences of trust and closeness with their own mothers between the ages of 11-13, and again during their pregnancy. At three months after first birth, young mothers completed an assessment with their infants, including a videotaped mother-infant interaction task. Caregiving behaviors were behaviorally coded, including maternal affect, involvement, and sensitivity to the infant. Data collection is complete. We will conduct a series of linear regressions to test associations between a history of positive parenting and observed maternal sensitivity to their infants at 3 months of age. We hypothesize that mother-daughter relationship closeness before and during pregnancy will positively predict mother-infant interaction behaviors such as expression of warmth and positive affect, engagement with the infant, and sensitive response to infant distress, which will, in turn, predict infant positive affect and social gaze response. We hypothesize that these associations will be moderated by age, with stronger effects for adolescent vs. young adult mothers. Findings have the potential to inform support and prevention programs for young mothers who may have unique developmental needs during the transition to parenthood.

Harmony Gregorio, Gabriel Angulo, and Kahlil Scott-Moss

CSUDH Environmental Education Awareness
Research Mentor: Parveen Chhetri (Earth Science)

CSUDH is on the cutting edge of environmental and sustainability efforts by an urban campus and is actively providing leadership in engaging faculty, students, and staff in on-campus environmental sustainability efforts. Our study was designed to get a baseline of the

environmental awareness level of the CSUDH campus. To determine this level of environmental awareness, our group created a survey with questions that will identify and enable our research to project a need for outreach for better student awareness and environmental education practices for future use. The data was collected on campus by speaking to classes and tabling events conducted at the farmer's market. We were fortunate to have several different academic departments agree to participate by involving their students to be a part of this study and take the survey. This gave us enough participants to form a good sample of the CSUDH campus. The main objective of this study was to get gauge the Environmental "IQ" of the CSUDH campus to determine if additional supportive education on environmental issues and current climate initiatives should be implicated and available to all students and faculty in the near future. In doing so, we hope to affect the students who will go on to graduate and make better decisions when it comes to green business, recycling, waste management, and natural resource use in their daily lives. A majority of students must have a better grasp of what sustainability and environmental awareness is. By providing more educational outreach targeting current and evolving environmental issues, CSUDH is taking a step in the right direction to address these problems facing future generations.

Kaitlyn Manoogian

Exercising for Your Brain: A Study on Exercise Intensity and Error Monitoring
Research Mentor: Kaylie Carbine (Psychology)

Error monitoring, or the process in which an individual assesses their behavior for mistakes and makes corrections, is important for learning and goal attainment. Exercise may enhance error monitoring, but it's unclear if this is dependent on exercise intensity. We assessed if moderate or vigorous exercise would affect one's ability to assess their mistakes and correct behavior. 210 participants (MAge= 22.47; SDAge= 3.69; 51% female) completed three conditions in random order- 40 minutes of moderate exercise on a treadmill (35% VO2max), 40 minutes of vigorous exercise on a treadmill (70% VO2max), and watching a 40-minute plant documentary. Following each condition, participants completed a flanker task to assess accuracy, reaction time, accuracy after making a mistake (post-error accuracy), and reaction time after making a mistake (post-error slowing). 3-Condition (rest, 35%, 70%) by 2-Trial (congruent, incongruent) repeated-measures ANOVAs on accuracy and reaction time revealed participants were more accurate and faster on congruent than incongruent trials, as expected (ps< .001). Participants were faster after vigorous than moderate exercise or rest (p< .001), especially for incongruent trials (p< .001). A 3-Condition (rest, 35%, 70%) by 2-Accuracy (post-correct, post-error) repeated-measures ANOVA on post-error slowing revealed slower reaction times after making a mistake, as expected (p< .001). Participants slowed down more after a mistake after moderate exercise and rest compared to vigorous exercise (p< .001). A 3-Condition (Rest, 35%, 70%) x 2-Accuracy (post-correct, post-error) repeated-measures ANOVA on post-error accuracy revealed increased accuracy for trials that followed correct trials compared to error trials (p< .001). While exercise did not affect accuracy, participants responded faster, even after making a mistake, after vigorous compared to moderate exercise or rest. Vigorous exercise may help individuals respond faster and adjust behavior quicker without compromising accuracy, resulting in more efficient error monitoring, which has positive implications for behavior modification and goal attainment.

Alexander Camarillo, Stacy Zamora, Maria De La Torre

Promoting Minority Student Success in STEM through First-Year Seminar Experiences

Research Mentor: Philip Vieira (Psychology)

Currently, minority students are less likely to pursue degrees and careers in Science, Technology, Engineering, and Math (STEM) than their non-minority counterparts. The disparity between achieving STEM goals can be attributed to the lack of access to resources and opportunities. Many students feel disengaged with their curriculum, particularly those from minority households, who are first-generation students. Without adequate resources and opportunities in their collegiate years, there is a decline in retention for first-year minority students in STEM majors. This directly impacts diversity in STEM careers. Studies indicate that from 2012 and 2022, there will be 11% growth in STEM occupations, compared to the projected growth of the Hispanic population in the United States. Therefore, it will be vital for Hispanic students to obtain certificates and degrees in STEM subjects to contribute to the workforce. In response, a pedagogical study was used with transformative exploratory sequential mixed methods. This included designing a first-year seminar for the career development of entering undergraduate students at California State University Dominguez Hills. The seminar helped gauge students' interest in STEM careers and retention in STEM education. The course-seminar UNV 101: Sex, Drugs, and Rock and Roll: The Neuroscience of Hedonism included various pedagogical strategies, such as: Design Thinking (DT), High-impact Practices (HIP), Course-based Undergraduate Research Experiences (CUREs). Additionally, low-cost electrophysiology technology provided students research experience in neuroscience. We examined if students pursued campus activities related to their interests in STEM, sought mentorship, and applied to entry level jobs. This study's potential impact includes providing a framework for which STEM departments can create a survey course to recruit and encourage retention of first-year students in STEM majors and careers. Finally, this develops a pipeline for students to graduate as STEM majors across the CSU system to retain interest in STEM subjects and join the STEM workforce.

THURSDAY, FEBRUARY 23

#18 Biological Sciences II Undergrad Poster
February 23 — LSU Ballroom A & B
Morning Session: 9:00 – 10:30 a.m.

Jocelyne Mena

Identifying if ycfJ, yqgB, malZ and tfaS Play a Role in Long-Term Stationary Phase in Escherichia coli

Research Mentor: Karin Kram (Biology)

Escherichia coli can survive long periods of time by adapting to live in stressful environments. *E. coli* enters a long-term stationary phase (LTSP) when it grows in an environment where nutrients are scarce; this is one of the five phases in bacteria's life cycle. After "stationary phase", over 99% of the cells die and the remaining cells survive into LTSP, which can be used as a proxy for a more natural environment in the lab to observe how cells adapt to these conditions. The genes which may be important to survival or adaptation in this phase are mostly unknown. Previous work in the Kram Lab screened through a collection of *E. coli* strains missing one gene each and identified a total of 101 gene deletions that affected the cell's ability to survive in long-term cultures when competing with wild-type strains (those that have the gene). To confirm that these genes actually play a role in survival, I compared the effect of the mutants ΔycfJ, ΔyqgB, ΔmalZ and ΔtfaS in competition with wild-type *E. coli*. We found that the deletion of yqgB had no effect on growth of *E. coli* while competing with wild-type. The strain missing ycfJ was outcompeted by the wild-type. ycfJ is activated upon biofilm formation and is involved in flagellar synthesis, swarming, and cell elongation. The strain missing malZ is greatly outcompeted by the wild-type as well. malZ is involved in maltose metabolism. The strain missing tfaS, is greatly outcompeted by the wild-type strain. These data confirm at least three genes from the initial screen are important for survival in LTSP when competing with wild-type strains. Our continued research will help determine why these are essential for survival into LTSP by determining their function in long-term cultures.

Susana Lopez-Ignacio

UBE3B in Autism Spectrum Disorder

Research Mentor: Sonal Singhal (Biology)

Neurodevelopmental disorders (NDDs) vary from common diagnoses, such as Autism Spectrum Disorder (ASD), to less diagnosed disorders, like Fetal Alcohol Syndrome Disorder (FASD). ASD has a prevalence of 1 in 44 children. Some common characteristics of the disorder are delayed speech, poor eye contact, and compulsive behavior. Neurodevelopmental disorders hinder normal brain development, affecting growth, learning ability, and behavior. To understand its underlying mechanisms and pathways of the disorder, it is important to identify genetic disruptions that can be linked to these disorders. UBE3B is a lacking gene and ubiquitin ligase in NDDs. When functioning normally, it regulates substrates in the surrounding areas. When it is

found to be mutated in ASD and other NDDs, there is a loss of function of UBE3B which leads to an increase of substrates that would usually be regulated by the ubiquitin ligase. In a recent study, BCKDK was identified as a UBE3B substrate, because it is upregulated when UBE3B is downregulated. Similar experiments were conducted with calcineurin, a calcium-dependent phosphatase present in the brain. With samples gathered from wildtype (WT) and brain-specific conditional knockout (cKO) mice, our model organism, we will conduct western blots to identify substrates present when UBE3B is being downregulated. Our conditional knockout mice specifically deletes the Ube3b from neuronal/glial cells only. This is done to focus on the potential neuronal substrates found in ASD. Currently there are no neuronal substrates identified and it would help us better understand what mechanisms in the brain are disrupted and cause ASD.

Victoria Espeso

Investigating the regulator mechanism of purine metabolism in the Intracellular Pathogen response

Research Mentor: Eillen Tecle (Biology)

Microsporidia is a phylum of ubiquitous obligate intracellular eukaryotic pathogens that can infect and kill a diverse collection of hosts ranging from protists to humans, and agriculturally relevant animals like fish, shrimp, silkworms, and honeybees. Despite the ubiquity of microsporidia infection, investigating its pathogenesis and host responses to infection in whole animals has been historically severely limited because no Microsporidia species had been identified to infect a host that can be genetically manipulated. However, in 2008, the microsporidium *Nematocida parisii* was shown to be a natural pathogen of the model organism *Caenorhabditis elegans*. Excellent work has demonstrated that *N. parisii* infects the C. elegans' intestine and promotes the expression of the Intracellular Pathogen Response (IPR). The IPR is a novel transcriptional-based immune response culminating in the upregulation of transcription of approximately eighty genes. IPR activation in the absence of infections results in numerous detrimental phenotypes indicating that the IPR is highly regulated. pnp-1 has been recently shown to be a negative regulator of the IPR. pnp-1 encodes the sole *C elegans'* purine nucleoside phosphorylase and functions in the purine recycling pathway. pnp-1 mutants constitutively express the IPR genes and are resistant to *N. parisii* infection. To understand how pnp-1 regulates the IPR, a suppressor screen was performed to identify genes required for IPR expression in pnp-1 mutants. Several suppressor mutants were identified and submitted to whole genome sequencing. I have begun analyzing this sequencing data and have identified four candidate genes that may interact with pnp-1 to regulate IPR expression. This work will shed light on how pnp-1, and more broadly purine metabolism, regulates immunity.

Amanda Thomas

Identification of Intracellular Pathogens from Wild-Caught Nematodes

Research Mentor: Eillen Tecle (Biology)

Caenorhabditis elegans (C. elegans) rely on their epithelial cells for defense against pathogens as they lack an adaptive immune system with specialized immune cells. The *C. elegans* intestine has very similar structures to those found in vertebrates and is an ideal model for studying epithelial immunity against various pathogens independent of the activities of the adaptive immune

system. Recently, the Intracellular Pathogen Response (IPR) has been discovered in the *C. elegans* intestine. The IPR is a transcriptionally – based response mounted after the infection of intestinal cells by natural intracellular pathogens. Only two such intracellular pathogens have been identified: Microsporidia and the Orsay virus. The IPR has not been fully characterized and identifying additional novel natural pathogens of the *C. elegans* intestine will help to achieve this.

I have developed a protocol that allows for the identification of natural pathogens of nematodes in the wild. From field sites on the CSUDH campus, I collect wild nematodes from soil – rich rotting plant material, their natural habitat. In the lab, I then identify and propagate the wild nematodes that likely carry an active intestinal infection, identified by distension of the intestinal lumen. Next, I determine if the infection can be passed to a lab – grown *C. elegans* strain. The lab strain I use is a visual reporter of the IPR where GFP is expressed in the intestine only when the IPR is activated. I have identified five wild nematode strains that contain a possible pathogen that activates the IPR. Next, I will perform PCR analysis and DNA sequencing to identify the pathogen each strain carries. In the future, I plan to isolate any novel IPR directly – activating pathogens, perform controlled infection experiments and quantify IPR activation by quantitative Reverse Transcription – PCR.

Ashley Sandoval

Milkweed Microbiome

Research Mentor: Kathryn Theiss (Biology)

Plants play an important role in terrestrial ecosystems. Flowering plants provide food for insects in the form of nectar and pollen, and in return, these insects ensure that plants are able to reproduce. This is especially important in urban environments, where insects rely on cultivated garden plants. Because the insects come into contact with the flowers, they can transfer microbes across plants. These microbes can change the sugar content and smell of the floral nectar, affecting the attractiveness of the flower to future pollinators. We chose to study these changes in the nectar microbiome of the tropical milkweed, *Asclepias curassavica*, which is planted throughout Los Angeles to support the iconic monarch butterfly. In this study, we documented pollinator activity in order to analyze what kind of microbes specific pollinators leave behind. This is important because this analysis could help us determine whether these microbes can affect insect or plant health and will allow us to identify the individual contributions of insects. During the summer of 2022, we observed that there was an array of various pollinator activity during warmer temperatures. Although there were various species of insects, most of the pollinators that visited the flowers on the milkweed were the iconic Monarch butterflies, the Gulf fritillary butterflies, and Honeybees. After documenting visitations, our next step is to extract and gather all the nectar samples. We will use DNA kits to identify the specific microbes each individual insect leaves behind after it visits.

David Giron Rodas and Melaine Singleton

Using zebrafish to investigate the role of transcription factors batf2 and cebpd in early skin development and its interactions with sensory neurons

Research Mentor: Fang Wang (Biology)

The skin is the largest organ in our body and one of the first to develop. Since the skin directly interacts with the outside environment, it acts as a protective barrier and interacts with specialized cells in our body that respond to diverse stimuli. During the early development stage, these specialized cells known as somatosensory neurons received instructive molecular cues from the skin to shape peripheral axon morphologies that innervate the skin itself. Humans and other animals rely on this relationship to sense and properly react to chemical, mechanical or thermal stimuli from their environment. Using RNA-sequencing data, our lab has identified several understudied genes that are likely involved in skin development. We aim to further understand their roles by inhibiting the expression of two of those genes, batf2 and cebpd, encoding transcription factors highly expressed in skin cells during early skin development. Zebrafish is a fantastic model organism because it shares many molecular similarities with humans, their external embryonic development facilitates observation, and their genome has already been sequenced. To investigate the role of these transcription factors performed microinjections of morpholinos into single-cell-stage zebrafish. Morpholinos are synthetic nucleic acids designed to disrupt the synthesis of normal gene products by binding to specific mRNA sequences, thus inhibiting normal RNA splicing or protein synthesis. Following microinjections, we observed and documented the development of the zebrafish to identify any morphological or behavior abnormalities. Interestingly, we have discovered that embryos injected with the batf2-morpholino display abnormal swimming patterns and a slow response to stimuli. We plan to conduct microinjections into transgenic zebrafish to see its effect on fluorescently labeled somatosensory neurons. These abnormalities could provide insight into the function of the morpholino-targeted gene, resulting in foreknowledge in developmental biology that could aid in the identification and treatment of disorders in humans.

Jessica Sklar

Using Zebrafish as a Model System to Study the Effects of Microplastic Ingestion on Fecal Microbiomes

Research Mentors: Fang Wang and Samantha Leigh (Biology)

Microplastics (MPs) are a major pollution issue in aquatic ecosystems that impact aquatic life, and some land animals. However, studies on how MPs affect vertebrates' health, especially at the cellular or molecular level, are limited. Our lab uses zebrafish as a model organism to investigate the effects of chronic microplastic ingestion. In this project we focus on identifying zebrafish fecal microbiome changes caused by MPs. To conduct this experiment, zebrafish from the same parents, born on the same day, will be separated into one control group (0 mg/L) and three treatment groups with MP concentrations mimicking locations in Los Angeles County: 1.0 mg/L (West Catalina site), 2.5 mg/L (Palos Verdes and San Pedro Channel sites), and 5.0 mg/L (LA Harbor). Fecal samples will be collected at 2,3,4,5 months post fertilization, and DNA will be isolated. Then, 16S sequencing libraries will be created and sequencing will be performed using the Illumina MiSeq. Finally, the microbiome sequencing data will be analyzed through web-based platform Nephele. We expect to identify fecal microbiome changes in zebrafish treated with MPs

compared to the control group, which will illustrate an important connection between MP ingestion and animal health. We will also compare our findings with physiological data such as growth, fecundity, digestive enzyme analyses, and visualization of MPs in various zebrafish tissues. Our results can also be applied to other aquatic organisms and animals consuming aquatic organisms. Since the MP conditions used are similar to the environments in Los Angeles County, our discoveries will be relevant to our local communities and can help find solutions.

Isabel Parada

*How does breeding system vary across populations of pale evening primrose (*Oenothera pallida *ssp*. pallida)?*
Research Mentor: Kathryn Theiss

Climate change can influence evolutionary and ecological processes in plants by influencing the timing of flowering due to weather patterns. The pale evening primrose, *Oenothera pallida* ssp*. pallida* is commonly found on exposed sand dunes from Washington to Utah and is primarily pollinated by hawkmoths. Our previous research shows that some populations of *Oenothera pallida* ssp*. pallida* are highly variable with regard to the breeding system, or the ability to inbreed. This is important because as the climate changes, their pollinators will become less reliable and may be forced to mate with close relatives. We obtained seeds from 14 populations of *Oenothera pallida* ssp*. pallida* from across its home range. After germination, we assessed the breeding system using hand pollination. Our goal was to have 15 plants per population; unfortunately, flower production did not start until late summer. As a result, we were limited in the amount of cross-pollination we could accomplish. However, even with our low sample sizes, we found variation in the breeding system across the populations. We used linear mixed-effect regression to determine the impact of pollination treatment, maternal and paternal plants, and the population on fruit production. Overall, our outcrossed flowers, those that received pollen from another plant, had more successful fruit production than self-crossed flowers ($P < 0.001$). Additionally, we found that the maternal plant had a significant effect on fruit production ($P < 0.001$). Our next step will be the germination of additional plants for the upcoming growing season to perform the breeding system assessment in the hopes of reaching 15 plants per population.

#21 Health, Nutrition, & Clinical Science Undergrad Poster
February 23 — LSU Ballroom A & B
Afternoon Session: 1:00 – 2:30 p.m.

Ana Castillo

Health Resource Accessibility on the Dominguez Hills Campus

Research Mentors: Ken Seligson and Sarah Lacy (Anthropology)

Access to effective and affordable menstrual hygiene products is vital to the reproductive health of adolescent girls and women. Studies suggest that the lack of access to menstrual hygiene products can disrupt the health and mental well-being of people with uteri. Recently, California state legislature mandated a program known as Assembly Bill 367, the Menstrual Equity for All Act, which requires that schools with grades 6-12, Community Colleges, and California State Universities stock restrooms with an adequate supply of free and effective menstrual products. This project assesses to what degree the California State University of Dominguez Hills is currently complying with Assembly Bill 367 and identifies barriers limiting full compliance. This study combines both qualitative and quantitative data in a mixed method approach to analyze interviews with health directors at California State University, Dominguez Hills, and other California State University campuses as well as first-hand observational data gathered on the campus of Dominguez Hills. These datasets are used to properly understand and address the deficiency of free access to menstrual products at the California State University, Dominguez Hills campus. Initial findings indicate that the California State University, Dominguez Hills has not adequately supplied signage and menstrual hygiene products in its bathrooms. The project results include a series of policy suggestions for assuring CSUDH's compliance with Assembly Bill 367.

Charlize Alyssa Castillo

What is the Actual Composition of Uric Acid Stone

Research Mentor: Sen Wang (Chemistry and Biochem)

Uric acid has been known to be one type of kidney stone since 1776. However, disputes about the stone's actual chemical composition have existed for a long time. Some have claimed that the stone is pure uric acid crystals, while others have claimed that the stone is crystals of sodium urate. Our work shows that crystals of pure uric acids cannot form even at a very high supersaturation degree. However, the crystals of sodium urate will form if its concentration reaches supersaturation. The work suggests that the main kidney stone of uric acid is the crystal of sodium urate.

Aysa-Monae Collins

Analysis of Prenatal and Maternal Risk of Fetal Mortality

Research Mentor: Enrique Ortega (Health Science)

In 2019, the fetal mortality rate was 5.70 fetal deaths at â‰¥20 weeks of gestation per 1,000 live births. The Non-Hispanic Black population was at the highest risk for fetal mortality outcomes compared to all other races and ethnicities. Studies cite prenatal care to reduce the risk of fetal mortality. This study examined fetal mortality risk factors in comparison to the month prenatal care began. These risk factors include the mother's medical history of diabetes, hypertension, and obesity. Using the Centers for Disease Control and Prevention, National Vital Statistics System, CDC WONDER Online Database, 11,105 fetal mortality reports in California for 2014-2019 were analyzed to compare racial and ethnic differences in fetal mortality with maternal sociodemographic and pregnancy-related factors. In California, Non-Hispanic Black women account for 5.7% of the total population but had 1,557 fetal death reports, accounting for half the total fetal death reports for Non-Hispanic White women (n= 3,678), who are 41.2% of the total population in California. Furthermore, 66% of non-Hispanic black women experienced fetal mortality despite beginning prenatal care in the first trimester. In addition, Statistical data analysis of pre-pregnancy BMI shows that maternal obesity increases the risk of fetal death, as almost 50% of the fetal mortality reports include mothers' BMI as overweight or obese prior to pregnancy. However, only 6% of non-Hispanic Black mothers reporting a history of diabetes experience fetal death, compared to the 86% without diabetes who experience fetal deaths. Similarly, less than 10% of non-Hispanic Black mothers who began prenatal care within the first trimester had a history of hypertension and experienced fetal mortality. Therefore, prenatal care alone does not address this disparity experienced by black mothers. Future research should explain fetal mortality disparities with additional variables, including social and structural determinants of health.

Vyvy Tran and Nuria Maida Safar

A description of cancer risk knowledge among college students and a test of the Structural Influence Model

Research Mentor: Erin Merz (Psychology)

Most research on cancer risk knowledge has focused on older adults or has been specific to cancer type. Early adulthood is a time when health behaviors become habits and could represent a point of intervention. This study describes cancer risk knowledge in ethnically diverse young adults enrolled at a four-year university and tests a version of the Structural Influence Model of Health to explore demographic and social capital predictors of knowledge. Cross-sectional data were collected. Respondents (N = 335) primarily identified as Latina/o (78.5%), women (78.8%), low-income (52.8% annual family income < $30,000), and first- or second-generation (74.86%). Most answered ~9 items correctly (M = 9.21). The majority correctly answered questions about smoking (97.9% correct), aging (94%), and sunscreen use (89.3%). The sample was less knowledgeable about cancer screening (46% correct), annual physician checkups (66.9%), and fiber intake (51%). Demographic (gender, income, health insurance) and social capital (generation, subjective social status) predictors of total cancer knowledge and the three domains of lower knowledge (screenings, checkups, fiber) were tested in four separate models. Total cancer risk knowledge was not related to any of the predictors. Small effects emerged for

screening (health insurance, generational status) and fiber (gender), but the relationships were not practically meaningful. Overall, the young adults had high knowledge about cancer risk. Given the sample demographics (i.e., low income, early generational status), it's possible that the sample's education level served as a protective factor via increased access to health information. It was notable that a large proportion didn't understand the impact of annual physician checkups and cancer screenings, with no clear demographic or social capital factors that explained these gaps. Health educators in university settings may want to emphasize the importance of secondary prevention, given the relative deficits in these areas.

#23 Behavioral, Social, & Health Sciences Undergrad Poster
February 23 — LSU Ballroom A & B
Afternoon Session: 2:45 – 4:15 p.m.

Maria Delgado and Kerry Moynihan
A Scoping Review of Alcoholism and Cannabis Use: Its Effects on Neurodevelopment
Research Mentor: Kevin Montes (Psychology)

The aim of this scoping review is to highlight important research at the intersection of substance use(i.e., alcohol, marijuana and other psychotropics) and neurodevelopment as it relates to mental health. Research has demonstrated evidence which suggests that the consumption of alcohol and marijuana have adverse effects on neurodevelopment in young teenagers that extend to adulthood. The neuro-cognitive impairments associated with substance use is also associated with a higher risk of developing psychological disorders such as depression and anxiety in adulthood. This scoping review also highlights recent research on how substance use impacts neurodevelopment and how impairment in neurodevelopment associated with substance use is linked to the prevalence of mental health disorders. Clinical implications from this scoping review will be discussed. Keywords: Neurodevelopment, addiction, cognitive impairment

Kerry Moynihan and Maria Delgado
Stimulants and Their Impulsive Consequences
Research Mentor: Kevin Montes (Psychology)

The present scoping study seeks to examine how impulsive behaviors that can arise as a symptom of stimulant addiction are reinforced by environmental stimuli (e.g. primary reinforcers). Previous research has suggested that pairing stimulants such as cocaine and methamphetamine with environmental reinforcers has influenced both impulsive and compulsive behavior in rats. Other studies of human subjects have suggested that stimulant addiction can result in impulsive behaviors (such e.g sexual and gambling behavior). Further studies have also examined stimulant addiction in relation to life history theory. Together, this research has suggested that impulsive behaviors as a symptom of stimulant addiction can potentially be reinforced by environmental stimuli. Previous research, however, has failed to address modern behavioral adaptations that

have potentially arisen from the usage of stimulants amongst humans and how impulsive decision-making is reinforced within the environment of those who engage in stimulant usage. The implications of stimulant addiction and the propensity of these individuals to succumb to impulsive behaviors because of environmental reinforcers has potentially contributed to a wide array of variation within humans and the intra- and inter-group behaviors of the social groups in which humans reside. The findings within this study suggest that the result variation that has occurred amongst humans has modified modern sexual selection pressures. Implications for future research could seek to examine this variance in human behavior, as well as how intragroup and intergroup human conflict over mates could potentially be influenced by the presence of stimulants.

Paulina Vinolas and Bernard Amofa

When Does Gratitude Matter More for College Students' Resilience and Mental Health?
Research Mentor: Giacomo Bono (Psychology)

Many college students struggle with their mental health. One reason is stress from academic and social factors. It is beneficial for students to find appropriate coping methods, such as gratitude (Kong et al., 2015). Individuals who practice gratitude show improved mental health and well-being (Jans-Beken et al., 2018). Additionally, developing resilience can support undergraduate students' mental health. Resilience helps individuals overcome adversity and foster growth. Indeed, research shows that gratitude supported college students in their resilience to the COVID-19 pandemic (Bono et al., 2020). But one question remains: when during the semester is gratitude most useful for college students? The literature is unclear. Therefore, the current study examines when, early or later in the semester, gratitude supports students' mental health and resilience to the pandemic. A sample of young (N = 299; M = 22, SD = 7) predominantly female (73%) and LatinX (69%) undergraduates completed a survey measuring gratitude, depression, anxiety, perceived stress, and pandemic resilience during the height of the pandemic (at the start and end of the Fall 2020 and Spring 2021 semesters). It was hypothesized that gratitude will be more beneficial towards the end of the semester due to rising academic challenges. For this study, multiple linear regressions were conducted to examine if gratitude protects mental health and resilience more at the end of the semester than at the beginning. Results showed that gratitude contributed to less perceived stress, anxiety, and depression, and more pandemic resilience at both time points but that associations of anxiety and resilience with gratitude were stronger at T2 than T1. This indicates that gratitude will be more beneficial at the end of the semester. The study will additionally examine males and females separately to better identify when gratitude is more beneficial for both sexes. Implications for counseling will be discussed.

Aysa-Monae Collins

The Impact of Prenatal Care on Fetal Mortality in Black Mothers
Research Mentor: Enrique Ortega (Health Science)

A national public health objective is to reduce fetal mortality by 2030. However, the United States has seen an overall increase in fetal and maternal mortality rates, notably in underrepresented populations. Non-Hispanic Black women are at the highest risk for maternal and fetal mortality outcomes compared to all other races and ethnicities. In 2019, the maternal mortality rate for

non-Hispanic black women was 44.0 deaths per 100,000 live births. Furthermore, the fetal mortality rate in 2019 was 5.70 fetal deaths at 20 or more weeks of gestation per 1,000 live births. This was 3.5 times higher than the rate for Hispanic women and 2.5 times higher than the rate for non-Hispanic white women. The most recent maternal and fetal mortality research focuses on establishing associations with prenatal care. Studies have shown that early and adequate prenatal care can considerably reduce the risk of preterm birth and maternal morbidity. However, investigations have found that prenatal care alone does not account for the poor maternal morbidity and mortality outcomes reported among non-Hispanic black women. This study examined the occurrence of fetal mortality compared to the month prenatal care began and patient demographics in California from 2014 to 2019 using the Centers for Disease Control and Prevention, National Vital Statistics System, CDC WONDER Online Database. Data analysis conclusions find that non-Hispanic black women are five times more likely than white women to experience fetal mortality despite beginning prenatal care in the first trimester. This study concludes that prenatal care does not address fetal mortality in non-Hispanic Black women. This study was limited because all the factors causing fetal mortality are not presently known and extensively understood. But we do know that the disparity in Black maternal healthcare must be addressed to improve Black maternal and infant health outcomes.

Bernard Amofa and Paulina Vinolas

How Emotion Regulation Supported College Students' Achievement and Resilience During the Covid-19 Pandemic

Research Mentor: Giacomo Bono (Psychology)

Understanding how to generate resilience during a crisis like the COVID-19 pandemic is essential, especially for undergraduate students. Many could not engage with peers and professors to study or to access critical resources on campus needed to succeed academically or to make important decisions about their future. Many students at urban colleges in particular lost a quiet place to study during lockdown. Research has recently identified positive reappraisal as an effective coping strategy for promoting resilience (Kuhlman et. al., 2021; Li & Hu, 2022). However, little is known about if and especially when positive reappraisal plays a role in the COVID-19 resilience of undergraduate students; longitudinal methods are also lacking (Kuhn et. al., 2022). Thus, this study aims to examine if positive reappraisal at the beginning of the semester contributes to academic harm from the pandemic and resilient responding to the pandemic among undergraduate students at an urban college during the height of the pandemic (the Fall 2020 and Spring 2021 semesters). An online questionnaire was given to a sample of undergraduate students at California State University, Dominguez Hills (N=299), predominantly Latinx (68%) and female (73%), at the beginning and end of both semesters. The survey measured positive reappraisal, academic harm from the pandemic, grit, and resilient responding to the pandemic at both time points; multiple linear regressions were conducted with positive reappraisal at T1 as the predictor of the dependent measures (i.e., pandemic academic harm, pandemic resilience, and grit) at T2. Test results supported our hypotheses that positive reappraisal would predict less academic harm from the pandemic, more grit, and more pandemic resilience. This study provides further evidence that positive reappraisal supported the academic function and resilience of urban college students during the COVID-19 pandemic. Recommendations for better supporting minority college students will be provided based on the results.

Anthony Makielski and Madison Reyna

Retrospective Self-Reports of Parental Monitoring

Research Mentor: Carl Sneed (Sociology)

With the increased accessibility of technology, parents have had to modify their ways of monitoring to adapt to the widespread use of technology among their children. However, very little research has been conducted on parental use of technology for monitoring the behavior and location of their children. Therefore, the purpose of the current study is to examine attitudes toward the use of technology for parental monitoring and gather information from retrospective self-reports of parental monitoring. This study contains an exploratory analysis as no assumptions were be made about students' past behaviors. A sample of 114 CSUDH students completed an online survey that contained questions relating to their adolescent experiences. Specifically, questions regarding opinions on parental behaviors, perceived parental self-efficacy, parental psychological control, resilience, and demographic questions relating to their personal background and home life. Most participants were female, first-year students between the ages of 18-19 years old and of Hispanic/Latinx ethnic background. The current study found that on average, participants did not agree with parents using technology to monitor their children. Additionally, most participants reported their parents did not track their location while they were adolescents. Furthermore, there was a positive correlation between parental monitoring and parental monitoring with technology ($r = .22$, $p = .02$) indicating that participants who reported more parental monitoring were also likely to report more parental monitoring with technology. These findings suggest that although parents have access to technological means to monitor their children, most parents are not utilizing them.

Aliza Potter

Sooo, like? Are you pregnant? You know the statistics, right?: An Analysis of Listening to Black Mothers in California.

Research Mentor: Ashley Membere (Psychology)

This poster focuses on the experiences of pregnant and recently pregnant Black women (within the last four months) with their healthcare providers (e.g., nurses, OB/GYN, family physicians, etc.). The Listening to Mothers in California survey will be used to investigate these experiences, and Black women will be the only demographic analyzed in this data. Black women's negative prenatal experiences will be examined to see if they can lead to distrust of healthcare providers, anxieties about second pregnancies, and general safety for themselves and their newborns, ultimately contributing to the current Black maternal health crisis.

#24 Physical, Mathematical, and Computer Sciences Undergraduate Poster

February 23 — LSU Ballroom A & B

Evening Session: 5:30 – 7:00 p.m.

Jose Guzman

Flood Estimation of Southern Fork Merced Watershed Using Spatial Analysis Techniques

Research Mentor: Parveen Chhetri (Earth Science)

As global temperatures continue to rise, several of California's natural processes are adapting to this change. None are as apparent as the change in water preservation from the Sierra Nevada Mountain range. The Sierra Nevada stores water used by the entire state through snowpack, delivered by atmospheric river precipitation in the form of snow. Due to climate change, however, threshold elevation and temperature for atmospheric river snow precipitation has shifted, resulting in sub-alpine drainage basins receiving more rainfall instead of the latter. Changes in precipitation followed by expedited snowmelt results in loss of reservoir water during dry seasons and most alarming an intensification of pluvial and river discharge-based floods. There are 26 drainage basins located within the Sierras, spanning over 63,100 km2 from Kern County to Placer near Sacramento. With that in mind, flood monitoring via cost-effective techniques such as spatial analysis, the ability to surmise drainage basin flood potential will be more astute and comprehensive than manual flood monitoring through rain/river-gauges and radar, although both methods complement each other. Many rivers and their tributaries from the Sierra only have historical or niche telemetry, meaning a GIS-based approach would be best. Utilizing a Unit Hydrograph model, estimating the flood potential of a basin can be done through identifying the velocity and flow length of channels residing in it. Other estimations such as gully formation and overland saturation will be surmised using Topographic Wetness and Stream Power Indexes.

Jose Guzman and Ian Yoon

Geospatial technology to map watershed and river order in San Bernardino County, CA

Research Mentor: Parveen Chhetri (Earth Science)

The watersheds are the basic land unit for water resource management which also may be referred to as a basin or catchment. The watershed is an area of land in which all incoming precipitation drains to the same point due to its topography. Mapping watershed is important for water quality monitoring, evaluating ecosystem services, and flood management. In this study, we will use GIS and RS to map and identify the total number of watersheds in San Bernardino County. After mapping, we will categorize the watershed based on size (small < 250 sq. km.; medium 250 – 2500 sq.km.; large >2500 sq.km) and land use (agriculture, urban, forest, mountain, desert, mixed). Within these watersheds, we will identify channel order, channel length, channel slope, channel profile, and drainage density. The findings of this study will help to manage watershed-related issues and are critical for environmental conservation.

Stephanie Isidoro, Cindy Muñoz, Noah Soto, and David Saldana

Measuring the environmental impact of reducing single-use plastic water bottle usage on CSUDH campus.

Research Mentor: Parveen Chhetri (Earth Science)

The increased usage and consumption of plastic water bottles and other single-use plastics is an ongoing environmental concern. Single-use water bottles only get recycled ~35% of the time, as a result the plastic ends up polluting every corner and ecosystem on this planet by the end of its life cycle. As a nationally recognized campus for best practices California State University Dominguez Hills (CSUDH) would be a great case study. We sought to investigate the amount of single-use plastic pollution diversion we were achieving due to the policies set out by the CSU and initiatives piloted by the CSUDH Office of Sustainability. Our preliminary findings include a total of ~1 million plastic bottles diverted from landfill streams. Furthermore, we observed an average of 55-60 uses of water refill stations on days where the campus is busiest (Mon-Thurs), and an average usage of 0-15 uses when the campus is least busy (Fri-Sun) per water refill station per day. This is calculated to 58 metric tons of $CO2$ or the output of 2 American families per year. For future studies we expect this number to increase as the final deadline to stop selling or giving out single-use plastics for the entire CSU system is Jan 3rd, 2023.

Melissa Avila-Briones

Identification of Putatively Novel Natural Products from a Marine Derived Penicillium sp. *of Fungi*

Research Mentor: Erin McCauley (Chem and Biochem)

Natural products (NP) play an important role in pharmaceutical drug development, they are secondary metabolites produced from living organisms and over 65% of all FDA approved pharmaceuticals are NPs, NP-derivatives, or their pharmacophore was inspired by NP chemical scaffolds. One of the major bottlenecks in NP research is the identification of previously known NPs. The objective of this research is to utilize an innovative tandem mass spectrometry (MS/MS) database called the Global Natural Products Social Molecular Networking (GNPS) platform to identify NP with novel chemical scaffolds. This research was initiated by culturing over 50 fungal strains and extracting the NP they produce. The extracts were analyzed in a MS/MS format so they could be run on the GNPS platform, there the MS/MS spectra were compared to a massive database of MS/MS spectra from known NP. Extracts with metabolites that showed minimal or no similarity to known NP in the database were prioritized for further study. One of these was an extract from a Penicilium sp. of fungi. These putatively NP were purified using high-performance liquid chromatography and their structures were determined using MS in addition to 1D and 2D NMR spectroscopy.

Anthony Trochez, Michelle Mohr, Gabriel Angulo, and Raju Bista

Tree-Ring climate response of Pinus ponderosa *in Prescott National Forest, Arizona*

Research Mentor: Parveen Chhetri (Earth Science)

A tree-ring growth response study was done to determine how climate conditions are changing the tree-ring growth pattern of *Pinus ponderosa* trees in Arizona's Prescott National Forest. A

species chronology was created to better understand the tree-ring growth patterns compared to current and past climate conditions. The data was acquired from four separate sites in Prescott National Forest. The data included two tree cores from thirty mature individuals at each site, tree diameter at breast height, tree height, tree canopy, and GPS Location. The data was then compared against each of the sites inside Prescott National Forest. We then analyzed the variation in growth variability in regard to climatic circumstances mentioned before. Mean temperature and Mean Precipitation were used to correspond years of growth alongside monthly and seasonal climatic circumstances. This was accomplished by analyzing Ring Width Index (RWI), which allowed us to determine how changes in climate have modified the growth pattern of Ponderosa Pine in Prescott National Forest. We used the dendrochronology program, Cdendro, to measure the core samples. We then proceeded to cross date the samples using COFECHA. One of the culminating steps was the dpIR program in R to create a RWI timeline graph to feature pointer years of little growth and relate them to known drought years in the region. Out of all the sites the variable that was the most influential on the growing season was the summer temperature. The suggest that higher temperatures due to climate change are most influential to the growth of the Ponderosa Pine.

Angel Perez, Rogelio Valdez, Nataly Mendoza, and Aileen Gandarilla

Sum-Free Sets in the Bubbling Cauldrons Problem

Research Mentors: Carolyn Yarnall, Jessalyn Bolkema, and Sharon Lanaghan (Mathematics)

In mathematics, sets are unordered lists of things; the things inside a set are called elements. A set A is sum-free if for any three elements $x, y, z \in A$ we have $x + y \neq z$ (Eliahou et. al 2012). Previous mathematical research on the bubbling cauldrons activity aimed to partition the set of natural numbers into two or more different sum-free sets. This problem can be modified to consider sum-free or product-fee sets. In our research we pursued several variations on this problem, including varying the number of sets, varying the conditions on the partition, and varying the algorithmic approach to building such sets. We present results on a hands-on approach to building product-free partitions, as well as results on algorithms implemented in Python. Three conjectures were produced as a result of this study, which paves the way for more exploration with the partitioning of other sets.

Berenice Rojas

Indoor Ventilation quality monitoring using a self-built monitor

Research Mentor: Barbara Belmont (Chem & Biochem)

Environmental safety entities have monitored indoor carbon dioxide levels for decades to estimate and control adequate ventilation. Higher CO_2 indoor levels limit cognitive ability and increase the risk of spreading viruses. CO_2 molecules have become a measure of collected exhaled breath indoors, setting a benchmark for ventilation conditions and occupancy levels. While CO_2 sensing devices are already commercially available for around $280, this project aimed to bring the cost down and facilitate the correlation between analytical chemistry and the carbon cycle related to global warming. It is hypothesized that levels of CO_2 will be higher in an occupied classroom with low ventilation, while CO_2 will be more significant in Yuma County elementary school than at California State University, Dominguez Hills' new buildings. Using Arduino IDE

software, this investigator built a real-time monitoring device coupling a Sensiron SCD 30 NDIR CO_2 sensor to a PJRC Teensy 3.0 microcontroller. The data was recorded via an excel data streamer, providing a live and continuous flow of data. One room at CSUDH was tested for twenty minutes with and without students to monitor the changes in CO_2 levels. One room at an occupied elementary school was tested for twenty minutes compared to the occupied room tested at CSUDH. The data showed CO_2 concentrations being higher in poorly ventilated spaces. The concentrations between CSUDH and Yuma County elementary schools showed concerning differences. The results have important implications for understanding how limiting outdoor air ventilation in buildings increases levels of CO_2. The poster presentation will describe the data collection, calibration, and measurement results and correlate the findings to established best practices for adequate ventilation to manage indoor COVID safety.

Yolanda McDow

Does a non-phthalate plasticizer contain phthalate?
Research Mentor: Barbara Belmont (Chem & Biochem)

The plastic we use is naturally very stiff and brittle, so the modifying agents we use make plastics flexible and soft. The most common plasticizers for these jobs were phthalate compounds, but due to their link to endocrine disruption and possible fertility issues, these compounds have been banned in most of the consumer products used today. There are several alternatives to non-phthalate plasticizers available in the market, but DINCH comes at a particular interest. DINCH is composed of 1,2-Cyclohexane dicarboxylic acid diisononyl ester and isomers and is produced through catalytic hydrogenation of di-isononyl phthalate (DINP). The question arises as to whether DINCH contains detectible amounts of DINP, and if it does, are the levels significant to the toxicological regulations. A GC-MS method was used to separate the components of DINCH and a selected-ion-monitoring technique was used to determine to analyze the components for evidence of DINP. These components were compared to existing toxicology reports and regulations to determine whether the DINCH compound can be stated with statistical certainty that it does or does not contain toxicologically significant amounts of DINP.

Cody Nichols

Reduced Graphene Oxide Synthesis from Waste Biomass and Its Usage in the Fabrication of Capacitors and Supercapacitors
Research Mentor: Lamar Glover (Physics)

Capacitors are used in a large range of electronics, and soon it will be possible to forge them in the comfort of a home through processes using biochar. Throughout the semester, biomass will be converted to biochar through pyrolysis, biochar to graphite through an acid wash, and then reduced to graphene oxide. To create the disks, different reductions and bonding agents will be used alongside with variable disk thickness to test the best capacitor component. Utilizing a range of preparation components, time and cost analyses were pertinent in the development of these graphene disks. The charge and discharge qualities of the graphene disks will then be tested through Arduino.

Justin Ruiz and Christopher Gonzalez

Prize-Collecting Traveling Salesman Problem: A Reinforcement Learning Approach

Research Mentor: Bin Tang (Computer Science)

Prize-Collecting Traveling Salesman Problem (PCTSP) is a new variation of TSP and is defined as follows. Given a weighted complete graph G(V, E) where node i âˆˆ V has an available prize of pi, and two nodes s, t âˆˆ V , the goal of the traveling salesman is to find a route from s to t such that the sum of the prizes of all the nodes visited along the route reaches a preset quota while the distance along the route is minimized. In this paper, we propose a multi-agent reinforcement learning (MARL) framework for the PC-TSP. Our novel observation is that prize-collecting in PC-TSP is intrinsically related to cumulative reward maximization in reinforcement learning (RL). By integrating the prizes in PC-TSP into the reward model in RL, we design an efficient and effective MARL algorithm to solve the PCTSP. Via extensive simulations under different network and RL parameters, we show that our learning algorithm delivers an average of 65.6% of less traveling distance compared to one existing handcrafted greedy algorithm. When changing the number of agents m from 1 to 5, our algorithm reduces the prize-collecting learning time by up to 66.9%, demonstrating the effectiveness of multi-agent collaboration in reducing the prize-collecting learning time in PC-TSP.

Edlyn Pacheco

A Study of Belady's Anomaly in Page Replacement Algorithms

Research Mentor: Bin Tang (Computer Science)

Demand paging is an important technique in modern operating systems (OSes), wherein a page is brought into the main memory only when it is needed by the CPU. In demand paging, how to design efficient page-replacement algorithms that minimizes page faults play an important role in an OS's performance. In certain page replacement algorithms, a counter-intuitive phenomenon known as Belady's anamaly occurs: increasing the number of frames in a process results in an increasing number of page faults. In this project, we implement two representative page replacement algorithms including the first in first out (FIFO) and the least recently used (LRU). We show how Belady's algorithm can occur in non-stacked-based replacement algorithms and give our analysis.

FRIDAY, FEBRUARY 24

#30 Health, Nutrition, and Clinical Science Grad Poster
February 24 — LSU Ballroom A & B
Morning Session: 9:00 – 10:30 a.m.

Tiffany Salazar

Administration of Minimal Enteral Nutrition During Therapeutic Hypothermia
Research Mentor: Terri Ares (Nursing)

Perinatal asphyxia leading to hypoxic ischemic encephalopathy (HIE) requiring therapeutic hypothermia (TH) treatment is often a high acuity, low frequency occurrence in the neonatal intensive care unit. As perinatal asphyxia causes disruptions in systemic functioning, enteral feeding, while undergoing TH treatment, is traditionally withheld, due to the belief that feeding an infant with altered gastrointestinal function may lead to necrotizing enterocolitis (NEC). The rather rare incidence of NEC in term infants and recent findings purporting the benefits of early human milk feeding bring forth a need to re-evaluate delayed feeding protocols among this population. An integrative review was conducted to explore the safety of beginning feeding during TH treatment. Databases searched included CINAHL Complete, Cochrane Library, MEDLINE complete, PubMed, and Ovid nursing journals. Terms for the search were combinations of "neonate or infant" AND "therapeutic hypothermia or cooling or cooled" AND "feeding or minimal enteral nutrition or enteral nutrition" AND "perinatal asphyxia." Once search terms, and exclusion and inclusion criteria were applied, a total of seven articles were retained. Analysis of the articles resulted in several themes: primary outcomes of feeding (incidence of NEC, infection/sepsis, feeding intolerance, inflammatory mediators) and secondary outcomes of feeding (length of stay, time to full enteral feeds, breastmilk or breastfeeding at discharge, and variability of feeding protocols). While few randomized control trials have been conducted, several retrospective studies have shown statistically similar safety and risk of primary outcomes for infants fed during TH when compared to their unfed counterparts. Similarly, secondary outcomes statistically favored infants that were fed during TH. Therefore, the possibility of implementing change in feeding standards for this population is not only safe but feasible and recommended.

Christa Berry, Riley Greer, Shelby Rose Shelman, and Ellyson Martens

Gross Motor Development in Children with Lower Limb Differences
Research Mentors: Julie Werner (Occupational Therapy), and Jennifer Lučarević (Orth. and Prosth.)

Cycling, running and walking are key developmental milestones for children, and if these are not reached, delays in gross motor and social skills may become issues in the future. This is a significant concern for those with lower limb differences (LLD) or amputations, as it is important to maintain pace with their peers and continue to develop normally. Therefore, a study was conducted to analyze whether having lower limb differences or amputations delayed the age range that children are able to cycle, run, and walk, and to see the impact on their developmental

timeline. An anonymous survey was provided, asking parents of children with lower limb differences or amputations the age their child was when they were able to participate in these activities, as well as other key indications of functional and skilled mobility. The benefits of this study will be further insight into what is typical for children who have lower limb differences in regards to these activities, and to be able to provide this information to parents. The main conclusions of this study were that the level of lower limb difference or amputation has a direct correlation to delaying the age at which a child can run, and the age at which lower limb amputation is acquired relates to a delay in standing and walking.

Karyssa Dela Cruz, Eric Andrews, Mazen Elhosseiny, and Conner Irvin

Clinical Applications between Different Types of 3D Scanners
Research Mentor: Julie Werner (Occupational Therapy)

There are numerous types of scanners that are utilized in the field of orthotics and prosthetics but very little research to support which scanner is best suited for specific applications. The purpose of this study is to provide a guideline on proper time management of using certain three-dimensional (3D) scanners. The Occipital Structure Sensor scanner and the Shining 3D EinScan scanner were compared by scanning five plaster models under three different variables; light, color, and object complexity. Certain scanning criteria and default variables were established to ensure reliability and consistency. The results revealed that there were significant differences between the two scanners throughout all three variables. Significant differences in performance were shown between the two scanners, with the Shining 3D EinScan scanner having the overall best performance. Despite this, other factors such as portability and ease of use should also be considered before committing to a certain scanner.

Blake Sanders, Eric Simington, and John Bishop

Osseointegration in Relation to Phantom Limb Pain
Research Mentors: Julie Werner (Occupational Therapy), and Mojtaba Kamyab (Orthotics & Prosth.)

Background: Osseointegration for limb prosthesis suspension is a surgical procedure where a metal shaft is directly attached to a bone in either a one or two-stage procedure, and the other end extrudes outside of the skin for attachment purposes. Wearing an osseointegration prosthesis allows for more proprioceptive feedback and does not compress surrounding tissue with a traditional socket. Hypothesis This study was meant to examine if there are benefits or changes in phantom limb sensations in people who have received an osseointegration procedure. Methods We disseminated a survey to three peer support groups on Facebook; Osseointegration of America, Osseointegration peer support group, and Osseointegration: facts & Info. The survey consisted of demographic questions and questions derived from the Trinity Amputation and Prosthesis Experience Scales - Revised (TAPES-R). Survey data was collected anonymously. Descriptive statistics were calculated for the sample characteristics. Participants were asked to recall their pain before osseointegration and after. The before/after results were compared. Results During a two-week period. 17 participants completed the survey. 67.4% male, and 35.3% female. 64.7% of participants had their surgery over 3 years ago. and 58.8% of participants

reported their amputation was due to trauma. All Participants were for leg amputations with 82.2% occurring above-the-knee amputations. The data collected during this study will allow comparison between population groups with amputations and their phantom limb sensations. Conclusion: The null hypothesis was rejected based on the P value on table 7, with a value of < .001. This implies that there is significant evidence that a reduction in phantom limb pain will occur after osseointegration. Although the survey design does not permit us to make causal inferences, the results seem to indicate that phantom limb pain was reduced following osseointegration. Future work may be designed as a pre-/post- study with additional specific questions.

Megan Hertzog

Occupational Noise in the Field of Orthotics and Prosthetics

Research Mentors: Julie Werner (Occupational Therapy), and Jennifer Lučarević and Mojtaba Kamyab (Orthotics and Prosthetics)

Practitioners in the field of Orthotics and Prosthetics are exposed to unsafe levels of noise in their careers. Long term exposure of high noise levels can result in multiple physical and mental health issues. The purpose of this study is to measure the decibel levels produced in an orthotic and prosthetic facility and determine if the exposure may cause long term health risks. A decibel meter was used to record multiple materials at varying thicknesses on different machines at varying distances from the meter. The results were significant for 'Machine' and 'Distance'. This notes that since most facilities utilize the same main machines, every facility could potentially be at risk for exposing its practitioners to unsafe noise levels without proper PPE. Keywords: noise pollution, orthotics and prosthetics, noise-induced hearing loss.

Lauren Jensen, Zoe Allyson, Will Kellett, & Sara Merlock

Silicone Gloves Designed to Limit Vibration While Using a Cast Saw

Research Mentors: Julie Werner (Occupational Therapy), and Jennifer Lučarević and Mojtaba Kamyab (Orthotics and Prosthetics)

Background: In the field of Orthotics and Prosthetics, cast saws are utilized often by practitioners and technicians. Vibrations from powered tools have been shown to cause early tingling and loss of sensation in the fingers, loss of grip strength, and carpal tunnel. It can also lead to fatigue and pain after use of the tool. Anti-vibration gloves on the market commonly use leathers, foams and rubbers to dampen vibration. Silicone has been shown to be effective at absorbing shock. The purpose of this study is to investigate if custom rolled silicone gloves will dampen vibration intensity and subjectively reduce fatigue when using a cast saw more than not using the glove. Hypothesis: We predict that using a glove with thicker silicone or silicone with a lower durometer will dampen the vibration felt by the user resulting in less fatigue while using the cast saw.

Methods: This study was conducted by fabricating three custom silicone gloves. The subject used a cast saw while wearing each glove, as well as no glove and a prefabricated fabric anti-vibration glove. Vibration intensity was measured with a sensor and a subjective survey was administered after each trial. Results: The vibration intensity (V), from highest to lowest, was the no glove trial, the fabric glove, the ⅛" shore A of 10 glove, the ⅛" 00-10 glove, and the ¼" 00-10 glove.

Subjectively, the subject preferred the ⅛" shore A of 10 glove over the others when factoring in fatigue, comfort, safety, and dexterity. Discussion/ Conclusion: The results indicated that the silicone more effectively dampened vibration than no glove or the prefabricated fabric glove. The subject did not prefer the gloves that dampened the most vibration, indicating that there are more factors to consider than just effectiveness of the dampening when creating a product.