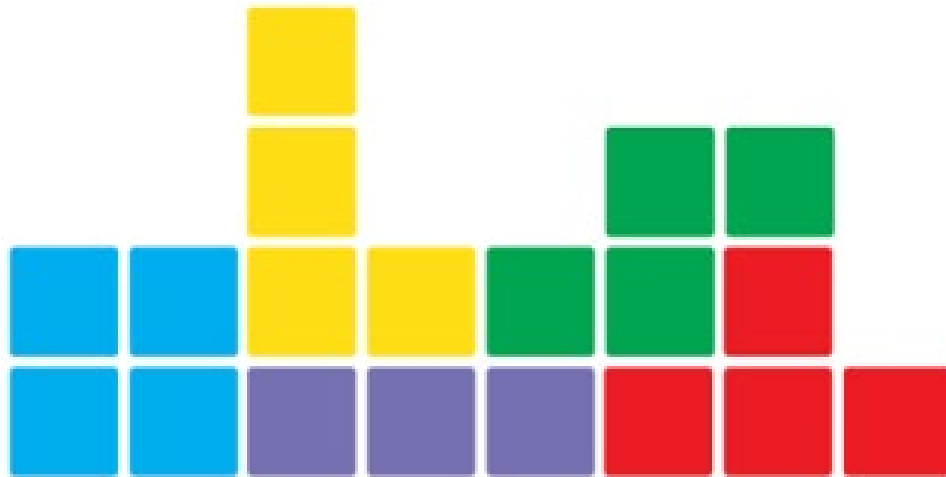# 43ʳᵈ Annual
Virtual
Central California
Research Symposium

Proceedings of the 2022 Symposium

April 20, 2022
Zoom

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Central California Research Symposium

Abstracts

Omar Ruiz| Jonathan Pryor

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Doctoral

California State University, Fresno

Education Leadership

Submission Number: 1

Oral Presentation

Exploring the communication and systematic barriers of Deaf and Hard of Hearing graduate students in higher education.

This research explored the communication and systematic barriers Deaf and Hard of Hearing graduate students face in higher education. Specifically, this study explored the experiences, barriers, and inequity the Deaf and Hard of Hearing (DHH) students face daily in academia. For years, the DHH students have been lagging in the classrooms due to a lack of full support in their academic accommodations and needs and their linguistic and social-emotional development. It is estimated that only 40% of DHH students receive at least one accommodation, indicating they are still missing out on other educational resources, such as captioning for videos or word-to-word instruction, as opposed to only the accommodation of conceptual interpretation in ASL. This study utilized a qualitative narrative inquiry approach to capture the human experience of the obstacles DHH people face in academia. Eight DHH students were recruited nationally, all who were either enrolled or have experienced the rigors of the lack of qualified communication access and other academic roadblocks. The findings revealed the importance of communicational accommodations. Specifically, participant narratives explain how the DHH students have been adversely affected by the lack of institutional funds and how the politics and bureaucratic issues prevalent in higher education influence the decision-making process to obtain the communicational accommodations that aid the DHH students to achieve academic success. The research provides important implications for colleges,universities and policymakers working with DHH students to aid the advancement of equity for Deaf and communicational accommodations access.

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Doctoral

California State University, Fresno

Doctoral Program in Educational Leadership

Submission Number: 2

Oral Presentation

More Than Just a Good Hmong Daughter: Hmong Women Reimagining Leadership in Higher Education

Minority women whose culture continues to place gender and cultural expectations are less likely to attain their aspirations and encounter more challenges (Montez, 1998). The Hmong culture embodies beliefs and practices that are very gendered, indicating that a Hmong woman must display specific behaviors and meet certain expectations. This phenomenological study explored the lived experiences of Hmong women leaders navigating their identities in different contexts. This study examined how culture influenced Hmong women's roles as leaders in higher education. Gender Schema theory and Bicultural Socialization theory were the two frameworks used in this study. Seven participants completed two rounds of interviews and data collected were coded for overarching themes. Findings unveiled that Hmong women navigated leadership differently between the home, community, and higher education. In the home and Hmong community, Hmong women navigated leadership by understanding that their role resided in fulfilling domestic duties, such as raising children or helping other Hmong women cook and clean at community events. In the higher education context, Hmong women had more autonomy and voice. Gender was not an emphasis on their leadership abilities. In addition, findings confirmed that cultural and gendered behaviors Hmong women have were apparent in the way they lead. They also noted skills they needed to develop to strengthen their leadership. For example, addressing conflict was one skill multiple participants had to develop because they were accustomed to not having voice or advocating for themselves. What we have learned from this study is that Hmong women leaders are incredibly capable, resilient, and talented. Their identities as Hmong women serve as strengths and through mentoring, professional development, and seeing representation of other Hmong women in roles they aspire to be in, they all have reimagined what it means to be a Hmong woman leader.

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Doctoral

California State University, Fresno

Doctoral Program in Educational Leadership

Submission Number: 3

Oral Presentation

Higher Education Philanthropy: Exploring LGBTQ+ Allyship Affiliations and Motivations for Giving

This qualitative case study explored the LGBTQ+ allyship affiliations of 16 participants, and their motivations for giving within a higher education and state-funded institution setting. The study utilized a primary theoretical framework, Identity-Based Motivation, and two secondary frameworks, Philanthropic Mirroring, and Identity-Based Philanthropy. All of the participants self-identified as heterosexual, and had previously provided donations to LGBTQ+ specific campus programs and student initiatives. Participants were interviewed in one-on-one interviews that were recorded and transcribed. Three rounds of line-by-line coding were conducted that revealed inductive codes garnered from the participants' interviews which revealed overall themes. This research study uncovered the reasons why heterosexual people align themselves as LGBTQ+ allies on behalf of the LGBTQ+ community. The primary reason was relational due to having a family member or close friend identity as LGBTQ+. The secondary reason was found to be in the aspects of supporting social justice and equality for all. Participants' responses revealed their LGBTQ+ allyship was an integral part of their personal and professional identities. The study also found that donors' personal and professional relationships with the asker or professional fundraiser were the primary reason for them making a gift. The secondary reason was the giving category itself, or in this case, an LGBTQ+ specifc campus program or student initiative. This study provides emerging scholarship to overall philanthropy, and especially within the higher education philanthropy profession. These findings will be useful for providing a foundation of understanding on which to build existing allyship affiliations. These include donor cultivation and stewardship, combined with appeals, branding, and messaging to LGBTQ+ alumnx and allies. This study's findings might enhance existing donor motivations in order to increase private support for higher education, especially to LGBTQ+ campus programs and student initiatives. These findings could be utilized to uncover additional opportunities for giving within higher education.

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Doctoral

California State University, Fresno

Educational Leadership

Submission Number: 4

Oral Presentation

Interrogating and Dismantling White Supremacy Culture in Biology Courses

Until white educators acknowledge and proactively work to uproot racism in the U.S. education system, racial equity reform efforts will be fruitless (Gibbons, 2018; Gillborn, 2006; Haynes, 2020). Dismantling white supremacy requires white people to collectively assume responsibility and engage with each other (Leonardo, 2004; Patton & Haynes, 2020) to redistribute power and privilege in academic spaces. A critical examination of how white supremacy culture manifests in biology courses is necessary for creating equitable educational environments as science education is foundationally rooted in whiteness. This qualitative, multiple case study (Yin, 2018) interrogated how four white biology faculty members teaching at 4-year public universities on the West Coast express their understanding of whiteness in relation to their teaching. The data were collected in three phases: 1) initial semi-structured interviews with individual participants, 2) three focus groups with participants, and 3) concluding individual semi-structured interviews. Throughout the phases, participants examined and critiqued their pedagogical practices in relation to tenets of Critical Whiteness Studies (Frankenberg, 1993; Gillborn, 2006; Harris, 1993; Leonardo, 2009; Matias & Mackey, 2016), a growing field of scholarship that centralizes dismantling and reconstructing white racial power systems. As a result of participating in this study, faculty deepened their awareness and understanding of their conscious and unconscious practices that perpetuate white supremacy culture in their courses. The faculty reflected on their perpetuation and/or dismantling of white supremacy culture in the classroom (e.g., objectivity, meritocracy, color-evasive approaches versus flexibility, student voice, various ways to demonstrate knowledge). The findings highlight the importance of biology faculty members' racial awareness and their ability to distinguish between practices that uphold or challenge white supremacy culture. Insights from this study have dramatic implications for the pedagogical practices of biology educators by challenging them to dismantle the racially oppressive systems of white-dominated academia and biology culture.

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Doctoral

California State University, Fresno

Educational Leadership

Submission Number: 5

Oral Presentation

Exploring the Underrepresentation of Asian American Leadership in Higher Education

Despite the significance of Asian American students to enrollment and graduation goals of U.S. colleges and universities, Asian Americans are invisible in critical leadership roles that make decisions and drive policy at these institutions. The purpose of this qualitative, phenomenological study was to explore the lived experiences of Asian Americans who became executive and senior leaders in higher education. Through CRT and AsianCrit perspectives, the study sought to understand the experiences of Asian American leaders and examine their narratives of navigating their racialized identities at postsecondary institutions. Fifteen participants in executive and senior leadership positions who identify as Asian American took part in interviews that explored their racialization, experiences with racism, and the meaning of these experiences. Five major themes emerged. One theme is connected to the racialization of Asian American higher education leaders demonstrating how stereotypes of archetype leaders impact how Asian Americans are viewed as deficient leaders. Another theme is related to the intersectionality of Asian American women leaders and presents how they maneuver the additional layers of gender and sexism. The significance of Asian American support on leadership was another theme that surfaced, where the scarcity of Asian American leaders in higher education results in minimal peer support that leads to isolation. The salience of representation to Asian American leadership experiences is a theme that demonstrates how being an Asian American leader means representing more than yourself. The final theme that emerged is connected to Asian American leaders' commitment to social justice and change where education is seen as the path forward to improve society. Through this exploration of lived experiences, insights into the underpinnings of the disproportionate representation of Asian American leadership in higher education will be provided.

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Doctoral

California State University, Fresno

Educational Leadership

Submission Number: 6

Oral Presentation

Effects of a Non-Passing California TPA Score on Latinx Teacher Candidates

Neoliberal policies such as the Fisher Credential, Ryan Act, Senate Bill 2042, and federally NCLB, and Race to the Top, have influenced and brought change to the landscape of education. These policies also impact prospective teachers within teacher preparation programs (TPP) in higher education. Hyper-regulation in teacher education comes in the form of added courses and assessments such as the Teacher Performance Assessment (TPA), which serves as a barrier to prospective educators. Through the lens of Chicana Feminism, neoliberalism, and constructivism, this narrative case study analyzed Latinx teacher candidates' counternarratives and the resulting effects from receiving a non-passing score on a California Teacher Performance Assessment (CalTPA). Participants included two inservice (K-6) teachers. Through a narrative case study design, meaning making was derived from journals, semi-structured interviews, and an observation. As holders and creators of knowledge, Latinx participants were included in all phases of the study. Initial findings suggest Latinx candidates experience substantial feelings of stress, overwhelmedness, powerlessness, and self-doubt as a result of receiving a non-passing CalTPA score. This score also led them to begin to view the TPA as performative, and question their TPP due to contradictions between the TPA feedback. Relationships that Latinx participants had with faculty, and staff of the TPP were essential as this was directly related to their ability to pass the CalTPA. Their relationships with family members provided Latinx participants with support to persevere after they received a non-passing CalTPA score. This study highlights how the inclusion of a for-profit company in the credentialing process calls to question the validity, reliability, and intention behind teacher education mandates, and questions whether equitable access is truly available to all prospective educators. TPAs have deeply impacted the credentialing process, shifting many toward neoliberal views of the profession, changing the environment for prospective educators.

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Doctoral

California State University, Fresno

Doctoral Program in Educational Leadership

Submission Number: 7

Poster Presentation

AN ASIANCRIT ANALYSIS OF SOUTHEAST ASIAN PRINCIPALS TRANSITION TO LEADERSHIP

Asian Americans are projected to be the fasting-growing race in the next three decades. Yet the underrepresentation of Asian American leaders with universal understanding of minorities and underserved populations in P-12 education make up approximately 1% of the population that is disproportionate to the 7% of Asian American students in public schools. An equitable voice is needed in leadership to advocate and speak for those that are often ignored. The representation of Southeast Asians in principalship roles is miniscule. Southeast Asians with refugee backgrounds are often lumped together as one Asian race, ignoring the challenges and denying students resources needed to bridge the gap in education. In the U.S., there are more than 48 different ethnic groups with unique languages, values, and traditions. It would be an injustice to group all Asian American ethnicities as a pan-ethnic group when their unique migration histories impact each ethnic group's level of educational attainment, economic success, and promotion in top leadership positions. Asian Stereotypes as the model minority or perpetual foreigner cast Asian Americans as lacking qualities (i.e., demanding authority or self promoting) that are often seen in Western society. To capture the voices of Southeast Asian principals, a phenomenological approach with an AsianCrit theoretical lens was used to analyze Southeast Asian principals racialized experiences as leaders, how they describe their experiences transitioning into principalship, and what meanings do they ascribe to their experiences as Southeast Asian principals. This research will contribute to spaces where the AsianCrit lens have not been applied. Additionally, the focus on Southeast Asian Principals with refugee backgrounds in P-12 leadership will not only add to the literature that is limited in academia, but also serve as a resource for those interested in pursuing P-12 leadership.

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Faculty

California State University, Fresno

Department of Civil and Geomatics Engineering

Submission Number: 8

Oral Presentation

OPUS-Projects: a systematic search

OPUS-Projects was made available to public by the National Geodetic Survey (NGS) in 2010 so that users can process static Global Positioning System (GPS) data involving multiple occupations of multiple points. Being fully online adjustment software, OPUS-Projects offers simple management and processing tools for GPS data processing and analysis. In this study, three research questions are investigated using OPUS-Projects; i) How many CORS stations should be used?, ii) How does baseline length impact 3D coordinates of the stations involved? and iii) What are the impacts of network size? In order to answer these questions, 24 h GPS data is downloaded for the CORSs stations in Missouri and neighboring states from the NOAA CORS Network (NCN) website. Utilizing these data, effect of varying the number of stations in the network, distances to constrained CORS stations and in terms size how big or small the network should be is investigated. At the end of the investigations, it is found out that adding more CORS stations into the adjustment did not affect the results significantly. Size of the network did not matter either. Regarding the distances to constraint CORSs, some variations are experienced as the baselines get longer. However, these variations are within the precision that CORS network maintains.

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Faculty

California State University, Fresno

Mathematics

Submission Number: 10

Oral Presentation

On the Chaoticity of Derivatives

We show that derivatives of all orders are chaotic linear operators in the space of functions continuous on a closed bounded interval.

Eve Laroche-Pinel| Luca Brillante

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Faculty

California State University, Fresno

Viticulture & Enology

Submission Number: 11

Oral Presentation

Red blotch and leafroll viruses identification with stationary VIS/NIR hyperspectral images acquired in the vineyard

North American vineyards are highly affected by two groups of viruses that cause major economic losses: grapevine leafroll-associated viruses (GLRaVs) and red blotch virus (GRBV). Unfortunately, no curative solution has been found to eradicate these viruses in diseased vineyards. Therefore, the only way to limit their spread is to quickly identify and remove infected vines (i. e., roguing). For this purpose, remote sensing, especially hyperspectral imagery, is an encouraging tool to identify infected vines autonomously and on a large scale.

We used more than 2,000 canopy images acquired in the vineyard with a stationary VIS-NIR hyperspectral camera (from 510nm to 900nm). Images were obtained from the onset of veraison to harvest at six time points in two consecutive growing seasons. Pre-trained machine learning models were used to extract the canopy signal from the images and predict the plants' infection status previously assessed by molecular analyses. Binary (healthy, infected) and four classification categories (healthy, infected by GLRaVs, infected by GRBV, or infected by both viruses) were tested. Prediction accuracy across phenological stages was determined and compared. Additional analysis was conducted to highlight the most relevant wavelengths among the 234 acquired by the camera to identify these viral diseases. This work showed that VIS/NIR imagery combined with machine learning is a promising tool to identify infected vines in the vineyard from static images acquired on the ground.

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Graduate

California State University, Fresno

Department of Physics

Submission Number: 13

3 Minute Thesis

The Photometric Periods from TESS Light Curves of the Superflare Stars Kappa Ceti, MT Tauri, and Pi1 Ursae Majoris

We use TESS light curves to measure the photometric periods of Kappa Ceti and MT Tauri. Both are G5 V stars and were suspected by Schaefer, King, and Deliyannis and published in 2000 to show superflares, with flare energies 1000-3000 times greater than the most energetic flares observed on the Sun. The periods we measure, probably from starspots, are 9.07 days for Kappa Ceti, and 6.02 days for MT Tauri. Pi1 Ursae Majoris (HD 72905) is a G1.5 Vb star observed to have a superflare with energy 100 times greater than a big solar flare. Its TESS light curve shows a period of 4.97 days, and a curious increase in amplitude over 5 cycles. We conclude that all three stars are rapidly rotating and likely young stars, which may or may not be related to the "ordinary solar-type stars" suggested by Schaefer et al.

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Graduate

California State University, Fresno

Public Administration

Submission Number: 14

3 Minute Thesis

THE ADMINISTRATOR/EDUCATOR INFLUENCE ON THE TRANSITION OF STUDENTS, WITH IDEA SERVICES,   FROM K-12 TO POSTSECONDARY/COLLEGE DURING THE COVID-19 PANDEMIC

The transition for students with Individualized Education Plans (IEPs) from K-12 to postsecondary education, specifically college, is a challenging one. The support they receive with an IEP in K-12 is structured with requirements in place that guide them through the completion of their K-12 experience. Once they transition out of K-12, those supports that were mandated are altered widely. Did the political framework of the administrator/educator affect the transition of students with Individuals with Disabilities Education Act (IDEA) services from K-12 to post-secondary/college during the COVID-19 pandemic? Examining this transition across multiple districts and administrators in California's Central Valley, this thesis provides first-hand insight and an understanding of the process along with recommendations, on how to support students as they are being advised to meet their educational goals or needs. With the COVID-19 pandemic it is uncertain whether this will be a factor in the outcomes.

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Graduate

California State University, Fresno

Mathematics

Submission Number: 15

3 Minute Thesis

Extending the Kauffman Polynomial to Singular Links

A mathematical link is a collection of closed, smooth curves in three-dimensional space without self intersections. A singular link is a link which may intersect itself at finitely many transverse double points. Knot theory is the study of mathematical links, and the goal of knot theory is to be able to distinguish between links which is possible through functions called invariants. In this talk, we define a new invariant for singular links. Our method of defining an invariant comes from a representation of singular links, namely the closure of singular braids. We then use the existence of an invariant of classical links, called the Kauffman polynomial, to construct our invariant in terms of algebras and trace functions. We give a formulation of the trace function and show that it is an invariant for singular links. Additionally, we study the algebra and show that it is a finite dimensional vector space. In conclusion, constructing invariants is similar to fitting a plug to a socket; the plug is the representation of singular links as the closure of singular braids, and the socket is the algebraic space in which our invariant is defined on. This research shows us how we can extend other classical link invariants to singular links in a similar way.

Korenna Estes| David Lent

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Graduate

California State University, Fresno

Biology Department

Submission Number: 16

3 Minute Thesis

Assessing the effects of Presenilin 1 on Learning, Memory, and Longevity in the Drosophila melanogaster model of Alzheimer's Disease

Alzheimer's disease (AD) is a form of dementia known to cause degeneration of the brain and results in the decline of cognition and behavior. One gene of interest, Presenilin 1 (PSEN1), has been found to be mutated in patients with early onset familial Alzheimer's disease (EoFAD). The direct link between mutations in PSEN1 and progressive neurodegeneration in relation to aging remains unclear both in humans and the fruit fly model system. Our objective here is to effect the expression of Presenilin 1, or dPsn in the fruit fly, in regions of the brain important for learning and memory. Using the GAL4/UAS system, we controlled the activation of the RNAi-PSEN1 to knockdown the gene expression in tissues of interest. We knocked down gene function in the Drosophila melanogaster model organism in the mushroom body and ellipsoid body, two regions implicated in visual guidance and learning and memory. We quantified the behavioral and physiological effects of knockdown of PSEN1 in the early, young, and old stages of the fruit fly to characterize the progressive behavioral decline and longevity. We hypothesized that PSEN1 knockdown would lead changes in lifespan and to deficits in learning and memory. To assess this, we monitored flies daily for rate of mortality and used a visual place learning assay to analyze learning and memory. Our results have shown fly groups with PSEN1 RNAi knocked down have altered mortality. Additionally, this knockdown resulted in observable deficits in visual learning and place memory. This research provides us with information needed to better understand and improve the fruit fly model for neurodegenerative diseases.

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Graduate

California State University, Fresno

DEPT. OF VITICULTURE & ENOLOGY

Submission Number: 17

3 Minute Thesis

Comparison of calcium-based amendments and their effects on vines and soils. A three-year study in a sodic soil in SJV.

The objective of this study was to monitor the response of the soil physics, grapevine physiology, and fruit composition to different dosages and forms of $CaSO_4$ (anhydrite, $CaSO_4$ & gypsum $CaSO_4.2H_2O$) in synergy with organic matter (biosolids). The experiment was performed for three years, 2019, 2020 & 2021, in a Merlot vineyard located in a sodic soil of the Bakersfield area. The experiment was carried out as a completely randomized block design with six treatments replicated four times. Each experimental unit had a 30x30m surface that overlapped with a pixel from Landsat 8. Soil amendments were broadcasted in winter 2019/20 (2.5 t/ac Gypsum, 5.1 t/ac Gypsum, 10.2 t/ac Gypsum, 5.1 t/ac Anhydrite, and 5.1 t/ac Gypsum + biosolids) after the first season of measurements to ensure no differences across treatments before application. Biweekly measurements of stem water potential and leaf gas-exchange showed moderate to severe water stress but did not evidence significant differences across treatments in plant water status, carbon assimilation, stomatal conductance, or water use efficiency in all years. Treatments had similar values in grape soluble solids, pH, titratable acidity measured during ripening of season 2020 & 2021. Yield was higher in the 10.2 t/ac gypsum in 2020 and the 5.1 t/ac gypsum + compost in 2021. Soil infiltration measurements showed that gypsum treatments had a higher increased change in infiltration than the control or the anhydrite treatments in both the years. For vegetation indexes measured from Landsat 8, we determined the Spearman's correlation with in-situ measurements such as ψstem. This parameter was significantly associated with various indices calculated; Green Normalized Difference Vegetation Index (r = 0.56) had highest correlation values followed by Normalized Difference Moisture Index (r = 0.54). The results from the study will help in evaluation of best reclamation practices for SJV vineyards.

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Graduate

California State University, Fresno

Department of Social Work Education

Submission Number: 18

3 Minute Thesis

Exploring belonging for adolescent newcomers in middle school: Perspectives from Latinx students in the northern San Joaquin Valley of CA

Researchers have only recently begun to explore newcomer students' specific experiences with belonging in schools in the United States, as newcomer students face unique challenges in balancing academics with being in a new country, navigating a new culture, and often learning a new language. The objective of this study is to develop a better understanding regarding the ways in which Latinx adolescent newcomer students in middle school develop a sense of belonging in the midst of a negative political climate surrounding immigration in the United States. Snowball sampling was used to recruit study participants within a participating local middle school site in California's northern San Joaquin Valley. To participate in the study, students had to: 1) Have arrived in the United States within the last five years, 2) Be between the ages of 10-16, 3) Identify as Hispanic or Latinx, and 4) Speak English or Spanish fluently. Interviews were conducted to hear directly about students' experiences with belonging at their school site. Thematic analysis was done on the interview data collected from interviews. Participating newcomer students shared a variety of views on how they developed their sense of belonging in their new school environment despite the negative political climate surrounding them, from connecting with their own cultural roots to building friendships with other students with similar experiences like them. The findings from this study are important because it can help school social workers, teachers, school administrators, and other school staff better understand belonging among newcomer students who may face a myriad of challenges. By better understanding this development, these stakeholders can use the results of this study to help improve the design and delivery of services specifically for newcomer students as well as the management of their school environment.

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Graduate

California State University, Fresno

Chemistry and Biochemistry

Submission Number: 19

3 Minute Thesis

Modular Cloning of Recombinant Antibodies by Assembly of Synthetic Domain Genes

Antibody immunotherapy has emerged as a constructive way to fight cancer. New immunotherapies require the identification of a tumor-specific antigen. The protein MUC1 is recognized as an important specific antigen and a potential immunotherapy target. In healthy human tissues, MUC1 is responsible for protecting the epithelial lining. However, in cancer cells, MUC1 displays truncated glycosylation, revealing tumor-specific epitopes. Recombinant antibodies are preferred for therapeutic development, and it is desirable to produce intact IgG or Fab fragments. Using the MUC1 specific antibody 4H5 as a model, we have developed a modular cloning approach that can rapidly produce different antibody modalities to facilitate the rapid production of both IgG and Fab antibody formats. The 4H5 variable domains were PCR amplified to contain 20 base-pair (bp) overlaps with the pcDNA3.1 vector on the 5' end, and 20 bp overlaps to either the human CH1 or Ck domains on the 3'end of the genes. To produce the Fab, a His-tag and a 20 base-pair (bp) overlap to the vector was added to the 3' end of a human CH1 domain gene sequence. For IgG production, human CH1-CH2-CH3 domains were PCR amplified, and the same vector overlap sequence was added to the 3' end of the sequence. Finally, a 20 bp overlap to the vector was added to the 3' end of a human CH1 domain. The PCR products were purified, and the constructs were assembled using the NEBuilder® HiFi DNA Assembly Cloning Kit. DNA sequencing confirmed the successful assembly of the coding sequence, and the 4H5 Fab fragments and IgG were produced by transient transfection in CHO cells. The antibodies were purified by affinity chromatography and binding to recombinant MUC1 antigens confirmed by ELISA. This approach will permit rapid assembly and screening of different antibody formats and isotypes for therapeutic antibody discovery and analysis.

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Graduate

California State University, Fresno

Biology

Submission Number: 20

3 Minute Thesis

Assessing Virulence Factors and Resistance in Pseudomonas aeruginosa After Gene Inactivation

Pseudomonas aeruginosa is a gram-negative bacterium that is naturally resistant to a wide range of antibiotics and is associated with nosocomial infections. Though many mechanisms of resistance and virulence are well understood, treatment of P. aeruginosa infections are exceedingly difficult. One approach to potentially alleviate resistance or virulence is through manipulation of P. aeruginosa genes. Based on transcriptome analysis of P. aeruginosa persister cells, we have selected a handful of genes (PA5159, PA1283, PA2898, PA4571, PA2897 and PA5157) to identify what role they may play in virulence and resistance. We hypothesized that the mutant strains would have decreased virulence and increased antibiotic sensitivity compared to the wild type PAO1 strain. We obtained transposon mutants for each of these genes to assess the function of the associated proteins in P. aeruginosa. We have performed pyocyanin production, persister cell formation, antibiotic sensitivity, quorum sensing, and motility assays for each of these strains. We found that one mutant strain (PA5159) has significantly increased persister cell formation and two other separate mutants had increased twitching motility (PA2898 and PA1283). We found that all the mutant strains exhibited decreased sensitivity to rifampin when compared to the wild type. Seven of the mutants showed increased sensitivity to kanamycin while seven other mutants had decreased sensitivity to erythromycin. With doxycycline treatment, four mutants had increased sensitivity while the remaining seven had decreased sensitivity. In order to further characterize the role of these genes, we plan to run sequence analysis of the mutant strains and compare them to the wild type. By understanding which proteins are contributing to P. aeruginosa antibiotic resistance and virulence, it may be possible to design novel therapies for treatment of these dangerous infections.

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Graduate

California State University, Fresno

Physics

Submission Number: 21

3 Minute Thesis

X-ray fluorescence measurements of strontium concentration in a lamb bone sample

Strontium (Sr) is an essential element found in the human bone in concentrations of 0.1 to 0.3 mg per gram of calcium (Ca). Low doses of dietary Sr were shown to reduce bone demineralization due to osteoporosis in animal studies. Bone Sr measurement was also demonstrated to improve the accuracy of human bone mineral content in dual x-ray absorptiometry (DXA) measurements used in clinical assessment of osteoporosis. In vivo bone Sr measurements can be performed using x-ray fluorescence (XRF) methods. Human bone Sr detectability at low radiation doses was demonstrated in past XRF studies, but Sr concentration determination remains elusive. The Sr content of superficial cortical bone from a lamb leg was probed using an x-ray beam from an integrated x-ray tube and polycapillary x-ray lens and a silicon x-ray detector measuring energy and number of characteristic x-rays. An optimal grazing-incidence XRF method developed in our lab selectively excited the superficial cortical bone layer. The lamb bone Sr concentration of (0.330.02) mg per gram of cortical bone was determined using the XRF data from plaster-of-Paris cylindrical samples with a Sr concentration of (1.010.07) mg/g. Further, the Sr XRF signal was probed using the lamb bone with three overlying leather samples of 1.8-, 2.3-, and 2.5-mm thickness mimicking in vivo human bone measurements. The average linear attenuation coefficient of the leather was measured to be (0.110.02) mm-1 at the 14.1 keV Sr Kα energy and (0.080.02) mm-1 at the 15.8 keV Sr Kβ energy. Analysis of the XRF and linear attenuation data indicated that Sr Kβ/Kα ratio can be used as a metric of the soft tissue x-ray attenuation, a key ingredient in establishing a method yielding accurate bone Sr concentration measurements.

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Graduate

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Biology

Submission Number: 22

3 Minute Thesis

The importance of Val183 in the DNA binding of cAMP receptor protein is due to its modest amino acid size

The F-helix of cAMP receptor protein (CRP) is directly involved in DNA recognition and binding. The F-helix includes six core residues which are critical for DNA binding and four of which are well-studied. This study investigates Val183, a core, yet unstudied F-helix residue. The Youn lab found that Val183 was important for the transcriptional activation of CRP, but the molecular basis was unknown. Since CRP's transcriptional activation requires CRP binding and RNA polymerase recruitment, the importance of Val183 on the function can be due to DNA binding or RNA polymerase recruitment or both. To determine which is the case, I randomized the codon for Val183 to create a pool of all possible 20 site-directed mutants (termed V183X), and introduced the plasmid pool (encoding the codon-randomized mutants) into an Escherichia coli CRP reporter strain (HYC620) which measures only DNA-binding activity. On an X-gal-containing assay plate, about 8.5% of transformants displayed the white phenotype of a wild type CRP-level or higher DNA binding activity. 6 positive transformants were selected and the corresponding plasmids were sequenced to reveal the causative codons and amino acid substitutions. DNA sequencing identified V183V (wild type), V183A, V183S (2 times), V183C, V183T. These substituted amino acids required for at least the wild type-level DNA-binding activity among the selected mutants are very similar in size with each other, suggesting a size constraint for the activity at this position. Given that Val183 is facing the interior of the protein and the opposite of the bound DNA, a substituted amino acid at position 183 is likely to influence CRP's DNA binding indirectly. We are currently testing the hypothesis that there is steric hindrance between a bulky amino acid at 183 and Ile172 located on the opposite side of the bound DNA may misplace the F-helix, thus negatively affecting DNA binding.

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Graduate

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Chemistry & Biochemistry

Submission Number: 23

3 Minute Thesis

Non-canonical Antigen Recognition by Camelid VHH Specific for the Virulence Factor Intimin

Enterohemorrhagic E. coli (EHEC) is a foodborne pathogen presenting a significant risk to human health. EHEC naturally resides in the intestinal tract of cattle but transmission to humans can occur when contaminated food is ingested. Upon EHEC invasion of the host gastrointestinal tract, the bacteria deliver Tir receptor into the host cell membrane serving as an anchor for intimin binding. Intimin is an outer membrane protein mediating the intimate attachment of the bacteria to the surface of mammalian cells. The bacteria release Shiga toxin leading to serious gastrointestinal illnesses. Therefore, this pathogen has been recognized as one of the most notorious pathogens featuring the properties of an extremely common and virulent serotype. Currently there is no treatments against EHEC, and treatments are solely dependent on supportive care. One possible solution against EHEC could be VHHs, which are the antigen binding fragment of camelid Heavy-Chain antibodies. Currently, we have five VHHs (1,2,3,5, and 9) which exhibit high specificity and binding affinity for intimin. Thus, we hypothesize that these VHHs would bind intimin blocking its interaction with Tir neutralizing EHEC pathogenesis. The goal of our research project is to determine the complex crystal structure of VHHs bound to intimin to unravel their molecular mechanism of interaction using X-ray crystallography. We were able to obtain the complex crystal structures of three VHHs (1,2,3), which showed to bound to a similar, overlapping epitopes adjacent to the Tir receptor binding site. Surprisingly, all the three VHHs formed polar contacts with intimin using a non-canonical and distinctive mechanism involving framework-2 (FWR2) in addition to bordering residues of the Complementary Determining Regions 3 (CDR3). The recognition mechanism involving FWR2 is likely encoded by the germline and may represent a novel and distinctive evolutionarily conserved mechanism to compensate for the loss of the light chain.

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Mechanical Engineering

Submission Number: 24

3 Minute Thesis

Thermal and mass transfer resistance through the liquid-gas interface of an evaporating nanodroplet.

Thermal and mass transfer resistance at a liquid-gas interface could strongly affect the evaporation of a micro/nanodroplet. One of the challenges in investigating heat and mass transfer across an evaporating liquid surface is the presence of two heat transfer modes: evaporation and heat conduction. Interfacial heat conduction was often overlooked in the analysis of evaporation of a liquid droplet. Using the kinetic theory of gases, we derive the analytical expressions for the heat and mass flow resistance across a liquid-gas interface of an evaporating droplet and verify the theoretical predictions by comparing them to molecular dynamics simulation results. We simulated the evaporation of a liquid Argon nanodroplet surrounded by a heated Neon gas environment and obtained high-resolution measurements of temperature and density distributions along the system to quantify their discontinuity at the liquid-gas interface, something currently difficult by conventional experimental methods. Additionally, we performed the same analysis on a liquid Water nanodroplet surrounded by heated Nitrogen gas to evaluate our findings in a system that better reflects applications used in industry. The modeling results show that the temperature jump across the evaporating droplet surface is mainly associated with interfacial heat conduction rather than evaporation, and the vapor density near the liquid-gas interface is determined by the resistance to mass transfer, i.e., evaporation, at the interface. Using the expressions for interfacial thermal and mass transfer resistance, we formulate the temperature jump and vapor density boundary conditions at an evaporating droplet surface and determine the scenario under which the conventional assumptions of continuous temperature profile and saturated vapor at the liquid-gas interface become invalid.

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Graduate

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Chemistry

Submission Number: 25

3 Minute Thesis

Using computational chemistry to investigate the mechanisms through which β-N-methylamino-L-alanine causes neurodegeneration

β-N-methylamino-L-alanine (BMAA) is a non-proteogenic amino acid, produced by cyanobacteria, which is considered to be the main cause of a neurodegenerative disease known as Amyotrophic Lateral Sclerosis/Parkinsonism Dementia complex (ALS/PDC). Furthermore, BMAA is also implicated in the onset and progression of other neurodegenerative conditions, and in vitro studies have demonstrated that it is directly harmful towards neurons. Despite these strong connections between BMAA and neurodegeneration, its exact role is not clearly understood. One theory suggests that BMAA might inhibit the protein degradation pathway since studies have suggested that it may bind to alter the function of ubiquitin. If ubiquitin is no longer able to degrade unwanted proteins in the brain, this may help to explain the buildup of protein aggregates that is commonly associated with neurodegenerative diseases. For these reasons, the goal of this study was to further assess the ability of BMAA to bind to ubiquitin and potentially alter its structure and function. Computational chemistry programs were used to first simulate the binding of BMAA to wild type ubiquitin protein in order to gain knowledge regarding its predicted binding sites and respective binding affinities. The preliminary results suggest that BMAA preferentially binds near lysine residues, including some which are known to be associated with the formation of polyubiquitin chains. The next step will be to perform NMR experiments using samples of ubiquitin protein mixed with various different concentrations of BMAA in order to determine the extent to which BMAA can alter the secondary structure of ubiquitin. Continuing to perform these types of studies should bring us closer to understanding the mechanisms which underlie this type of neurodegeneration.

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Graduate

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Mathematics

Submission Number: 26

3 Minute Thesis

Incorporation of Gerchberg Saxton Reconstruction Techniques to an Artificial Neural Network to Solve the Phase Retrieval Problem

In the past, algorithms have attempted to solve the phase retrieval problem using linear ap- proximations. The Gerchberg Saxton (GS) Algorithm was the first algorithm that created an efficient way to solve the phase retrieval problem by measuring the intensities between the image and diffraction planes. While initially successful in solving the phase retrieval problem, it does contain some drawbacks, such as a low recovery rate of the phases and stagnated iterations, causing excessive computation time and unreliable solutions. To improve the success rate of the algorithm, we have created a Neural Network that combines the reconstructive methods from the Gerchberg Saxton (GS) Algorithm with an artificial neural network (ANN) to conduct a more accurate phase retrieval algorithm than the original GS Algorithm. These modifications can be beneficial in applications such as X-ray crystallography, electron microscopy, astronomical imaging, and a multitude of image and signaling problems. Our goal is to provide a practical solution to the phase retrieval problem that provides a feasible solution that is not computationally expensive.

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Graduate

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Plant Science

Submission Number: 27

3 Minute Thesis

EM38 Soil Surveys and the collection of site-specific data for future 1-D Hydrus modelling to characterize salt transport and estimate leaching fractions for forage fields irrigated with saline drainage water

CCRS ABSTRACT - Rito Medina

Saline waters are increasingly used for irrigation due to a declining irrigation water supply in California. Saline irrigation brings the risk of salt accumulation in the rootzone, and periodic leaching is required to move accumulated salts below the rootzone. This project aims to gather field-specific data to calibrate Hydrus, a computer model, to simulate 1-dimensional movement of water and salt and predict the outcome of long term, saline irrigation on forage production at the San Joaquin River Improvement Project (SJRIP) in western Fresno County. Four fields sown to 'Jose' tall wheatgrass and irrigated with saline water of 4.5 to 9.5 dS/m ECw were selected. An EM38 electromagnetic induction sensor was used to map soil salinity (ECe) by walking the sensor along 20 to 25 transects per field (~30 meters apart), after which 12 soil-sampling locations for ground-truthing were generated using ESAP-RSSD software. Soil samples taken in 30 cm increments to a depth of 120 cm were analyzed for gravimetric water content, saturation percentage, pH, and ECe. Calibration of the EM38 sensor data (ECa) to soil salinity (ECe) was conducted using ESAP-Calibrate software. For fields 13-2 and 13-6, soil salinity (ECe) was lowest in the 0-30 cm layer indicating some leaching, but salinity was highest in the 30-60 cm and 60-90 cm soil layers suggesting a need for increased leaching. ECe values ranged from 8.9 dS/m to 27.9 dS/m at various soil depths, far above the established yield loss threshold of 7.5 dS/m ECe for tall wheatgrass. The spatial map revealed very high salinity (>20 dS/m) in a large area in the center north of field 13-2, whereas field 13-6 had large areas of lower salinity (<15 dS/m). Spatial patterns of soil salinity will be compared to spatial patterns of forage dry matter production and satellite imagery on the survey dates.

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Graduate

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Chemistry

Submission Number: 28

3 Minute Thesis

Fighting Prostate Cancer With JJ-450 Based PROTACS

Androgen Receptor (AR) signaling is crucial for normal prostate development, but also fuels the growth of prostate cancer cells. Current treatments to target AR signaling include inhibiting AR function through AR antagonists such as enzalutamide and bicalutamide. However, there are no known therapies that decisively inhibit nuclear localized AR in castration-resistance prostate cancer (CRPC) cells. The small molecule JJ-450 has been identified by the WIPF group as a lead molecule to reduce nuclear level of AR. The main disadvantage of using small molecules is the lack of sensitivity to changes in proteins due to mutations, and therefore are prone to increase drug resistance. Also, small molecules typically act by inhibiting the enzymatic function of the target, but do not degrade the target. These disadvantages can be mitigated through the use of a proteolysis targeting chimera (PROTACS). PROTACs are bifunctional molecules that consist of three chemical elements: a ligand binding to a protein of interest (POI), ligand binding to E3 ubiquitin ligase, and a linker for conjugating the two ligands. Upon binding to the POI, the PROTAC can recruit E3 for POI ubiquitination, which is subjected to degradation by the proteosome. Our goal is to synthesize JJ-450 and append it to an E3 ligase via a PEG linker to create a JJ-450 PROTAC. The PROTAC can facilitate active degradation of AR in the nucleus, which is not possible with a small molecule alone. Currently, the JJ-450 PROTAC is in development as the synthesis of JJ-450 is in second step (out of four). Unfortunately, the yield is low and the NMR indicates the compound is not pure due to residual solvents. The next steps are to purify the compound and to optimize conditions to increase the yield.

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Graduate

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Civil Engineering

Submission Number: 29

Oral Presentation

Seepage analysis of a dam using numerical modeling

Most dams in the United States were constructed in the last century and need reevaluations based on current needs and design standards. Two major concerns for such old dams are i) excessive seepage pressures and ii) failure due to piping. Numerical modeling provides a powerful tool for assessing the current status and evaluating design alternatives. Therefore, a numerical modeling study on an earth dam was undertaken to evaluate the efficiency of alternate designs that could address the issues of seepage and piping. The goal of numerical experimentation was to reduce seepage losses, pore pressures, and exit gradient to increase overall safety for the given model. A generic geometry resembling the Big Dry Creek Dam in Fresno County was used to develop numerical models using the SEEP/W program of GEOSTUDIO software. Since any modifications on the dam's upstream side are not advisable due to standing water, four alternative designs for downstream toe regions were considered. They are 1) layered inclined toe drains, 2) layered vertical toe drains, 3) 2 ft thick layered exterior toe protection, and 4) 4 ft thick layered exterior toe protection. The results of the four alternatives are compared with the original dam model. The findings show that the alternate design consisting of inclined layered toe drain reduced the discharge, exit gradient at the toe, and the uplift pressure at the dam base, improving the overall safety factor.

Keywords: flood control, seepage, finite element method, pore-water pressure, exit gradient, discharge

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Graduate

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Mathematics

Submission Number: 30

Oral Presentation

On Linear Chaos in the Space of Convergent Sequences

We construct bounded and unbounded linear chaotic operators in the space of convergent sequences.

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Graduate

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Biology

Submission Number: 32

Oral Presentation

Origins of Amaranthus tuberculatus (Waterhemp) in Central Valley Agroecosystems: A Population Genetics Approach Using Genotyping-By-Sequencing

Amaranthus tuberculatus (waterhemp) first began invading agricultural cropping systems in the 1950's and has since become a widely troublesome weed throughout the Midwestern United States. This species is not reported as a common weed in the agriculturally intensive Central Valley of California; however, in the last decade waterhemp has been increasingly observed invading agroecosystems within Merced County. The aim of this study is to (1) map the distribution of these waterhemp infestations in the Central Valley, (2) genetically characterize and determine the geographic origin(s) of this invasion, and (3) evaluate evolutionary route(s) that may have facilitated this invasion. Seven (7) waterhemp populations were identified in 2019 invading various agricultural fields (almond, corn, hay, rice) within Merced County between Highways 140 & 152; DNA samples were collected from each population and sequenced on the Illumina HiSeq4000 platform using genotyping-by-sequencing library construction. To determine the origin of this invasion, we compared allelic variation among these populations to potential source populations from across the species' Midwestern native range using the genetic clustering method STRUCTURE 2.3.4. Clustering results suggest K=2 clusters as the most likely, with population assignments aligning closely with western and eastern subunits representing the two established variety forms within the species, rudis and tuberculatus respectively. Merced populations cluster predominantly with the western rudis cluster associated more highly with agricultural invasiveness, suggesting they were introduced from this region and are likely preadapted for agricultural invasion success. Evolutionary routes of this invasion will be evaluated through demographic modeling using approximate Bayesian computation with DIYABC 2.1.0. Presence of the western rudis variety in Merced County poses a significant threat to the Central Valley agricultural industry. Biotypes of the rudis variety are commonly multiply resistant to several herbicide chemical classes; therefore, further characterization and integration of pest management strategies will be critical to successful management.

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Plant Science

Submission Number: 34

Oral Presentation

Can Landsat Imaging be a Useful Tool to Assess Yield Reduction in 'Jose' Tall Wheatgrass under High Salinity Conditions in the San Joaquin Valley of California?

As the San Joaquin Valley continues to face drought and rising temperatures, alternative waters that are often saline will increasingly be used for irrigation. Using saline water for crop irrigation has benefits for water conservation, but it poses some challenges such as the need to periodically remove salts from the root zone by heavy irrigation (leaching) and at the same time, avoiding nitrate movement into groundwater. Intricacies between applied water salinity, soil salinity, and evapotranspiration losses make estimations of saline fluxes difficult to predict when direct observations cannot be made. Computer models can be used to simulate these exchanges and assess salinity distribution in a soil profile, but these models require calibration with data representative of local soil, water, and cropping conditions. The San Joaquin River Improvement Project (SJRIP) is a 6,000-acre facility located in the Grasslands Drainage Area that reuses saline drainage water coming from 98,000 acres of productive farmland to irrigate forages. The intent of this research is to provide decision support to SJRIP managers by determining if Landsat satellite images can be used to detect salinity stress in tall wheatgrass fields and provide rapid and accurate assessment to complement EM38 soil surveys. Using four fields ranging from 70 – 88 acres, satellite band widths R, G, B and NIR will be compared to EM38 soil salinity maps and forage sampling at the EM38 ground-truthing sites to determine whether multispectral imagery can predict salinity stress in the fields over the irrigation season. The overall objective of the research is to improve our understanding of soil salinity constraints to irrigation with saline-sodic water, to improve salt management in saline-sodic soils and to ensure success and sustainability of tall wheatgrass production.

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Graduate

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Plant Science

Submission Number: 35

Oral Presentation

Impacts of Native and Introduced Cover Crops on Soil Health in a Table Grape Vineyard of the San Joaquin Valley

Cover crops are deemed to be a component of sustainable agriculture, but their adoption in California is fairly low compared to other states primarily due to water use concerns by the cover crops and diverse cropping systems in California.

This study was conducted to determine how cover crops can be managed efficiently in a newly established Autumn King table grape vineyard in the semi-arid climate of the Eastern San Joaquin valley. The impacts of native species cover crops (Phacelia tanacetifolia) and introduced species cover crops (Secale cereale L. 'Merced') on soil health, crop water dynamics, and grapevine development were studied at the USDA-ARS in Parlier, CA. These cover crops were planted in vine row inter-rows, and the cover species were chosen with characteristics deemed beneficial to vineyards such as ease in establishment, ability to attract beneficial insects, and low or non-competitiveness for soil water.

In 2020, soil moisture in the native cover treatment averaged 15% higher than the introduced treatment and 41% higher than the bare treatment, a trend which was retained even after irrigation run times were decreased in the native cover treatments. Vine vigor, a common assessment for vine health, was measured in December 2020; the average shoot mass, trunk diameter, and shoot mass per vine length were highest in the native treatment. Soil aggregates assessed in 2021 showed that the percent soil mass of native treatment plots in the 2mm fraction was 7.3% higher compared to the introduced and 7.9% higher compared to the bare treatment. The vine vigor, soil aggregation, and soil moisture benefits in plots with native cover crops were not expected to be seen so definitively in first years of establishment; with more time and investigation other trends may become apparent, potentially making cover crop adoption more feasible and appealing to California farmers.

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Biology

Submission Number: 36

Oral Presentation

A Phylogeny of the Western North American Wildflower Genus Helianthella

This project aims to establish a phylogeny of the plant genus Helianthella (little sunflowers) and place it within its taxonomic subtribe in the family Asteraceae. Helianthella are wildflowers with perennial taproots and annual flowers with basal rosettes of leaves. They are distributed along the mountains of western North America, from southern Canada to northern Mexico, with some highly geographically restricted species in California and Mexico. This genus has gone understudied for many decades, with its last major taxonomic treatment being a monograph in 1952. The relationships among the 11 species within Helianthella, and the relationship of the genus to the four other genera in the taxonomic subtribe Enceliinae, are unknown. The nuclear regions ETS and ITS and three chloroplast regions have been sequenced and analyzed thus far. First, phylogenies were constructed using the Bayesian inference software MrBayes, separately for nuclear and chloroplast data, then these phylogenies were combined with distribution data to infer the biogeographic history of the genus using the program RASP. The resulting data have revealed a history of hybridization between the northernmost species H. uniflora and its neighboring taxa, as well as among taxa in the Central US. All phylogenies support two major clades within the genus, one containing all of the exclusively Mexican Helianthella and one containing the rest of the genus, as well as the monophyly of the genus as a whole. Helianthella californica was found to be non-monophyletic due to the presence of a neighboring species within its clade, so further taxonomic work will need to be done to resolve the conflict. The placement of Helianthella among its neighboring genera also remains contentious, potentially due to low sampling or its history of hybridization. These analyses have provided many insights into the history of the genus that were not possible when last it was studied.

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Graduate

California State University, Fresno

Department of Biology

Submission Number: 37

Oral Presentation

Population Genomics of the Native and Invaded California Range of Palmer Amaranth (Amaranthus palmeri)

Palmer amaranth (Amaranthus palmeri S. Watson), a dioecious, wind-pollinated annual plant native to the Southwestern United States, has become a significant challenge in modern weed management over the last three decades, recently establishing itself as a weed in agricultural ecosystems within the Californian Central Valley in 2015. Palmer amaranth's range expansion potential is well-documented in the Eastern United States, where it went from a relatively unknown plant to a weedy species of major concern over a short period of time. The expansion into Central California warrants an examination of where the new weed infestations fit into the population structure of Palmer amaranth in the Western United States and what differences in population genetic statistics may be exhibited by the new California populations versus those in Palmer amaranth's native range. To this end, we have conducted population-level sampling from both these regions and generated genomic data via genotyping-by-sequencing to identify genetic variants (single-nucleotide polymorphisms) for population genetic analysis. Using these data, we conducted population structure analysis including various hierarchical clustering methods (ADMIXTURE/STRUCTURE). STRUCTURE and ADMIXTURE analyses with an original dataset (n = 114 individuals from 9 native Southwestern U.S. populations and 4 invasive Central California populations) shows weak structure within these populations. ADMIXTURE analysis indicates that a scenario with K= 2 genetic clusters is most likely given the data. STRUCTURE analysis however appears to favor a scenario with K = 4. STRUCTURE ancestry estimates indicate that Californian samples cluster with the Southwestern U.S. samples, but ADMIXTURE, in contrast, appears to indicate some populations in the invaded region cluster differently than the majority of individuals in the native region. More sampling from the native range, invaded California range, and the Eastern U.S. invaded range is being undertaken to improve understanding of population genomics in this problematic agricultural weed.

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Graduate

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Biology

Submission Number: 38

Oral Presentation

Project title and abstract unavaliable per the request of the presenter and mentor

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Graduate

California State University, Fresno

Physics

Submission Number: 39

Oral Presentation

X-ray fluorescence measurements of iron, zinc, and selenium in subcutaneous blood pool – a phantom study.

Monitoring essential trace elements in the human body is an important part of clinical assessment of metabolic health. Rapid, non-invasive, non-destructive, and low-dose monitoring of trace elements can be achieved by x-ray fluorescence (XRF) measurements. Past XRF studies addressed detection and quantitation of zinc (Zn) in nails, selenium (Se) in skin, or strontium (Sr) in bone. XRF detection of iron (Fe), Zn, and Se in the subcutaneous blood pool was investigated. The method is as a non-invasive alternative to current clinical measurements using inductively coupled plasma mass spectrometry (ICP-MS). Six water solutions containing Fe, Zn, and Se in 5, 10, 15, 20, 25, and 30 μg/g concentrations placed in micropipette polyethylene plastic vials mimicked the skin and subcutaneous capillary blood pool. Spatially selective excitation of the solution elements was achieved by employing a small (~1 mm lateral size) x-ray beam produced by an integrated x-ray tube and poly capillary x-ray lens system. A silicon x-ray detector, a positioning stage, and a grazing-incidence method developed in our lab were used to acquire three 300-s x-ray spectra for each concentration. Spectral Kα peak area measurements yielded a calibration line for each element. Calibration line slope and peak area uncertainty values were used to compute

detection limits of (7.040.04), (4.50.2), and (3.90.2) μg/g for Fe, Zn, and Se, respectively. Normal levels of Fe, Zn, and Se concentrations in human blood are roughly 10, 5, and 0.1 μg/g, respectively. Therefore, Fe and Zn measurements are feasible, but Se level assessment is not possible. Future work will assess radiation dose cost and the effect of varying skin x-ray attenuation on detection and concentration measurement.

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Graduate

California State University, Fresno

Social Work

Submission Number: 40

Oral Presentation

A qualitative study exploring the effects of multiple placement changes for minors in foster care.

The goal of this study is to explore multiple placement changes through the lens of the youth in foster care. Prior research in the field of social work has demonstrated how detrimental multiple placement changes are to children in foster care, but there is minimal insight from the child's point of view. Placement instability can occur due to a variety of issues, but it has been proven to cause attachment difficulties, poor outcomes in education, and the likely hood of contact with the criminal justice system (Khoo & Skoog, 2014; Perez, 2011; Mcmillen et al., 2003; Fernandes-Alcantara, 2018; Krimsky, 2010). Using a hermeneutical phenological research design allowed the researcher to explore the lived experiences of the children in foster care (Creswell & Creswell, 2018). Individual interviews were conducted with nine teenagers currently in out-of-home placements. Using thematic analysis three themes stood out: improved education, internalized responsibility and recognition of good placements. The discussions revealed that the youth felt that if their placement was positive their grades improved, and more focus was placed on their education. Through discussions it was found that the youth in care had a great deal of internalized responsibility to maintain their placements by behaving well. The interviews also provided insight into the way that the youth recognized a good placement, especially when they have been in care for longer than the other youth. The information and knowledge that is gathered can then be taken to help inform social workers of the ramifications and continued trauma that comes with multiple placement changes.

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Graduate

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Submission Number: 41

Oral Presentation

Analysis of Freight Movements in the San Joaquin Valley

Freight transportation represents a significant amount of traffic and all its associated externalities, such as traffic safety, congestion, energy demand, greenhouse, and air pollution emissions, and infrastructure costs. However, it also plays a primary role in the supply chains and the costs and availability of goods and is a major player of the economy. This study aims to identify, assess and utilize different data sources to uncover and understand the patterns and movements of the different types of freight in different counties of the San Joaquin Valley. The San Joaquin Valley region consists of 13 counties naming San Joaquin, Stanislaus, Marced, Madera, Fresno, Kings, Tulare, Kern, Calaveras, Tuolumne, Mono, Mariposa and Inyo. This research has explored some major datasets consisting of freight data such as GTA, PIERS, and Streetlight Data Insights for the year 2019, i.e. to get a clear insight on what the actual movement of freight looked like pre-covid. The primary softwares used for this analysis are MS Excel, MS Access, ArcGIS and Jacob Streetlight Insight. This research investigated all modes of freight transportation for domestic and international trade which are air, water, rail and road. Findings of this research are valuable for multiple different government as well as private agencies for various use cases such as developing of transportation infrastructure, freight business, and environment assessments.

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Graduate

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Biology

Submission Number: 43

Oral Presentation

Virtual field trips during the COVID-19 pandemic: findings on second-grade student STEM attitudes

Places of informal learning, such as science centers, museums, zoos, aquariums, libraries, gardens, and more experienced broad closures due to quarantine and social distancing measures during the COVID-19 pandemic. Providing virtual field trips as a distance learning method can allow students to explore informal learning sites virtually while receiving access to community resources and education on science, technology, engineering, and math (STEM). However, not much is known about how virtual field trips can impact student attitudes toward STEM. To evaluate how students would respond to a virtual field trip program, we collaborated with the Fresno Discovery Center and four teachers to pilot a series of four virtual field trip sessions to 96 students in the second grade. Each virtual field trip was developed to align with national learning standards and included an activity kit where students virtually met with Fresno Discovery Center staff to explore a lesson. Using a survey distributed to the students, we measured their attitudes toward STEM before and after the program. In addition, we also collected data on how interested students would be in visiting the Fresno Discovery Center before and after the virtual field trips. Preliminary data revealed that while there was a 14% mean increase in visitation interest to the Fresno Discovery Center, students reported a 7% mean decrease in positive attitudes toward STEM. Interview data provided by teachers indicated technological constraints, activity difficulty, challenges in parent communication, and other factors introduced during the virtual field trips may have contributed toward the declines in positive STEM attitudes . As we predict that the use of virtual field trips will continue throughout the pandemic and beyond, we are hopeful that the information from this study can be used to improve virtual field trips for education.

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Biology

Submission Number: 44

Oral Presentation

Evidence for the Resurgence of the Chinese Mitten Crab, Eriorcheir sinensis, in the San Francisco Bay

In 1992, the Chinese mitten crab, Eriocheir sinensis, was discovered in the San Francisco Bay Delta system due to human introduction. Since the establishment of this invasive species, there have been many negative environmental and economic impacts surrounding the San Francisco Bay. Explosions in adult populations can potentially have negative effects on native species through competition and predation. Other effects of the mitten crab are caused by juveniles that include stream bank and levee erosion through burrowing behavior that could potentially destroy future housing developments and erode natural ecosystems. Monthly plankton tows taken from the California Department of Fish and Wildlife (CDFW) station D41 were analyzed for E. sinensis zoeae. Brachyuran zoeae and megalopa were keyed to species with the use of a dichotomous key (Rice and Tsukimura, 2007; Gonzales et al, 2009). In April 2003, was the highest number of mitten crab zoeae where they recorded a total of 407 larva samples (CPUE = 4064.5). In 2005, no adult crabs were found in Otter trawls conducted by the CDFW and by 2008, no mitten crab zoeae were found in plankton tow surveys. However, in 2012 a total of 26 mitten crab megalopa were discovered and in 2013, another 9 mitten crab megalopa were found. This suggests the beginning of the population resurgence for the Chinese Mitten Crab since their population dynamics are known to undergo dramatic oscillation patterns. If population explosions can be predicted, preparations can be made for the negative effects caused by the downstream migration of mitten crab juveniles. We are continuing to sort and identify crab zoeae for the years of 2014 and on to keep a record for all the invasive crab species in San Francisco.

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Oral Presentation

Migratory dark-eyed juncos (Junco hyemalis) have lower MHC class I diversity and higher parasite prevalence compared to resident subspecies.

In birds, seasonal migration may increase exposure to a wide variety of pathogens, which can impose strong balancing selection (heterozygote advantage) on immune genes, such as the major histocompatibility complex (MHC). In contrast, sedentary species may exhibit good gene effects at MHC since they need to adapt to local pathogens. The system of seasonally sympatric dark-eyed juncos (Junco hyemalis) near the Mountain Lake Biological Station in Virginia is composed of two subspecies — the resident Carolina juncos (J. h. carolinensis) and the overwintering migratory slate-colored juncos (J. h. hyemalis), which diverged ~10,000 years ago. These seasonally sympatric subspecies provide a unique opportunity to study how differences in migratory behavior may explain variation in parasite-mediated selection of immune genes and overall parasitemia. We hypothesize that migratory juncos will have a higher prevalence of blood-borne parasitic infections due to occupying many habitats throughout the year. Conversely, the resident juncos will contain fewer MHC alleles due to local adaptation to parasite fauna. Using bird blood collected in March 2018, we analyzed blood-borne parasite (e.g., malaria) prevalence through parasite-specific PCR and parasitemia through qPCR. We characterized MHC class I exon 3 using high-throughput sequencing and bioinformatics and measured molecular selection and genetic differentiation at MHC using the DataMonkey adaptive evolution server and STRUCTURE, respectively. Contrary to our prediction, we found higher MHC class I diversity in the resident Carolina juncos than in the migratory slate-colored juncos. We also found higher prevalence and greater diversity of blood-borne parasites in the migratory juncos. Results on infectivity levels are ongoing and will be discussed. Our results indicate spatially varying selection on immune genes due to migratory behavior and an inverse relationship between MHC class I and parasite diversity. Ultimately, this study adds to our understanding of how adaptation to parasites may vary in recently diverged subspecies.

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Chemistry and Biochemistry

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Oral Presentation

Developing a Chemical Database to Analyze Molecular Excited State Information

The main objective of this project is to develop a computational method for efficiently interpreting excited state information using a chemical database. This information varies significantly between different types of molecules, which makes it difficult to store and process. As a result, excited states often require molecular orbital visualization to interpret their properties. However, generating each pair of transition orbitals becomes labor-intensive if there is a desire to use orbitals to compare the excited states of different compounds. One alternative is to analyze data associated with excited states. Although both the orbitals and excitation data can be calculated using one function, the data is readily available in the computational output file. For this project, a computer database program was developed to use computed excited state data to compare the excited state properties of different molecules. An excited state database was created using twenty organic molecules, twelve of which were aromatic to establish a metric. Optimized molecular geometries, SCF energies, IR/Raman frequencies, and excitation energies were calculated for each molecule using Q-Chem and visualized using IQmol. The calculations were done using configuration interaction singles (CIS), the Tamm-Dancoff approximation (TDA), time-dependent density-functional theory (TDDFT), and a Gaussian basis set, 6-31G. A Python script was then developed to extract from each output file the molecular geometry, SCF energy, excitation energies and amplitudes, orbital energies, and the calculation methods and bases. Using hierarchical clustering, the molecules were organized in the form of a dendrogram based on their excitation energy (ED) and orbital (OS) differences. Another set of dendrograms were generated using the same method, but the molecules were organized based on different weighed combinations of excited state data element differences. While both sets of dendrograms share similar subclusters, a combination of elements was not found that can match the more accurate OS-ED generated dendrograms.

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Department of Social Work Education

Submission Number: 49

Oral Presentation

Social work and homelessness: An exploration of negative bias and higher education

California accounts for over half the country's total unsheltered homeless population. While social workers are often tasked with assisting such populations in healthcare and social service settings, the level of educational preparedness and degree of negative bias among practitioners remains unclear. Despite nuanced combinations of environmental factors impacting one's risk of homelessness, the general public tends to attribute homelessness to individual factors such as substance abuse, severe mental illness, social deviance, disability, and perceived immorality. Stereotypes correlating with such narrow views have contributed to stigmatizing, discriminatory, and punitive interactions within healthcare and social service environments, posing barriers to service utilization and health equity among populations experiencing homelessness. Practitioners interacting with unhoused populations report elevated rates of mental health problems, burnout, compassion fatigue, and post-traumatic stress, citing levels of education, professional experience, organizational support, and subjective exposure as predictors of such symptoms. Minimal research has investigated the prevalence of homeless-specific curriculum within social work education programs, and while recent studies indicate a need for professional development programs for those working with unhoused populations, it is unclear how such interventions should be designed to address curriculum gaps in California. A convenience sample of 265 California social work practitioners and students completed an online questionnaire exploring participants' social work education, practice experience, and beliefs about homelessness. Despite most participants indicating progressive political views and awareness of causes, barriers and policies impacting homelessness, respondents endorsed stereotypical views of homeless individuals as irresponsible, unmotivated, violent, antisocial, and untrustworthy. A significant number of respondents supported increased punitive interventions to solve homelessness, further indicating reluctance toward increasing wages or welfare benefits as possible solutions. These findings indicate a need for more comprehensive representations of homelessness in social work education programs, including causes, barriers, effective interventions, and commonly held biases in conflict with the NASW Code of Ethics.

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Oral Presentation

Quantification of Constitutive Innate Immunity of Songbirds against Salmonella

Salmonella bacteria is a significant zoonotic pathogen found throughout the environment and is characterized by high genetic variability. Many serovars of Salmonella are found in the intestines of wild animals, with wild birds acting as a reservoir and disseminator of the bacteria. A recent outbreak of Salmonella enterica serovar Typhimurium in 2020-21 resulted in a large die-off of seed-eating (granivorous) songbirds (e.g., pine siskin, Pinus spinus) in the Pacific Northwest. Furthering this, some humans that handled the sick birds and bird feeders contracted Salmonella, demonstrating its zoonotic potential. In 2021, the CDC reported 29 illnesses and 14 hospitalizations because of Salmonella linked to wild songbirds. Granivorous songbirds readily occupy bird feeders in both urban and rural spaces, however, only some appear to be susceptible to Salmonella infection while other species may have superior constitutive innate immunity, which helps birds resist infection. The aims of the project are to quantify constitutive innate immune function by measuring bactericidal activity in multiple songbird species against a local avian Salmonella strain and to monitor Salmonella prevalence through direct sampling. We will be performing a bacteria killing assay to measure the antimicrobial activity of fresh whole blood from granivorous songbirds captured at bird feeders. Target species include finches and new world sparrows. Direct sampling of birds and bird feeders will be performed through fecal, oral, and cloacal swabs cultured on selective agar. The results from this project would let us establish which species are more susceptible to Salmonella. A better understanding of the bird's capability in fighting off the bacteria is important for watching for future Salmonella outbreaks, conservation of local bird populations, and human health.

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Plant Science

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Oral Presentation

Biomass Accumulation and Nitrogen Fixation by Fava bean (Vicia faba L.) in Various Cover Crop Mixes

In recent years, environmental quality, biodiversity, and agricultural production have declined significantly due to conventional agricultural practices such as intensive tillage, short or no fallow, monocultures, leaching and excessive use of inorganic fertilizers (Dabney et al., 2010). Moreover, with an expenditure of $3.6 billion yearly on herbicides (Pimentel and Levitan, 1986), has not resulted in reduction of weeds, and reduced output by 10% (Shaw, 1982). Soil degradation from intensive cropping production and resultant losses in productivity require use of rejuvenating practices to rebuild soil health and crop productivity potential. Therefore, cover crops are now recognized as an important component of sustainable production in most areas of California because of their potential for biological nitrogen fixation and biomass addition into the soil. The production of fava bean biomass is typically higher than most other legumes, achieving 20-40 tons per acre, with a nitrogen fixation rate of 90 to 200 lbs. per acre. (Hickmam and Canevari, 2018; Jensen et al., 2010). In this experiment, the nitrogen fixation and biomass addition are examined in various crop mixes in split-plot design. The crops include Fava bean (Vicia faba L.), Oat (Avena sativa), Mustard (Brassica sp.), Radish (Raphanus sativus), Pea (Pisum sativum) and Vetch (Vicia sp.) with different seed rates. Five best performing fava bean varieties (En 39, Bell Bean, En 3, SSN-1 and En-15) were selected from a panel of 63 previously tested fava bean germplasm lines and were examined for various parameters such as root length, shoot length, nodule count, dry weight of nodules, and leaf area. N derived from the atmosphere (%Ndfa) and N isotopes will be presented.

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Mathematics

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Oral Presentation

Marked Point Process Analysis Applied on Seabirds Data

Spatial point processes are stochastic processes that generate point patterns. A point pattern is the locations of the events that are generated by the point process within a bounded region. Our focus is on the location of these events, and additional data provided at these locations. We call these additional data points marks.

The objective of this study is to explore methods of analysis that can be used for unmarked point patterns and marked point patterns. We also survey different types of marked point patterns. Methods of analysis for marked point patterns are applied to a seabirds data set. This set contains columns for 34 species of seabirds at specific locations off the U.S. East coast. The observations of this data set include longitude and latitude coordinates of seabird records, along with a number of birds for each species. For our methods, we look at the simplest case. This is the case where the mark for the point process only takes into account two species of birds. Some analysis methods used on this set are computing first-order and second-order kernel intensities. These intensities provide information about how events are clustering around a specific area in the region, and how these events are clustering around an existing event. Another second-order intensity measure comes from the K-function. This function is a conditional scaled expectation that describes the likelihood that a new event will happen within a specified distance of an existing event. Some results that we can expect are successfully assigning the two-seabird species mark to the data set, and results that come from our intensity computations. Results from other methods of marked point process analysis may provide other insights. We also strive for early results in the direction of assigning a mark in the form of composition of bird species.

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Plant Science

Submission Number: 53

Oral Presentation

Salinity Tolerance and Forage Quality Comparison for Four Varieties of Alfalfa (Medicago sativa)

Alfalfa is an important forage and the most valued hay crop for California's dairy industry which leads the nation in milk production. Statewide, alfalfa was grown on 515,000 acres in 2020 (USDA-NASS, 2020), down from over a million acres in 2006. California alfalfa yields average 7.1 tons/acre, nearly twice the U.S average, due to a long growing season that allows for more cuts per year and to breeding efforts to address changing conditions in climate, water availability and soil quality (Geisseler and Horwath, 2016). With increasing drought and irrigation water scarcity, lower quality irrigation waters that are often saline are increasingly used for forage irrigation, as our marginal soils, higher in salinity. Alfalfa seed companies have foreseen this trend and invested considerable resources into breeding more salt tolerant varieties (Alforex, https://www.alforexseeds.com/alforex-alfalfa-seed-technology/hi-salt-salinity-tolerant-alfalfa-seed/). In this experiment, four alfalfa (Medicago sativa) cultivars are being evaluated at five irrigation water salinity levels (0.5, 5, 10, 15, 20 ds/m ECw) using a split plot design in an outdoor pot experiment. A companion seed germination test is also being conducted. The cultivars include two newly licensed varieties from Barkley Seed, Inc. (B6604-0588F, B6269 SR), a salt tolerant control (AZ90NDCST) and a public control (CUF101). The seedlings were established under non-saline conditions and grown in large pots (15 gal.) filled with a 4:1 fritted clay to peat moss combination. Nutrient solution (1/4 strength Hoagland's) was applied every two weeks. Once salinization began, the plants were cut to the crown and then harvested every 3 to 4 weeks, just prior to flowering in the controls. Dry matter production and sodium and potassium accumulation in shoot tissue will be presented.

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Submission Number: 57

Poster Presentation

Use of a Mobile Health Clinic to Improve Flu Vaccination Coverage Among Underserved Pediatric Population of Clovis Unified School District

Introduction: Universal access to healthcare services is essential in health promotion and disease prevention. Providing direct healthcare access would expand healthcare boundaries and advance health equity to underserved populations. Barriers to healthcare include limited access to healthcare, high-poverty, lack of transportation, or the uninsured. The use of mobile health clinics (MHC) would benefit underserved populations by directly delivering healthcare, especially for vulnerable pediatric populations and thus, help to eliminate these barriers. This was evident during the COVID-19 pandemic when pediatric preventive care visits and vaccination rates declined across the country, which increased the vulnerability of pediatrics towards unnecessary disease.

Purpose: To address the healthcare needs of an underserved pediatric population located within the Clovis Unified School District (CUSD), a project using the Fresno State Nursing School Mobile Health Clinic aimed to offer families with healthcare barriers their necessary vaccinations. The goals of this project will include: (1) maximizing routine childhood flu vaccinations, (2) decrease barriers to care by expanding healthcare delivery, and (3) strengthen the school community relationships with the mobile health clinic.

Methods: This project will utilize a descriptive design and offer two Flu vaccination clinics using the MHC to students who attend Title 1 elementary schools that are considered high poverty. Parents will complete a validated 6-item questionnaire that will assess the effectiveness of the MHC.

Results: Data collection from the validated parental questionnaire is ongoing through March of 2022 and will be analyzed using descriptive statistics with SPSS software to obtain statistical significance ($p < 0.05$).

Conclusion: Mobile clinics serve as a positive healthcare resource as they can decrease barriers by bringing healthcare directly to the underserved, like those students who attend CUSD Title 1 schools. Evidence from this quantitative research study will denote the importance of the MHC as an effective means to improve healthcare access.

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Poster Presentation

LGBTQ+ STUDENTS' EXPERIENCE WITH THE CALIFORNIA STATE UNIVERSITY, FRESNO STUDENT HEALTH AND COUNSELING CENTER

LGBTQ+ individuals face many extrapersonal and intrapersonal barriers to accessing healthcare, causing this group of individuals to remain underserved in our current healthcare arena. The continued lack of healthcare utilization results in negative health outcomes, higher risks for diseases, and lower quality of life for these LGBTQ+ individuals. Awareness of a lack of provider education and attitudes, locations of services, or stringent government restrictions can better address the client's intrapersonal factors including fear of disclosure relevance to healthcare treatment, anger and frustration associated with the untrained providers, and individualized fear of stigmatization or discrimination for LGBTQ+ identity. This research is guided by the following research question: How do Fresno State students who identify as LGBTQ+ perceive their quality/access to health care during their use of the Student Health and Counseling Center in the last five years? The purpose of this study is to discover areas of improvement for the Fresno State SHCC and discuss the LGBTQ+ students' healthcare encounters at Fresno State. This qualitative, quality improvement study will be accomplished through a written survey of Fresno State LGBTQ+ current students and alumni. Identified extrapersonal and intrapersonal factors can be recognized to better identify weaknesses in the current system and better enable the implementation of improved healthcare access at Fresno State.

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Poster Presentation

DOES MEDITERRANEAN DIET RECOMMENDATION BY A SINGLE PROVIDER IN A PRIVATE FAMILY PRACTICE SETTING IMPROVE PREDIABETIC AND DIABETIC OUTCOMES? A RETROSPECTIVE DESCRIPTIVE CHART REVIEW STUDY.

The purpose of this project was to evaluate the effects of the Mediterranean diet on diabetic outcomes in a primary care setting and establish evidence for an efficient and efficacious dietary recommendation. Literature indicates prediabetes is one of the most prevalent diseases among American adults and children today. Key themes that place patients at risk for the development and complications of prediabetes and Type II diabetes are sustained elevations of and rising blood sugar readings, obesity, sedentary lifestyle, and multiple other health issues. Diet and exercise are first-line treatments to improve blood sugar levels and prevent disease complications. To address this, current recommendations do not include a specific diet; rather, there lacks consistency and clarity which confuses patients thus affecting dietary compliance rates. This project used a retrospective case study involving 30 patients over a 6-month period who were recommended the Mediterranean diet at a primary care setting in Los Osos, California. The study investigated diabetic measurements of health including HbA1c percentages, number of UTI infections, blood pressure readings, total cholesterol, HDL ratios, and serum BUN and creatinine levels. Results showed improvements in lower HbA1c percentages; improved blood pressure readings; and some patients lost several pounds. In conclusion, this study shows some evidence for providers to recommend this diet to prediabetic and diabetic patients to prevent and improve diabetes and complications.

Keywords: type II diabetes, prediabetes, Mediterranean diet, HbA1c, weight loss, primary care, diet recommendation

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Poster Presentation

Using Isochrone Maps and OD Matrices to Assess the Impact of the High Speed Rail on Multimodal Regional Mobility in California

California is looking to build the United States' first high-speed rail (HSR) network. The

California High Speed Rail (CAHSR) is expected to have significant impacts on regional

mobility. While the consensus is that High-Speed Rail will decrease intercity travel times, it is uncertain to what extent time savings will be realized for the residents of the major urban centers in California. The main goal of this research is to quantify and visualize the impact of the CAHSR on regional travel times across the state. Isochrone maps and origin-destination (OD) travel time matrices were developed using ArcGIS and advanced ArcGIS extensions (Network Analyst and Model Builder) for each of four different existing intercity transportation networks (Car, Train, Bus, and Air) and two additional future networks reflecting the two construction stages of the CAHSR (stage I: San Francisco to Los Angeles, and stage II: additional extensions to Sacramento and San Diego). Isochrone maps were produced for 11 major attractions across the state: the cities of San Francisco, San Jose, Los Angeles, San Diego, Redding, Sacramento, Fresno, and Bakersfield; and the Yosemite, Sequoia and Joshua Tree National Parks. Travel times (weighted by population) were computed between these 11 attractions and 460 cities across the state. The results of this study indicate that significant time savings (an average travel time reduction of 31%, in comparison to the car) will be achieved through the development, construction, and operation of the CAHSR system, and the impact on intercity travel times can be readily demonstrated and understood using GIS tools and Isochrone maps.

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Poster Presentation

Identifying Informal Hospice Caregivers perceived Barriers to Administering Morphine

When patients go on home hospice, family members assume the responsibilities for their dying loved ones; they share the patients illness journey and experience the pain and suffering that can occur at the end of life. The purpose of this qualitative study is to explore barriers that informal caregivers have when assuming the responsibility of administering morphine for their dying loved one. Methods: Data was gathered by semi-structured interviews of informal hospice caregivers. An interview guide was used to elicit the same core information for each patient. Preliminary Results: Themes identified are fears of over medicating, concerns about addiction, family influence on morphine administration.

This study provided valuable knowledge, the information obtained from this study will help nurses understand caregivers perspective of administering morphine and their perceived barriers with the aim of improving comfort and optimal pain management at the end of life.

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Submission Number: 62

Poster Presentation

Healthcare Providers' Role in Nutritional Education in an Inpatient Setting

Abstract

Introduction:

This correlational study uses The Nutritional Competency Tool (NUTCOMP) to survey healthcare providers and measures their confidence in nutrition skills, knowledge about nutrition and chronic disease, confidence in communication in counseling about nutrition, and attitudes towards nutritional care. This study aimed at assessing the knowledge and answering the following research question; what knowledge, attitudes and perceptions about nutrition do healthcare providers have?

Methods:

Pearsons correlation will be used as an open-source tool to analyze survey data and create visualizations. Hypothesis tests and confidence intervals are used to address the statistical significance of the results and to estimate the strength of the relationship in the population from which the data are sampled.

Results:

Data collection will be completed on March 2022. Survey data will be compiled into excel as a database for exploratory data analysis including using Pearson's R to investigate. We hypothesize based on current literature self-perceived competence is likely to be an indicator of actual competence.

Conclusion:

This study was designed to reveal what methods healthcare providers are using to perform nutritional care and with what extent of nutrition knowledge. Results can be used to identify opportunities for enhancement to curricula in medical and health professional education programs, as well as assisting in the evaluation of health services by providing information on the readiness and capacity of primary health professionals to provide nutrition care to a community or population group. This takes into account aspects of awareness, knowledge, perceptions and attitudes towards nutrition care in chronically ill patients.

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Poster Presentation

Design and Synthesis of EPI-Based PROTACs for Prostate Cancer

The prostate is a male sex organ located between the bladder and the penis. In the United States, American Cancer Society estimates that there are roughly 268,000 new cases of prostate cancer and 34,000 deaths from prostate cancer in 2022. Androgen receptor, a key protein in the growth and survival of prostate cancer cells, is overexpressed in 30% to 50% of castration-resistant prostate cancer patients. One way to reduce the levels of this protein is through the use of PROTACs. Proteolysis Targeting Chimeras (PROTACs) are hetero-bifunctional molecules where one end binds to a protein of interest and the other to an E3 ligase ligand; starting up the Ubiquitin-Proteasome Pathway for protein degradation.

EPI has shown to be a potential candidate for PROTAC incorporation due to its direct binding to androgen receptor in the N-terminal domain. EPI-506 has even undergone Phase I clinical trials in 2016-2017 but was concluded due to a high pill burden. Through the utilization of PROTAC technology, attaching an EPI derivative to an E3 ligase ligand could improve EPI's solubility and potency for the inhibition of prostate cancer cell growth via androgen receptor protein degradation. The synthesis of the EPI derivative begins with the starting material Bisphenol A (BPA). Then moves forward by attaching a linker to one end and the active functional group to the other end.

The synthesis of the EPI derivative has been characterized via 1HNMR, 13CNMR, and Infrared Spectroscopy. The intermediate with the active functional group towards androgen receptors has been tested in vitro using DU-145, PC-3, LNCaP, and 22Rv1 prostate cancer cell lines. The intermediate has shown little inhibitory effects towards prostate cancer cells.

An EPI PROTAC has been designed for androgen receptor degradation. The EPI derivative is nearing the final stages for VHL ligand incorporation to yield the desired PROTAC.

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Poster Presentation

The Impact of Service Use and the COVID-19 Pandemic on Graduation and Retention

California State University, Fresno serves a diverse student population in the Central Valley, with many students being from underrepresented backgrounds. Historically, underrepresented minority students have lower degree completion rates than non-underrepresented minority students. Support services have been implemented to address these disparities. However, the systems to assist underrepresented minority students may not always be as effective as anticipated. At California State University, Fresno, the effects of service use by underrepresented minority students on graduation and retention rates were assessed. Additionally, the COVID-19 pandemic was considered. The primary research hypothesis determined if student support services positively predicted four-year graduation rates and one-year retention rates among underrepresented minority students. Services selected for the research were academic advising, career development, supplemental instruction, tutoring, and the student cupboard. All chosen services have been recognized as particularly beneficial resources to the underrepresented minority population. Their effectiveness in graduation rates is essential to understand. In turn, resolutions can be made to constructively support the California State University, Fresno students as they pursue a college degree. The present research aims to address the following questions (1) What is the 4-year graduation rate for students at Fresno State? Is there a gap in 4-year graduation rates among underrepresented minority students and non-underrepresented minority students? Is there a gap by gender? (2) Do student support services positively predict a 4-year graduation rate and 1-year retention? Does the association between support services and graduation/retention rate differ by underrepresented minority status? Does it differ by gender? (3) Has the COVID-19 pandemic decreased the 4-year graduation rate or 1-year retention? Does this differ by underrepresented minority status? Does this differ by gender? (4) Has the COVID-19 pandemic decreased the use of student support services? Has the pandemic differentially affected students by underrepresented minority status? Has it differentially affected students by gender?

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Poster Presentation

Effects of COVID-19 on participation in a scientific conference, a case study

COVID-19 has profound effects on the ability and willingness of scholars to attend conferences and write scholarly articles. In this study we focus on the annual meeting of a professional society for biologists and how COVID-19 is affecting the participation of scholars. We collected data about invited symposium speakers over four years from 2019 to 2022. Symposium speakers commit two years before the conference to presenting a talk and to submitting a manuscript to a proceedings journal soon after the meeting, which takes place in early January. We hypothesize a negative effect of COVID-19 on groups who face increased care-giver responsibilities and increased teaching loads, such as women, BIPOC, and instructors at teaching-intensive institutions. We predict that affected groups will present fewer talks and be less likely to submit a manuscript. To test our hypotheses, we collected speaker names plus their institution from conference programs and journal citations. We used two R scripts to predict gender and ethnicity or race from their first and last name. Our analysis found that our data were largely consistent with our predictions. COVID-19 caused speakers to submit fewer manuscripts. In 2020, the conference ended before COVID-19 became a pandemic, so COVID-19 affected only the manuscript process. In 2021, we see a strong effect of COVID-19, especially on manuscript submission. Our preliminary data for 2022 suggest that many speakers opted to switch to a virtual presentation. In the years affected by COVID-19, speakers from teaching-intensive institutions (predicted based on Carnegie classification of the speaker's institution) are more strongly affected, but gender (predicted based on first name) and ethnicity or race (predicted based on last name) did not have the predicted effect. We conclude that the COVID-19 has a noticeable effect on scholars' productivity and opportunities to participate in conferences.

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Submission Number: 66

Poster Presentation

Tracing the Origin of Central California Amaranthus palmeri Populations and Identifying Possible Genes of Adaptation

Palmer amaranth (Amaranthus palmeri), a plant native to parts of the Southwestern United States, has become one of the most extensive agricultural threats in the Southeast, and has also established itself in parts of the Midwest and more recently in Central California. The aim of this study is to elucidate the origins of the Central California populations with the use of population genetic analysis. Neutral markers and adaptive herbicide resistance genes will be used to explore genetic clustering of Central California populations with native Southwestern and non-native Eastern/Midwestern populations. Support for different invasion scenarios will be evaluated via analysis of single nucleotide polymorphisms (SNPs) using genetic clustering programs and approximate Bayesian computation (ABC). In addition, selection analysis of SNP data from California populations will be used to screen for overlap in outliers possibly linked to adaptation. Results so far have been obtained from surveys of herbarium records and field sampling in 2017-2018, and 2021 (when field collections were obtained from 11 Eastern US populations). These surveys reveal that Palmer amaranth's distribution in the US is continuing to expand north and northeast beyond its historical Southwestern native range, suggesting that invasion is ongoing in this species, facilitated by establishment in agricultural fields. Recent sampling in Central California have reported populations appearing in orchard and vineyard crops (with shaded understories) and in saline soils, both uncommon growing environments in other parts of the species' range, suggest that adaptation to these new agricultural conditions may be evolving. Ongoing genetic analysis may further suggest possible invasion scenarios of California populations and identify genes involved in adaptation. The final results have the potential to facilitate future research identifying other weedy source populations, alternative strategies into more sustainable agronomic practices, and creating models for evolutionary adaptation applicable to invasiveness, evolution, and weedy plants.

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Submission Number: 67

Poster Presentation

Characterizing the trap morphology of the carnivorous plant genus Utricularia (bladderworts)

Bladderworts (Utricularia) are a global genus of carnivorous plants with more than 200 species. Bladderworts supplement their nutrient uptake by catching minute animal prey in specialized leaf structures that form millimeter-sized, active, underwater suction traps. Bladderworts occur in a wide range of habitats, ranging from aquatic (rootless plants floating in the water column) over epiphytic-epilithic (living in water puddles on plants and rocks) to terrestrial (traps operating in water-logged soil). These habitats with their different prey types and physical constraints might result in different trap morphologies. Bladderwort species vary widely in their trap morphology, especially in the structures present around the trap entrance. These structures have been hypothesized to serve habitat-specific functions, such as rod-like antennae attract zooplankton prey in aquatic habitats, curved wide spurs help collect and retain water at the traps entrance of epiphytic species, and dense bundles of fine hairs prevent traps being fouled by soil particles in terrestrial species. The aim of this study is to test these hypotheses by characterizing a wide range of entrance structures (absence vs presence; shape, size, number) for more than 200 bladderwort species and correlating those characteristics with habitat. We used a taxonomic monograph (containing species descriptions and specimen drawings) to develop and collect data on 15 morphological characteristics, including trap size, trap shape, and nine types of appendages. We found that some characteristics correlate with habitat (such as a short entrance region, large trap size, long antennae), but not others (hair bundles, curved spurs). We concluded that aquatic species exhibited the strongest form-habitat correlations. In the future, we will test whether the observed form-habitat correlations can be explained by the hypothesized functions by conducting experiments with live plants and on mechanical trap models.

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Poster Presentation

Electrical and Fire Safety Technology and Standards

Electrical and Fire Safety is a safety procedure that informs a person on how to act in such situations and how latest technologies can used to alert way before. It is a must at every home, buildings, and offices, as alone electrical fire incidents resulted in 440 deaths and $1.3 billion worth of property damages according to the National Fire Protection Association (NFPA). To apply mandate approaches to these problems in a particular way, we must not only first create Awareness, Standard Drills, use latest Technology but also learn about the incident types and then communicate as early as possible. Awareness such as sharing information about what does a particular sign board means and places where extinguishers and pull stations are placed. Apparently, it has five aspects; Self-concept, Thoughts, Feelings, Body, and Emotions. Secondly, Standard Drills are practices that teaches a person to behave and act in such a way to avoid any stampede, panic attack, exit blockage, and many more. It has four aspects; Massed, Distributive, Fixed, and Variable. Lastly, Technology is a vital part of safety such as Mass Notification System (MNS) which broadcast messages to public during critical events. Tools such as smoke detector, sprinkler, safety fuse, and sorts of sensors must be used. It has five aspects; Analyze, Design, Implement, Execute, and Evaluate. The purpose of this research is to show the aspects mentioned above in regards to electrical and fire safety technology and standards as well as details on comparisons on past and present incidents. The research presents exemplar incidents if all these approaches are taken and the results thereby for effective evacuation. Methods must be published to create awareness to the public, where all these approaches must be practiced to prevent widespread incidents, panic and deaths.

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Poster Presentation

Core Structure-Antiproliferative Activity Relationship Studies on 5,7,20-O-trimethylsilybins

Androgen Receptor (AR) is a nuclear receptor that promotes prostate cancer cell growth by reactivating transcriptional activities. Silybin is an active natural flavonolignans that was isolated from Milk Thistle (Silybum marianum) with a potential to treat prostate cancer by inhibiting AR activities. However, its moderate anti-cancer potency, poor bioavailability, and low selectivity towards different prostate cancer cell lines can only make it a good lead compound rather than a drug candidate. Thus, the goal of our ongoing project to search for optimized derivatives of silybin for the potential treatment for prostate cancer. Specifically, this study aims to investigate the relationships between the core structure of 5,7,20-trimethylsilybin and their antiproliferative activities towards two AR-positive (LNCaP, 22Rv1) and two AR-negative (PC-3, DU-145) prostate cancer cell lines. At this point, thirty-three derivatives with three different core scaffolds, including flavanonol-type flavonolignan (silybins), flavone-type flavonolignan (hydnocarpin-Ds) and chalcone, have been synthesized from 5,7,20-O-trimethylsilybin that was prepared from commercially available silybin. All chemical structures of these thirty-three derivatives have been well-characterized by NMR, IR, and HRMS data. Currently, their antiproliferative activities towards three prostate cancer cell lines (PC-3, DU145 and LNCaP) have been evaluated through WST-1 bioassay. The current cell proliferation data indicated that silybin derivatives with flavanonol-type flavonolignan scaffold possess highest potency while the silybin derivatives with chalcone core structure have least potency against the three prostate cancer cell lines. Eighteen synthesized derivatives have shown selectivity towards AR-positive LNCaP prostate cancer cell lines. The further evaluation of these derivatives on more prostate cancer cell lines (22Rv1 and VCaP) is currently in progress.

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Poster Presentation

Smart Home and Energy Implications

Smart Home Technology allows customers the ability to manage and control energy consumption within their home by creating a network of connected smart devices. Smart Home devices like thermostats and appliances can track energy usage in real time so that users can choose to make more informed energy efficient decisions for their homes. It is estimated that customers who choose to create a Smart Home system that includes zone heating/cooling as well as monitoring and control of appliances, can reduce their energy consumption by 26%. It is important to note that several variables may potentially affect this outcome. The purpose of this paper is to identify the most common barriers associated with implementation of successful Smart Home Energy Management (HEM) systems by conducting a thorough review of smart home products. Results of the review found that the largest barriers associated with implementation of HEM systems include lack of knowledge about smart technology devices, hardware installation difficulties, network connectivity issues, and user error. The results of this review suggest that the next generation of Smart Home technology will require companies to prioritize devices that are more user friendly and mistake proof. This can lead to short term energy saving in the form of reduced energy consumption, however the long-term energy saving implications will require users to continue to integrate more areas of their home which can only happen when the Smart Technology gets easier for users to use. The secondary goal of this research was to develop a common platform for all to optimize not only the knowledge base, but also to reduce the resources such as installation, unnecessary time involved in returning the product, and applicability. Considering the terminology and standards, this presentation provides suggestions to users, producers, and distributors who are either technical or non-technical in a formal manner.

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Poster Presentation

Agricultural Safety and Standards

The agricultural standards and safety regulations are created to protect the health of consumers and to provide control over a certain market. California Occupational Health and Safety Act provides a safer work environment for farmworkers. It requires the farm employers to follow the safety program and the farmers to follow the safety instruction provided by manufacturers of machinery, tools, supplies, etc. The ISO standards cover all aspects of agriculture. ISO promotes effective farming methods to adequate levels of safety and quality. This research presents on agricultural safety and standards including standards for machinery (ISO-17989 & ISO/TC-23), irrigation standards (ISO/TC-23/SC-18), food safety standards (ISO/TS-22002-6), fertilizer standards (ISO/TC-134), environmental standards (ISO-14055), PPE standards (ISO-27065) and feeding related standards (ISO-22000). There is a difference in international standards for agricultural products as different nations use different standardized fertilizers for their produce. The international standards are present to manage inconsistent markets in different countries. For example, Indonesia, Bangladesh and India have shown growth of 17.34% in export during the year 2020-2021 given the fact that it has been declining due to non-usage of standards. Detailed information on the usage of standards will be provided in the presentation. Further, most of the Asian countries suffer in the EU market as they use different standard fertilizers in rice cultivation, this means Asian countries cannot sell their cereal products in the EU and the rest of the world market without proper export standards. The global standards and safety practices for agriculture should bring the right balance to help entrepreneurs from developing countries find a place in the international market. This research comprehensively validates appropriate methods and procedures considering applicability of international standards so as to enable the agricultural sectors around the world to implement a coherent and unified agricultural safety related standards across the globe.

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Submission Number: 73

Poster Presentation

Recent Advances in Hypertube Technology in Transportation

Hypertube (hyperloop) is a method of transportation that is currently being sought out as a new form of long-distance travel, preferably within cities. Immune to weather and self-powering sustainability, hyperloop promoted by Tesla and Space X. The engineering concept for hyperloop is sending pods through tubes using magnetic fields which would allow people to travel long distances at high speeds. The systems vary depending on the companies that are working on this but the basic is a capsule design for passengers to sit, tube structure where capsule is set to travel from place to place, solar panels for power of system. Sounding very futuristic, hyperloop capsules designs generated by different corporations such as the Boring Co. have made concepts of having above ground and underground tubes that would stretch long distances. I will present positive and flaws that can arise from such development. Benefits of such technology is not just high-speed travel but cutting down on emission greenhouse gases from using other transportation such as cars and airplanes. With new advances come factors to develop it such as cost, safety, the technology that will be used which is the major factor. The distance of tube is another factor, constructing a tube hundreds of miles long bring challenges to construct something durable and support the speed and weight of constant use. More detailed engineering factors affecting hyperloop are the pressure, spontaneous decomposition, thermal expansion, and other considerations that engineers have seen in the proposals and simulations on how hyperloop will work. Considering all factors pros and cons for hyperloop technology this presentation will review the concepts behind hyperloop innovation.

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Submission Number: 74

Poster Presentation

Business Opportunity in Social Media and Networking

Networking via social media plays critical role in business. According to Forbes, 85% of job vacancies are filled via networking using apps such as LinkedIn and Indeed help find people that are interested and could potentially create future transactions, 61% of professionals worldwide agree that regular online interaction with their professional network can lead to possible job opportunities. Establishing a transaction with businesses that have a similar service or product that could be bundled together making profits for both you and the other business partner. The objective is to ensure that you can create a connection, customer satisfaction, targeted audience, partnership, and visibility. Using social media for your business this is how you will attract buyers from important parts of the world. Marketing utilizing social media outlets such as Facebook, Instagram, Twitter, etc has increased over the past years. People are likely to find information about your products on these social media platforms due to it being much more convenient than going on your actual website. Also, people will be looking for reviews from other people using that social media platform. With over 53% of the world's population on social media, it's critical that your business has an effective social media strategy that helps you reach your intended audience. The purpose of this research is to explain the in-depth process of Social Media and Networking being utilized by several different companies and using AI algorithms how they target a specific audience that will more than likely buy the product or service. These software intervene tactics are in place to ensure that business opportunity goals are met. Thus the primary goal of this research is to explore various AI techniques and methods that are being used in the Social Media to achieve greater business opportunity.

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Submission Number: 76

Poster Presentation

Critical Review on Ocean Technology Systems

Researchers have been exploring the ocean as a renewable source and developed technologies to extract sustainable energy from waves, tides and ocean thermal activity. The research fields are to study and critically review and compare the developed systems systematically. Oceans have long been regarded as an immediate prospect for exploration, scientific discovery, commerce, and trade as they cover two-thirds of the earth and contain more than 90% of the world's biodiversity. Ocean systems have numerous applications in marine archeology, military, biotechnology, medical, energy, hydrography, fisheries and aquaculture and many industries. All of the advancements leading to ocean data collection accounts to the blue economy. This study aims to provide trends and review the different ocean systems in use in exploration and sustainability. In particular, I will present the latest breakthroughs and technological advancement that include Industry 4.0 concepts and the application of machine learning and artificial intelligence (MLAI), IOT, Bio-mimic engineering, which can undoubtedly open new markets for ocean-based technologies while considering sustainability, exploration and advance research. This is due to the fact that ocean technology systems can help us understand the ocean, which is instrumental in determining how to build future cities and what food supply systems are required to feed an increasing population. With rapid development in technology so has our understanding about the relationship between oceans and atmosphere improved, including how the oceans affect the climatic conditions and water cycle therein boosting the research in ocean energy. This paper provides an analysis of a new generation of engineering and scientific noninvasive tools, such as enhanced co-robotic systems, SONAR, advanced sensors, geographic information systems and eDNA, which widen in-situ observational capabilities and develop the knowledge of the ocean floor required to maintain a safe, clean and sustainable blue economy.

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Submission Number: 77

Poster Presentation

INDUSTRY 4.0 TECHNOLOGY AND BEYOND

Industry 4.0 has become a norm recently. Although Industry 5.0 has already been immersed, it overlaps with Industry 4.0. This presentation will concentrate on Industry 4.0 and beyond with an objective aiming at the agricultural sector. In essence, Industry 4.0 is the new age industrial revolution that brings digital and physical technology together which helps in smart factories, supply chains. As Industry 4.0 uses Cyber-Physical Systems (CPS), this presentation looks into the key elements of Industry 4.0 including Cyber-Physical systems-based industrial robotics, sensors & IoT, and cloud computing to increase productivity in an industry. There are multiple challenges for industry 4.0. For example, the integration of digital and physical systems enables cyber threats which could affect the company's data privacy. The estimated revenue generation is due to companies adapting to Industry 4.0 by reaching $1 Trillion by the year 2030. This presentation also looks into five key perspectives which help in analyzing the market data for the industrial internet. The five key perspectives are being determined by industries, industry 4.0 technologies, countries, regions, sources of revenue. The companies that have adapted industry 4.0 are IBM, QUALCOMM, INTEL, MICROSOFT, and so on. Industry 4.0 can also set and collect vast data across wide scope activity with Descriptive Research Design. Industrial Internet can establish for focusing end-to-end process for better improvements. Secondary data will further deal with hardware after that system and personal management issues with AI and automation can be determined. All the above will be presented systematically.

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Submission Number: 78

Poster Presentation

Space technology and systems

Space systems are vehicles and infrastructure working together to perform a task in the space environment. We depend largely on space technology systems in our daily tasks, such as weather forecasting, remote sensing, satellite television, as well as long-distance communications. Space systems not only improve our knowledge of the physical universe through celestial observation and planetary exploration, but also provide intelligence and surveillance that is critical for national defense. There are a variety of categories under the scope of space technology systems research and development. This study will present major progress made in the following three key areas: advanced satellite systems, advanced sensors and techniques, and information integration and decision support. This study draws major developments and conclusions from NASA and MIT Lincoln Laboratory. For each key area, this study will present stages of development, benefits and future challenges. Researchers have developed and operated sensor systems that discover, track, and characterize satellites in earth orbit to support national security space objectives. Advanced satellite systems that are used to monitor the activity of objects in space and to perform remote sensing of Earth. While sensor systems that discover, track, and characterize satellites in earth orbit to support national security space objectives. Information integration systems are software tools that can help the military track, monitor, control, and protect these valuable satellites. The nation's satellites perform critical civil, scientific, and national defense functions, such as navigation, communications, weather forecasting, astronomical observations, and surveillance. This study will particularly suggest how each area of development progresses and depends on the others.

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Submission Number: 79

Poster Presentation

Where would go crypto currency technology

Cryptocurrency is a type of virtual currency protected by cryptography that eliminates counterfeiting. It was developed in the last eight years and encrypted to provide the business environment for barter trade. Cryptocurrencies facilitate disruptive technology and transform how the digital markets interact. It is the digital currency that acts as a medium of exchange. Several cryptocurrencies are in the market with low trading volume since their identity is unfamiliar to traders. Popular cryptocurrencies include Bitcoin, Litecoin, and Ethereum. Cryptocurrencies are illegal in most countries. This currency is affected by price fluctuation,   inflation, and money policies because it lacks support from government.

This study aims to discover the emergence of cryptocurrencies and the extent of cryptocurrency technologies since the market of these currencies determines the rate of technological advancements, and the volatile market is depicted by the rise and fall of the prices of the crypto currency. Most countries globally have tried to ban the use of cryptocurrencies because of their economic threats. For example, FinTech has advised the government of the responsible economies to consider its regulation. Past studies use research methods from Blockchain and ledger technologies and evaluate the source of cryptocurrency technology and standardization. This study gives various contributions to the research including summary of the pros and cons of the coin and study. It describes how an adjustable technique can raise research efficiency and give the most probable results to impact cryptocurrency technology. This presentation also presents the researcher's lessons, especially those in the run to generate the cryptocurrency technological standards. And aims at examining the data rise and fall of the cryptocurrency.

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Industrial Technology

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Poster Presentation

Applications of MEMS and NEMS

Micro-electromechanical and nano-electromechanical systems development (MEMS and NEMS) have changed the technological world. MEMS and NEMS technology are expected to have enormous opportunities for future development and with development expect challenges. MEMS and NEMS technology are low-cost, high functionality, and small size and weight. Their applications span the automotive industry, sports, communications, military, bioscience, transportation, energy/power, medical, information technology, agriculture, and many other industries. The use of sensors is limitless, and it is proven daily. Many industries will continue to change and with the help of MEMS and NEMS there will be monumental new developments. This study will be looking into different types of sensors and thinking of ways that the different technologies can be combined. The thought process behind a sensor of this type came from lowering costs by combining materials to make a more versatile technology as well as the critical role MEMS and NEMS are playing in our daily lives. A type of system that would be used is a smart system that can be used in a sensor or other MEMS and NEMS systems. Many types of sensors exist but a sensor with multiple applications would be different and save money. The objective is to keep costs low and build a quality sensor designed to support the needs of multiple industries. Design optimization will allow for a sensor of this type to be experimented with and possibly be used in homes, businesses and many industries. This presentation includes various aspects of design and development of MEMS and NEMS technology in many sectors. It will also provide detailed research breakthroughs and throw light on future developments.

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INDUSTRIAL TECHNOLOGY

Submission Number: 81

Poster Presentation

Modern Aquaculture and Technology System

Lack of expansion and new site space, limited fresh water availability, and pollution concerns are viewed as major barriers to the expansion of conventional flow-through aquaculture systems. According to a recent report on the technologies used in Denmark, RAS (Recirculating Aquaculture System) are becoming increasingly popular. Recently, many European countries used RAS systems, and research programs are all on-going. Although RAS are gaining momentum with infrastructure improvements but its all round development is at the rudimentary state. In a RAS facilities water is continuously purified and reused. It is a closed system in which the system converts waste products such as solid waste, ammonium, and CO_2 into non-toxic products. The water and energy requirements are kept to minimum. This study presents design and operation of the RAS system using various examples and indicates its impacts on the environment. This poster also presents work on retrofitting of high-tech systems (HTS) to improve production efficiency. The objective is focus on architecture for a more automated system. The poster has been organized into four sections: (i) background and business opportunity on aquaculture, (ii) sensory and actuation components, (iii) required software and computing platform, and (iv) six-layer model for the development of a fully contained total automation system along with approaches and methods.

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Poster Presentation

Long-term Visible Light Curves of Low-Mass X-ray Binaries and Old Novae, from the Catalina Real-Time Transient Survey

The Catalina Real-Time Transient Survey was originally intended to find near-Earth asteroids, but it provides useful long-term light curves of other objects. Here, we present the light curves of 16 low-mass X-ray binaries and 21 old novae, all from the second data release (CSDR2). All sources are at relatively high galactic latitudes, since the survey covered about |b| > 15 degrees.

Lomb-Scargle periodograms are calculated for all, to search for previously unknown periodic behavior. Periodic light curves are clearly present in systems previously known to show them, including the low-mass X-ray binary Sco X-1, the radio pulsar AY Sex (PSR J1023+0038), the eclipsing intermediate polar DQ Her (Nova 1934), and the intermediate-mass X-ray binary Her X-1.

Several results include observing the 2011-2012, year-long high state of the atoll source MAXI J0556-332 (BO Col), as well as the 2012-2013 low state of PSR J1227-4853. PSR J1417+4402 appeared to show ellipsoidal variations with a period of 2.6872 days. U Leo (Nova 1855) appears to show variability with a period of 0.1334 days (3.202 h).

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Submission Number: 83

Poster Presentation

Shingles Vaccine in primary care

There are more than 1,000,000 cases of herpes zoster in the United States annually the incidence of HZ has been rising in the U.S. since the 1990s. One third of all people in the U.S. will get HZ. The highest incidence in people aged 50 to 70s. The Shingles Prevention Study (SPS) demonstrated that a HZ vaccine reduces the burden of illness by 61%. The U.S. Food and Drug Administration (FDA) and Advisory Committee on Immunization Practices (ACIP) of the Centers for Disease Control and Prevention (CDC) approved the Zostavax vaccine by Merck & Co Inc, for the prevention of HZ extended the approval to patients aged 50 to 59 in March 2011. However, despite the recent evidence supporting the prevention of HZ with administration of the Shingles vaccine the overall compliance with vaccination among eligible patients has been significantly less than other standard adult vaccines. A critical component of a vaccine provider's practice is ensuring vaccines reach all patients who need them, when they need them. Implementing a vaccine patient survey is a way to provide effective vaccine assessment and possible uptake of the vaccine itself. Therefore, preventing diseases and optimizing the health of our community. This is a study which will be conducted via a questionnaire. The first part of the questionnaire will be simple demographics of the client; age and sex, education level and then go on to assess the client's shingles vaccine status. Clients who meet these criteria will be male or female and 50 years or older. This study is of no risk to the client, the main purpose of it being to investigate their current vaccine status and evaluate their personal beliefs of the vaccine. With this research the primary physician, can better understand and educate those clients who may question receiving the vaccine, with open conversation and education clients may then wish to vaccinate with confidence.

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Poster Presentation

Decreasing Stroke Transfer Times

Kaweah Health is a small rural hospital that has limited resources for the treatment of stroke patients. Patients are regularly transferred to larger hospitals that provide stroke care that is not available at Kaweah Health. According to proven research, this delay in treatment time directly impacts the patient outcomes. A review of the stroke process was completed, establishing a new protocol to see if it would decrease transfer times. The new protocol was initiated in January of 2021. The prior protocol was as follows: 1) Call the medical helicopter transport dispatch for every stroke transfer upon receiving a call from the MD stating acceptance to another hospital. 2) The dispatch center calls the flight crew and gives them the weight of the patient, the location of the accepting hospital and the pilot checks the weather. 3) The pilot then accepts or declines transfer. In contrast, the new protocol gave the hospital the responsibility of calling the critical care transport team directly. This way a quick medical report could be given to the crew and they would have a sense of the urgency for these patients. It also cuts out the third party and facilitates direct communication between the health care providers. Results of this study were collected from January 2020 to December 2021. The intent of the protocol was improved transparency between the hospital and the transport team resulting in more efficient transfer times. The results however are inconclusive for this study. The calls being made did not make the transfer times shorter. COVID was an unpredictable variable that affected this study, impacted the capacity of hospitals, and forced patient transfers further distances, ultimately affecting care. The data collected can still be useful in analyzing and creating a system that better serves stroke patients, taking into consideration a pandemic impact.

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Poster Presentation

Self-Management among patients with Hypertension

Nearly half of American adults have high blood pressure. Most of the time hypertension (HTN) or high blood pressure has no obvious signs and symptoms that indicate that something is wrong. Often times the signs and symptoms are misunderstood and many people with high blood pressure don't even know they have it. High blood pressure develops slowly over time and can be related to many causes. High blood pressure cannot be cured, but it can be managed effectively through lifestyle changes and when needed, medication. If left untreated, the damage that high pressure does to the circulatory system is significant and can lead to heart attack, stroke, and other health risks. It is crucial to be aware of your own risk factors because certain physical activities and lifestyles can make a person more likely to develop high blood pressure. Awareness of risks can help identify changes that can be made. This is a study which will be conducted via a questionnaire. With this research the primary physician, can better understand and educate those patients who may lack awareness and knowledge of the hypertension self-management.

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Submission Number: 88

Poster Presentation

Contextualizing Support for Southeast Asian American College Students at an Asian American and Native American Pacific Islander Serving Institution in the Central Valley

The experiences of Southeast Asian American (SEAA) students are often hidden and invisible due to data aggregation practices that subsume their experiences under the Asian American racial category. However, SEAA students experience significant disparities in educational attainment. Limited research on Asian American and Native American Pacific Islander Serving Institutions (AANAPISIs) indicate the need to understand how these institutions support SEAA students. Due to its large body of the SEAA student population, a case study at California State University, Fresno (CSU Fresno) was conducted to explore how a public four-year AANAPISI in the Central Valley serves its SEAA students. Semi-structured interviews were conducted with senior administrators, faculty, staff, and SEAA students to understand how CSU Fresno's institutional context shapes both the students' experiences and the institutional agents' efforts to advocate for and support SEAA student needs. Findings report that although the AANAPISI status and funding is an important aspect of fostering such change, unsustained resources and limited support at multiple levels, as well as unrealized disaggregated data structures, have prohibited sustained changes to increased support for SEAA students. Findings also suggest that change agents within the faculty and staff have started multiple localized efforts to organize sustainable change at the infrastructure level to mitigate these contexts.

Keywords: Asian American and Native American Pacific Islander Serving Institution (AANAPISI), Southeast Asian American (SEAA), higher education

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Poster Presentation

Exploring Dementia Caregiver Burden and Identifying Barriers to Resource Access

Informal family caregivers of people with dementia-related diseases often have high levels of burden and stress. As the diseases progress, people with dementia require more care and the demands of care for them increase. Screening caregivers for caregiver burden, as well as determining barriers to resources available, will help health care providers know how best to support informal caregivers. The purpose of this qualitative study is to determine the optimum type of informal caregiver support needed to lessen caregiver burden. Methods: Data was gathered by semi-structured interviews of informal caregivers. Results: Interview results are pending and data collection is ongoing until March. Conclusion: Health care providers can provide early and frequent support to these caregivers to help decrease the burden and improve the care of both the patients and their loved ones.

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Civil Engineering

Submission Number: 90

Poster Presentation

Using Cellphone Trace Big Data to Analyze Travel Patterns and Behaviors in Urban and Rural Areas in Fresno, California

Over the past decades, different kinds of surveys have traditionally been the primary source of data for understanding travel demand (patterns and behaviors) in a region, and for developing the transportation planning models and designing the transportation infrastructure. However, the substantial evolution of communication technologies and the large market penetration of smartphones over the last decade have opened the door for novel types of data: cellphone trace big data. While traditional surveys will continue to provide value and answers that are not possible by cellphone trace big data, applications of this novel data source in transportation have been consistently growing and are expected to only grow further. This study utilizes cellphone trace big data (from Streetlight Data) to uncover the spatio-temporal distribution of travel demand (e.g. trips by mode) in the urban as well as rural areas in Fresno County, California. The study visualizes Origin-Destination (OD) patterns and OD trends by mode in the region and contrasts them with the existing transportation infrastructure. The study demonstrates the potential value of this novel data source as it provides additional and valuable information that can significantly improve our ability for understanding travel demand, and plan and design more efficient transportation systems to meet this travel demand.

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Graduate

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Biology

Submission Number: 91

Poster Presentation

Project title and abstract unavaliable per the request of the presenter and mentor

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Graduate

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Mechanical Engineering

Submission Number: 92

Poster Presentation

Inspiring Young Minds: Fresno State Transportation Institute K-12 Hands-on Activities

While transportation is an integral part of our daily lives and the world economy, it currently faces several significant challenges, e.g., safety, air pollution, energy demand, traffic congestion, equity, and others. To help address this, Fresno State Transportation Institute launched different programs that aim to educate and inspire the youth about the various challenges and the diverse opportunities that the industry faces and has to offer. For the K-12 hands-on activities program, over a hundred different activity-based learning exercises that were developed by different organizations were identified and studied. Then, we researched, designed, and developed eight different hands-on activities that are believed to be most engaging and relevant for our local community challenges. The activities were developed for the different grade levels: kindergarten, lower elementary, upper elementary, middle school, high school, and other public events, e.g., science fairs. All activities were designed to be hands-on, using interactive devices and resources, engaging, fun to perform, involving critical thinking, and aligned with the guidelines of California Standards of Learning. The activities focus on existing challenges and possible technological solutions. Each activity involves group discussions to nurture out-of-the-box thinking. To date, more than 100 students participated from over 5 different schools. A detailed lesson plan was created for each of the activities, and feedback and consultation with different teachers were incorporated. Additionally, different assessment tools, e.g., pre-, and post-activity assessments, and surveys were developed for the activities. Data analysis indicates the eagerness of students in learning more about Transportation Sciences increased by more than 30%. These activities will not only make one more aware of transportation but are expected to inspire young minds to pursue careers in transportation sciences and explore various opportunities to improve the system to make it more safe, reliable, and sustainable.

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Graduate

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Nursing

Submission Number: 93

Poster Presentation

Understanding postpartum depression knowledge deficits in nurses that care for primarily Hispanic patient population.

Every year, about 16 million American adults are affected by depression. Depression is more than a feeling of sadness or a feeling of being let down due to a bad day, it is a serious mental health condition (Center for Disease Control and Prevention (CDC), 2020). Depression can occur at any time in a person's lifespan. However, symptoms usually first appear during the late teens to mid-20s and women are twice as likely to be affected than men. Four of the most common forms of depression found among women are major depression, persistent depressive disorder, premenstrual dysphoric disorder, and postpartum depression (Cagliostro, 2020, p. 1).

Postpartum depression is the most common complication after childbirth, and in most cases, it's the first time these women come face to face with depression (March of Dimes, 2019). Healthcare providers, in particular nurses, who care for women during their postpartum phase play a crucial role in a mother's and infant's positive outcomes. Nurses serve as patient educators, resource persons, and in some instances, are the first line of help most of these women seek when facing signs and symptoms of postpartum depression. Therefore, it's highly important for nurses to be educated and aware of postpartum signs and symptoms, risk factors, barriers, early screening methods, interventions, and treatment plan options for improving nurses' attitude and knowledge demonstrated a decreased risk for postpartum depression and/or negative consequences.

Therefore, the purpose of this study was to evaluate the attitude of postpartum depression (PPD) among registered nurses on a maternity and labor and delivery units at a local community hospital. The project was conducted through the use of a simple questionnaire and focus groups that assessed the nurses' current attitude toward PPD. The project goal was to evaluate and improve the healthcare providers' attitude regarding postpartum depression and identification of barriers such as culture, language, education, mental health beliefs, socioeconomic, and healthcare access that interferes with recognition and adequate treatment.

Data collection is ongoing and will be completed by March 2022.

Inderpal Sekhon| Qiao-Hong Chen

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Graduate

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Chemistry

Submission Number: 95

Poster Presentation

Antiproliferative Potency of Abietic Acid and Diterpenoids on Prostate Cancer Cell Models

Prostate cancer is one of the leading causes of cancer death among men. It affects the prostate gland that is located below the bladder. Current treatments include chemotherapy, androgen deprivation therapy (ADT), and surgery that help control the spread of prostate cancer cells but can develop into castration resistant prostate cancer (CRPC). CRPC occurs when prostate cancer cells continue to develop even with very limited amount of androgen, such as testosterone or dihydrotesterone (DHT). The main driving force for the continued progression of CRPC is the reactivation of androgen receptor (AR) transcriptional activity. Therefore, AR remains to be a viable therapeutic target for CRPC. Current treatments can only improve median overall survival and become ineffective in CRPC with AR gene amplification, ligand binding domain (LBD) mutation, and the evolution of AR splice variants lacking the LBD. A good strategy to possibly treat CRPC would be to target the other functional domain on the AR.

Only three groups of the N-terminal AR antagonist have been identified. The most recent one is tricyclic aromatic diterpenoid QW07. However, QW07 does not show selective suppression of AR-positive cell proliferation over AR-negative one. The goal of the project is to develop tricyclic aromatic diterpenoids as potential N-terminal AR antagonists. The diterpenoids will be synthesized from dehydroabietic acid that was prepared from the readily available starting material abietic acid. The carboxylic acid group at C-18 is identified as the functional group to introduce various amides. This modification is envisioned to increase the selectivity towards AR-positive prostate cancer cell lines. The synthesized compounds will be characterized with 1H, 13C NMR, and IR. The antiproliferative potency of the synthesized diterpenoids will be tested on AR-positive prostate cancer cell lines (LNCaP, 22Rv1, and VCaP) using AR-negative cell models (PC-3 and DU145) as comparison.

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Graduate

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Transportation Institute

Submission Number: 96

Poster Presentation

K-12 Railroad Model Competition

Transportation plays an important role in the economy and society since it enables communication, connectivity, and trades between people and goods. Personal automobiles are considered the major transportation mode and one of the greatest contributors to air pollution, greenhouse gas emissions, and energy consumption, among others. Public transportation benefits communities by reducing traffic congestion and energy and pollution levels. The Fresno State Transportation Institute designed a K-12 Railroad Model competition to educate and inspire the youth about the history and value of rail systems. The core of this competition is to design and build a railroad model by using materials such N-scale tracks and locomotives to connect cities throughout California and Nevada. More than just creating a path to connect destination points on the map, this educational competition aimed to give students a complete experience of the real phases and challenges involving a railroad project. The competition's map used as a base site for the railroad path presents many features, such as mountains, rivers, forests, deserts, cities, national parks, and social-environmental protection areas. Each detail on the map was thought to stimulate students with critical thinking and decision-making skills when building an efficient and sustainable railroad model. One of the principal tasks in this challenge is the cost and revenue estimate section. Cost alone was split into four parts: Land, Construction, Operation, and Maintenance. For each one of those, a specific method was described on the competition's manual, to guide the participants in how to estimate these costs according to their particularities. The Fresno State K-12 Railroad model competition goal is to inspire young minds to pursue careers in transportation and have a better idea of rail transportation systems and the importance of public transportation technologies and developments.

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Biology

Submission Number: 97

Poster Presentation

Importance of the Beta-4/5 loop for the stabilization of the inactive form in the cAMP receptor protein

cAMP receptor protein (CRP) responds to the signaling molecule cAMP to then bind to DNA and activate transcription. Optimal gene regulation requires keeping CRP activity to the lowest possible level in the absence of cAMP in addition to attaining high activity in its presence. Previous studies in Dr. Youn's lab have identified several residues throughout the CRP protein which may play a role in keeping the protein activity minimal in the absence of cAMP. This work focuses on residue D53 which is part of the ꞵ4/ꞵ5 loop and elucidates the molecular basis for the importance of this residue. For this, we randomized the codon for D53 and screened the plasmid pool of all 20 possible CRP mutants for the ones which display cAMP-free activities using a CRP reporter strain. If D53 is important for keeping the protein inactive in the absence of cAMP, multiple mutants lacking D53 would acquire cAMP-free activity. 43 positive colonies (displaying elevated activity) out of a total of 218 transformants were identified on an X-gal-containing assay plate. The about 20% (43/218) positivity observed above would approximately correspond to 13 codons and 4 amino acids. This prediction of multiple amino acids conducive to cAMP-free activity supports the hypothesis that the absence of the original amino acid D53 is the primary requirement for the selection, and in turn is consistent with the notion that D53 may be important for maintaining the CRP inactive in the absence of cAMP. We are currently sequencing the mutants selected above to reveal the causative mutations. Also, we are also investigating K57 because the residue forms an ionic interaction with D53 in the inactive CRP structure. This work underscores the importance of the inactive CRP form and elucidates one mechanism how the CRP activity is minimized when the environmental signal is not present.

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Graduate

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Chemistry and Biochemistry

Submission Number: 99

Poster Presentation

Development of Fluorinated Peroxyl Radical Clock: Synthesis of Standards and Calibration Studies

Peroxyl radicals are intermediates that propagate a free-radical chain oxidation process known as peroxidation or autoxidation. Peroxidation is the major chemical process behind degradation of petroleum products, biomolecules, polymers, and foodstuffs. The discovery of new methods that allow for measuring the rate constants of H-atom transfer (key step in peroxidation) is an integral part of the development process of radical-trapping antioxidants (RTAs), small molecules that slow the rate of peroxidation and have long been a focus of research in this field. Radical clocks are simple and inexpensive methods of measuring rate constants of hydrogen atom transfer from an organic substrate to the propagating peroxyl radical. Current radical clocks use chromatography (GC, HPLC) for product analysis but chromatography-based methods are reproducible only when all parameters of the method

(column, flow rate, mobile phase, detector) are conserved. Quantitative NMR (qNMR) offers an alternative way of quantifying oxidation products all with minimal or no modification to existing instrumentation since there is no actual separation of the analyzed mixture. In this presentation we will describe the synthesis of fluorinated compounds that are the basis for development of NMR-based radical clock methodology.

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Graduate

California State University, Fresno

Nursing

Submission Number: 100

Poster Presentation

Assessing Nurses' Knowledge on Peripheral intravenous maintenance and care

Abstract

Title: Assessing Nurses' Knowledge on Peripheral Intravenous Maintenance and Care

Presentation Type: Poster

Author: Esther Cortes BSN, RN

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Peripheral intravenous catheter insertion is a common and often essential procedure used in the clinical setting. As with any invasive procedure, there are risks involved for the patient if clinical guidelines and protocols are not followed. As part of their routine practice, the nursing staff has a critical role in administering therapies that require peripheral intravenous catheter insertion: the nurses must demonstrate competency and evidence-based-practice knowledge that assures a patient's safety. The purpose of this quantitative, descriptive study are to measure knowledge regarding peripheral intravenous catheter care for nursing staff from the intensive care unit, emergency department, and vascular access team at a local pediatric specialty hospital. Methods: Data was gathered by using a 16 questionnaire tool "Knowledge towards care and maintenance of peripheral IV cannula" created by Arbaee & Mohd. The data results reveal whether or not there are opportunities for knowledge and skills improvement among the nursing staff.

Results: The result is pending. Data collection is ongoing until March 2022.

The benefits of this study identified lack of knowledge and recommendations of how nurses can provide better care for patients with peripheral intravenous access and maintenance. This will benefit patient care as well as healthcare staff and the overall hospital, as they continue collaborating in improving patient care.

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Graduate

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Chemistry

Submission Number: 101

Poster Presentation

From Broad Spectrum to Selective Flavonoids: Potential CDK9 Inhibitors for Prostate Cancer

Prostate cancer (PCa) is the most commonly diagnosed male malignancy worldwide.

Current treatments, including Androgen-deprivation therapy (ADT), do not significantly increase the survival rate due to the development of drug resistance. Castration-resistant prostate cancer is a lethal version of PCa as it develops with the continuous activation of the androgen receptor (AR), leading to a prostate cancer cell's impediment to ADTs. Another way to suppress androgen receptor signaling involves utilizing AR inhibitors. The link between CDKs and the cell cycle encourages the development of a novel inhibitory drug. Cyclin-Dependent Kinase 9 (CDK9) is known for its role in cell cycle regulation and is a vital transcription factor. In conjunction with Cyclin T1, CDK9 phosphorylates the C-terminal domain of RNA polymerase II, releasing the elongation phase of gene transcription. 2- Phenylchromones, also known as flavonoids, are secondary polyphenolic metabolites that naturally occur in many fungi and plants. Research revealing the anti-cancer properties of the naturally occurring flavonoid compound demonstrates the importance of evaluating this process in creating cancer therapeutics. Flavopiridol, a commercial flavonoid, is a broad-spectrum CDK inhibitor with a Ki value of 3 nM. This project has an intermediate backbone for 5-hydroxy-8-iodo-2-phenylchromone synthesized through a three-step synthesis. After which 5-hydroxy-8-iodo-2-phenylchromone derivatives will be synthesized; by adding various moiety groups to the 8th position. Future work will revolve around finding ideal R groups to attach at the C-8 positions to test the selectivity and potency versus the other broad-spectrum flavonoids. All synthesized compounds have been characterized by interpreting 1H and 13C NMR spectra.

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Graduate

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Department of Public Health

Submission Number: 104

Poster Presentation

RISK OF COVID-19 DEATH IN PATIENTS WITH PRIOR HISTORY OF VALLEY FEVER

As of October 15, 2021, a total of 4.5 million COVID-19 cases and 70,000 COVID-19 deaths have been reported in California. Although there are constant advancements and information on COVID-19, there is still uncertainty on how COVID-19 is associated with other infections such as Valley Fever (coccidioidomycosis). Therefore, the purpose of this study was to investigate the risk of COVID-19 death in Tulare County patients with a prior history of Valley Fever. The factors used to examine the difference are Valley Fever infection, gender, race and ethnicity, and age. The study utilized secondary data from the California Reportable Disease Information Exchange (CalRedie) from 2015 to 2021. For analysis, a case-control study calculated the odds ratio, followed by a chi-square and logistic regression analysis. The results found a four-fold greater risk of COVID-19 death in COVID-19 cases with prior history of Valley Fever. In addition, there were statistically significant differences and elevated odds ratios in all covariates. This study brings awareness to two essential health issues in the Central Valley. It also encourages future research to further investigate the risk of COVID-19 in patients with prior Valley Fever infections.

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Graduate

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Department of Counselor Education and Rehabilitation

Submission Number: 105

Poster Presentation

International Students' Interactions with Campus Services amidst COVID-19 and Back to Campus Transition

As Fresno State transitioned from virtual back to in-person with precautionary measures, international students got the opportunity to experience the campus life and on-campus resources again, or for some of them, the very first time. Because of the unprecedented transitions, it was crucial to learn more about international students' experiences navigating student services to better support their academic endeavors. In order to accomplish this, all 501 current international students were invited to take a 12 question survey about their campus service's literacy, preferences, usage frequency, and interactions with student services staff. The survey was a mix of closed-ended questions (e.g., Likert-type, multiple-choice) with a handful of open-ended questions. The current study analyzed 71 responses (14%) of the total international students at Fresno State. Descriptive statistics highlighted the uneven awareness of campus resources by student levels: Freshmen and Sophomores tended to utilize fewer resources and at a lower frequency compared to the rest of the student population. The results also showed that knowledge and accessibility of specific campus resources did not mean that international students would utilize these resources. This finding emphasized the gap in service availability and their frequency of usage. Though most students rated their interaction with staff from neutral to excellent interactions, international students still resorted to more familiar resources for help and information. Open-ended responses in the study revealed that it would be faster, more convenient, and comfortable to seek help from friends. Thus, the study extends our current understanding of international students' experiences while providing recommendations to student affairs professionals to further support students' transition back to campus.

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Department of Chemistry and Biochemistry

Submission Number: 106

Poster Presentation

Effect of Red, Green and Blue Light on the Growth Rate of Chlorella Vulgaris

As more fossil fuel is used for human consumption, the years left to use these energy sources dwindles away. One promising alternate resource to help ease the use of fossil fuel is biofuel. Microalgae holds potential to function as an alternate source for biofuel due to its rich lipid content. Further, its ability to remove nutrients from secondary effluent makes it an attractive tool for improving water quality. Although these properties have made microalgae gain much importance in the past decade, yet much more research is needed to advance this field to the next stage.

Previous experiments in the laboratory with Chlorella Vulgaris (C.V.) grown in recharging basin water decreased the nutrient levels of nitrate and phosphate at the end of the experiment by 99.58% and 93.96% respectively. The accumulation of total lipid in the harvested biomass after the growth period of the algae was approximately 37.32%. Further experimentations with the C.V. culture is ongoing that involves varying light-dark cycles coupled with specific red, green and blue lighting conditions. The objective is to understand how the duration and color of the different lights affect the growth rate, lipid accumulation, and nutrient absorption in the algal cells. These results will ultimately lead to optimizing the growth conditions of the culture by adjusting the different parameters to maximize lipid production in the algal cells and explore its potential to function as biofuel.

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Undergraduate

California State University, Fresno

Political Science

Submission Number: 107

3 Minute Thesis

The Effects of Stigma on Policymaking and Policy Execution on Sex Work in Fresno, CA

Literature about sex work is sparse leaving a need for further research in the area. Currently, there have been no studies detailing the barriers to protecting sex workers' rights in the city of Fresno. This study focuses on the motivations for current policy governing sex workers and the larger influences behind policy making and enforcement affecting sex workers. The stigma that will be focused on is the victim narrative which states that sex workers are unwilling participants in the occupation and coerced by some external force. To better understand the situation of sex workers, advocacy groups focusing on issues like sex trafficking, substance abuse, and homelessness have been contacted because of the possible overlap with these groups and sex workers. Government employees who influence policy making and enforcement have been contacted to share their insight as well. Using transcripts of interviews concepts will be tagged based on their connection to the victim narrative stigma. How frequently ideas associated with the victim narrative are mentioned is meant to show how large of an effect it has over policy making and execution. Government employees and advocates will be able to use the study how they desire including future policy initiatives and communication. The main benefit of this study is its contribution to the literature for the broader public and scholarly community with its focus on sex workers' rights.

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Undergraduate

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Mathematics

Submission Number: 108

Oral Presentation

On a Characterization of Convergence in Banach Spaces with a Schauder Basis

Extending well-known characterizations of convergence in certain sequence spaces, we furnish a general characterization of convergence in a Banach space with a Schauder basis.

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Undergraduate

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Department of Mathematics

Submission Number: 109

Oral Presentation

An Invariant for Colored Links and Associated Graphical Relations.

A mathematical knot is a closed curve in the three-dimensional space that does not intersect itself, and a mathematical link is a disjoint union of knots that may be linked together or not. One of the main goals of knot theory is to differentiate between links, and one way to classify links is through a set of operations on link diagrams referred to as the Reidemeister moves. Another, more efficient tool to distinguish links is that of a link invariant, which is a function defined on the set of links and yields the same output on links that are of the same type.

In this presentation, we introduce the concept of colored links and construct a rational function that is an invariant for colored links. Our construction makes use of planar graphs with vertices of degree four, and it allows for extending the invariant to another type of links, called colored singular links. We also prove that our invariant yields a set of graphical relations for planar 4-valent graphs, which allow for a combinatorial proof that our rational function is invariant under the Reidemeister moves.

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Undergraduate

California State University, Fresno

Chemistry

Submission Number: 110

Oral Presentation

Photodegradation Mechanisms of Imidacloprid in Water

The degradation mechanism of a neonicotinoid insecticide, imidacloprid, was studied using computational quantum chemistry. Imidacloprid is widely used in agriculture and can find its way into ground and surface water after use. Thus better knowing its degradation process can help with purification of water in the Central Valley. The research methods include use of Q-Chem to look at imidacloprid's excited states, solvation in water etc. Some of the computations done on this molecule include: investigation of the best solvent model, looking at the effect of implicit solvation on the molecular geometry and the excitation energies, and looking at energy barriers for breaking various bonds in the molecule. We found that two solvent models, PCM (Polarizable Continuum Model) and Langevin Dipoles, were very accurate in ground state but only PCM is compatible with excited state calculations. Water has a significant effect on imidacloprid as it changes its molecular geometry and the character of the excited states. The molecule's N-N bond was found to be the most likely to break after excitation resulting in degradation. The accuracy of calculations is affected by methodology used. For imidacloprid excitations, it was found that Density Functional Theory (DFT) worked best when the specific form of the functional known as CAM-B3LYP (Coulomb-attenuating method for B3LYP) was used. Therefore, careful selection of methods is crucial to get the desired and reliable results. In conclusion, to learn the degradation mechanism of imidacloprid, data on its solvation, excited states, bond breaking was collected which has shown a lot about this molecule's degradation. Also, the process of selection of the best solvent model was accomplished which ensures that any future calculations will reliably reflect the behavior of the molecule. Further computational work on this molecule will reveal more about its properties and add to our understanding of its degradation mechanism.

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Criminology Department

Submission Number: 112

Oral Presentation

An Undeniably Sweet Deal for All? An Examination of Guilty and Innocent Plea Bargaining with Variations in Strength of Evidence

In the U.S. approximately 90-95% of cases are resolved via guilty pleas, however roughly 21% of exonerated persons falsely plead guilty even though they were innocent (National Registry of Exonerations, 2021). This problem warrants attention and research to understand the processes of plea bargaining that result in guilty and innocent defendants pleading guilty. The present study experimentally investigated participants' plea decision-making in a hypothetical case where they were accused of cheating. This study utilized a 2 (guilt status: guilty or innocent) x 3 (strength of evidence: strong vs. moderate vs. weak) between participants' factorial design. The goals are twofold: (1) to assess guilty students' plea decision-making in comparison to innocent students' plea decision-making, and (2) to examine whether students' plea decision-making differentiates based on the strength of the evidence (strong vs. moderate vs. weak) presented against them. University students participated in an online study and read a hypothetical vignette in which they were accused of cheating by a professor in one of their current classes following an exam. Later the chair of their department offered them a plea deal, or the student could choose to go before the university's Academic Integrity Board and possibly face expulsion. Additionally, students were told they were guilty or not of cheating, and also informed about the evidence the professor had of this cheating and its strength. Preliminary results suggest that guilty participants are more likely to accept the plea deal regardless of evidence strength. However, students that did not cheat were more likely to take a type of plea that allowed them to maintain their innocence. Results support the notion that even innocent people accept plea deals, likely in order to avoid unknown and possibly larger consequences.

Keywords: Plea bargaining, wrongful convictions

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Undergraduate

California State University, Fresno

Child and Family Science

Submission Number: 113

Oral Presentation

Undergraduate Major Selection Within the Social Sciences as it Relates to Student Success

Introduction: While some students attend college to pursue a specific career goal, some are less sure of their final occupational ambition. Furthermore, some academic disciplines are unlikely to lead to a specific occupation. The objective of this study is to explore the relationships between career focus and outcomes such as student success, goodness of fit in major, and satisfaction in major.

Methods: After department chairs were interviewed as an orientation to the multiple programs in the college, current students majoring in those departments were surveyed about their selection of major, specifically in regard to career goals, academic success, goodness of fit, and satisfaction.

Results: We invited 2,836 students with a declared major in one of the 10 departments in the college. Data collection is currently underway, so we present here preliminary results based on only the first 154 respondents.

Using ANOVA, we found that students who "discovered" their major are slightly less career-oriented than those who came to campus with their major already established, but we found no relationship between status as a discovery major and the outcomes of academic success, goodness of fit, and satisfaction in major. Career-focus is associated positively with all indicators of success (academic success $r=.29$ $p<.0001$; goodness of fit $r=.57$ $p<.0001$; satisfaction $r=.41$ $p<.0001$). Furthermore, satisfaction in the major is more strongly correlated with goodness of fit ($r=.57$ $p<.0001$) than with academic success ($r=.29$ $p<.0001$).

Conclusion: The concept of discovery major is not related to students' experience in college. Career-focused students have better outcomes. Students' satisfaction in the major is more related to goodness of fit than academic success, emphasizing the importance of the social aspect of feeling like one "belongs" in their program.

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Undergraduate

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Political Science

Submission Number: 114

Oral Presentation

Injustice Anywhere is a Threat to Justice Everywhere: Trying Presidents for Human Rights Abuses in Argentina, Colombia, and Peru

This project focuses on the necessary and sufficient conditions for states to try their presidents for human rights violations, including crimes against humanity and war crimes. I coded primary documents, including national newspapers and truth and reconciliation commission reports, and analyzed secondary data compiled by human rights scholars. While the literature has explored the impact of human rights trials on democracy, it fails to specify necessary and sufficient conditions for prosecuting and convicting democratically elected presidents of human rights violations through a tribunal. To fill this gap, I explore how Argentina and Peru, two countries who tried presidents for violations during their regimes, were able to prosecute and convict former dictators as post-conflict areas. By comparing Argentina and Peru to Colombia, which has a similar human rights record, this research reveals explanatory factors for why both Argentina and Peru were able to try presidents, while Colombia has been unable to do so. I argue transitional justice mechanisms and democratic judicial institutions are necessary conditions for trying presidents through human rights tribunals. If states strengthen their legal institutions to hold presidents accountable for human rights abuse, humanity becomes one step closer toward ensuring justice for millions of victims and those survived by them.

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Undergraduate

California State University, Fresno

Mathematics

Submission Number: 115

Oral Presentation

Multiplier Sequences Over the F_2, F_3, and F_4

Do you love mathematics? Then this talk is for you! In this talk, you will learn about sequences of field elements called multiplier sequences, that interact with polynomials in a fairly natural way while still maintaining the types of zeros each polynomial has. The multiplier sequences we will specifically be looking at are the multiplier sequences over the fields of order 2, 3, and 4.

 If you, as a math person, are wondering why we are striving to find all of the multiplier sequences only over the specific fields of order 2, 3, and 4, then you need to come to this talk and find out why!

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Undergraduate

California State University, Fresno

Biology

Submission Number: 116

Oral Presentation

Growth of juvenile Chinook salmon and transition from yolk to environmental carbon and nitrogen

San Joaquin River Restoration Program (SJRRP) was started in 2006 to create water flows that can restore a naturally reproducing and self-sustaining population of Chinook salmon. Blumenshine lab collaborates with the SJRRP and plays an important part in salmon restoration by studying the interactions between juvenile Chinook and their environment, including trophic interactions. Carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) stable isotope analyses (SIA) are widely used in aquatic ecology to understand the trophic interactions of fish because the stable isotope signatures of fish closely resemble that of their prey. We processed juvenile Chinook salmon samples from the 2019-20 and 2020-21 cohorts for SIA. We dissected, dried, encapsulated, and shipped dorsal muscle tissue samples to the UC Davis Stable Isotope Facility for dual $\delta^{13}C$ and $\delta^{15}N$ SIA. Analysis of the stable isotope data showed abnormally high $\delta^{13}C$ and $\delta^{15}N$ values for smaller and recently hatched fish that decreased quickly as the size of the fish increased, thus showing an apparent relationship between fish size and $\delta^{13}C$ and $\delta^{15}N$ values. We hypothesize that the abnormal $\delta^{13}C$ and $\delta^{15}N$ values can be attributed to the distinct stable isotope signature of yolk derived from the mother. We are currently analyzing stable isotope data from previous years to examine the generality of this pattern. We plan to use hatchery-grown fish with a controlled food source in the future to study the change in Chinook juveniles from maternally-derived to environmentally sourced $\delta^{13}C$ and $\delta^{15}N$ stable isotope signatures. We will use the results from this study to inform our selection of viable individuals for studying trophic interactions in the future.

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Undergraduate

California State University, Fresno

Crimonology

Submission Number: 117

Oral Presentation

An Analysis of the Influence of Parental Incarceration, Socioeconomic Status, and Witnessing Violence on the Severity of Crime and Rearrest

This study investigated the quality of family relationships and parental behaviors, and whether they impacted re-offending or the type of crime the juvenile committed. Data were obtained from the Florida Departments of Education and Juvenile Justice. The final data set included 19,872 participants, with 62.6% (12,441) male and 37.4% (7,431) female juveniles. Almost half of the participants (47.5%) identified as White, about a third of the participants (33.6%) identified as Black, 15.5% were Hispanic and White, and 2.8% were Hispanic and Black. Age for this data set was measured at the time of arrest, with the two age groups with the highest percentage of participants being 15 years old (30.1%) and 16 years old (28.9%). We analyzed multiple factors from the codebook using a binary logistic regression model to determine whether there are relationships between the predictor variables (parental incarceration, eligibility for free or reduced lunch, witnessing violence, gender) and outcome variable (whether the juvenile is rearrested within a year). The full model significantly predicted being rearrested within one year, as three of the four predictor variables helped explain part of the reason these juveniles were or were not rearrested within one year. The strongest predictor was youth's reported history of witnessing violence. Specifically, juveniles who have witnessed violence in the past were about 1.5 times more likely to be rearrested within one year. Surprisingly, gender had no significant impact on predictions of rearrest.

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Undergraduate

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Biology

Submission Number: 118

Oral Presentation

Beta-N-methylamino-L-alanine and neuronal death of glutaminergic and cholinergic neurons

Beta-Methylamino-L-alanine (BMAA) is a non-protein amino acid produced by cyanobacteria living in symbiosis with cycad trees' roots, discovered in 1987. BMAA is known to be an excitotoxin and correlated with the neurodegenerative disease, amyotrophic lateral sclerosis-parkinsonism dementia complex (ALS-PDC). The ability for BMAA to act as an excitotoxin was characterized in previous research in septal cultures that cholinergic neurons were more susceptible to BMAA toxicity than dopaminergic neurons. However, the full mechanism of how BMAA can affect the neuronal system is unclear. This project aimed to visualize the putative excitotoxic effect on different neuronal types that we hypothesized are susceptible to BMAA. We specifically wanted to know if glutamatergic or nicotinic cholinergic receptors were more susceptible to apoptosis induced by BMAA. We are testing the toxicity of BMAA on embryonic cultures of early gastrula stage (3.5 hours) of transgenic Drosophila melanogaster: CHA-GAL4-UAS-GFP. Treatments of BMAA at concentrations of 0, 30, 100, 300, 1000, and 3000 µM were introduced 24 hours after the culturing of early gastrula stage Drosophila cells in a six-well plate. Pictures of each culture were taken at 24 hours and 48 hours post treatment to evaluate the level of GFP expression measured using grayscale pixel density in treated versus un-treated cells. We hypothesized that nicotinic cholinergic neurons are more susceptible to BMAA toxicity than glutamatergic neurons based on previous research comparing the sensitivity of dopaminergic and cholinergic neurons to BMAA.

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Undergraduate

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Criminology

Submission Number: 119

Oral Presentation

Perceptions of Procedural Justice and Police Authority in Police-Eyewitness Interactions

In eyewitness identification procedures, police administrators can unintentionally bias eyewitnesses' decision making. The degree to which an administrator biases an eyewitness may be influenced by the eyewitness's perceptions of the administrator's authority. Notably, procedural justice theory suggests that police officers who are respectful and encourage citizen participation in criminal justice processes are generally perceived as possessing more authority. In this study, we conducted a secondary data analysis of an experiment examining perceptions of procedural justice and police authority in a police-eyewitness interaction. Specifically, we tested whether eyewitnesses' (N = 567) perceptions of respect and voice in a police-eyewitness interaction were associated with eyewitnesses' perceptions of expert and hierarchical authority. Linear regression analyses indicate that perceptions of both respect, $t(565) = 4.87$, $p < .001$, $r = 0.20$, 95% CI [0.12, 0.28], and voice, $t(565) = 6.16$, $p < .001$, $r = 0.25$, 95% CI [0.17, 0.33], significantly predicted perceptions of expert authority. By contrast, only respect, $t(565) = 4.87$, $p < .001$, $r = 0.20$, 95% CI [0.12, 0.28], significantly predicted perceptions of hierarchical police authority. Follow-up correlational analyses indicate that perceptions of respect and voice were strongly and positively associated with perceptions of expert authority but were moderately and negatively associated with perceptions of hierarchical authority. These findings suggest that police officers who adhere to the principles of procedural justice during eyewitness identification procedures may be perceived as more competent at conducting investigations. However, this increase in perceived expertise may come at the expense of decreased perceived social power and social status conferred by their badge. We will discuss implications of these findings for future research and policy aimed at reforming police interactions with eyewitnesses.

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Undergraduate

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Math

Submission Number: 120

Oral Presentation

Rectangle Tsuro

In this presentation, we will share our findings and progress in understanding the board game Tsuro as we work towards developing winning strategies for similar games. After a quick introduction to two new Tsuro-like games, we will provide winning probabilities for either player depending on the players' initial positions.

After studying these two smaller versions of Tsuro, we developed and studied a larger game, still smaller than Tsuro, that we call Rectangular Tsuro. For this game, we will present several strategies that we have discovered and proved for winning the game. Just like on the first two games studied, these strategies usually depend on the initial positions taken by the two players of the game.

Most of our results are obtained using case-analysis together with methods of combinatorial game theory, such as elements of Sprague–Grundy theory, even though Sprague–Grundy theory is not applicable to the games studied.

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Biology

Submission Number: 121

Oral Presentation

Investigating Abrogating Effects of L-Serine With BMAA Within SOD1 In Fruit Flies

Beta-N-Methylamino-L-alanine (BMAA) is a natural occurring amino acid produced by cyanobacteria and has caused an escalated number of neurodegenerative diseases. The chronic exposure of BMAA reflects on its ability to biomagnify within the food chain of humans and this neurotoxin has led to cases of ALS, Alzheimer's, Parkinson's, and dementia. The focus of this study is the antioxidant copper-zine superoxide dismutase (SOD1), which is an enzyme that converts metabolic waste into harmless compounds. During the translation process of RNA to protein, L-serine is replaced by BMAA and results in the aggregation of misfolded proteins. This causes SOD1 to become mutated and destabilizes to cause ALS and other neurodegenerative diseases. From previous studies within our lab, L-serine abrogated the effects of BMAA. The purpose of this study is to investigate the relationship between the enzymatic function of SOD1, L-Serine, zinc, and BMAA. To further explore the effects and pathways, we utilize fruit flies (Drosophila melanogaster) to replicate the similar neuronic structure and function of humans. The methods of this experiment utilize 10 fruit flies for a total of 50 flies have been treated with varying concentrations and combinations of BMAA, L-serine, and zine. It is hypothesized that the results of this study will show a concentration and activity-dependent increase in SOD1 with increasing concentrations of BMAA. With the presence of L-Serine with BMAA, the results should repeal these SOD1 effects. This could ultimately provide the possibility of utilizing L-serine as a drug or therapy to slow down the progression of neurodegenerative diseases.

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Criminology

Submission Number: 122

Oral Presentation

A Life Altered: A Study Exploring the Repercussions Faced by Those Wrongfully Convicted

The current study explored the hardships faced by those who were wrongfully convicted for crimes they did not commit and are now released, forced to reintegrate back into society. Exonerees were asked a multitude of questions through an online survey that was sent out through social media. These questions were focused on three main areas made up of the reintegration back into society after release, their perceptions about aspects of the criminal justice system, and how others perceive them. Data from over 80 male and female exonerees across 23 states illustrated that many of those who were wrongfully imprisoned have a difficult time reintegrating back into society and do not receive any type of assistance from the government. Of those who were wrongfully convicted, a multitude mentioned the stigmas they now encounter due to their status as an exoneree, even from their families and loved ones. It is understandable that their beliefs of law enforcement and the criminal justice system are now filled with disdain and doubt as well as perceive the justice system to be flawed and untrustworthy. This includes a lack of trust and an unwillingness to cooperate or reach out to the police even in times of crisis. Although this study does not provide all views held by exonerees, it is a good starting point to understand some of the hardships that they endure in the United States. With more research, heightened focus can be put on those areas that exonerees deem the most important, and, hopefully, trust can begin to be re-built.

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Undergraduate

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Mechanical Engineering

Submission Number: 124

Oral Presentation

Thermal Transmission Characteristics of Human Flesh

The purpose of this research is to investigate the thermal transmission characteristics of human flesh in relation to external thermal therapy treatments. We conducted our research through a detailed online search of the thermal properties of human skin. This included basic background information on its thermoregulatory properties as well as the influence of external factors such as pharmaceuticals and temperature.From our research, we found that the thermoregulatory response system in the body is divided into two main components: the core (the head and the trunk) and the periphery (arms and legs). The core regulates the thermal response system to maintain a tight range of temperature whereas the periphery has a wider range of possible temperatures to respond to the core. The peripheral tissues are typically cooler than the core by a few degrees Celsius to maintain a thermal gradient within the skin for homeostasis. Our research indicated that, in relation to medical procedures, skin is heated through various methods to combat potential cooling from conditions such as operating room temperatures or anesthesia. Heat is often used with skin because it can be more safely applied to the surface and there is greater heat loss from skin that would lead to less overheating. In regards to the cooler temperature of the peripheral components and the larger heat loss through skin, cooling the surface of the skin for thermal treatments on the arms or legs would be easily accomplished. However, providing this same level of cooling treatment to the deeper levels of the skin poses a greater challenge due to potential damage to the nerves. We anticipate that this thermal behavior can be modeled using engineering drafting software. This would involve replicating the properties of human skin within the program and applying the thermal analysis software to this material.

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Undergraduate

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Political Science

Submission Number: 125

Oral Presentation

Struggles of Legitimacy: Examining Internal Legitimacy in Afghanistan

The Taliban has been a destabilizing force in Afghanistan throughout the 1990s to the present day. The fall of the Western-backed Afghan government in August 2021 captured the attention and consciousness of many around the world. What is often overshadowed are the experiences of the individual Afghans fleeing violence and oppression from a regime that once ruled with an iron fist. The research question this project focuses on is: What are the sources of gaining and losing internal legitimacy, and how do new governments maintain power and control? Specifically, this study explores what variables increase or decrease internal legitimacy of governments, using Afghanistan as a case study. It is increasingly important to understand the legitimacy struggle in Afghanistan, as definitions of legitimacy have evolved over time. The value of reviewing Afghanistan as a case study derives from its unique history of political control. The Taliban movement has expanded over the decades, and research into this region is important to assess if the theories and perspectives of legitimacy established in scholarship hold up or should be modified to explain the circumstances surrounding Afghanistan's current government rule. The methods used to address the research question are case study and process tracing. These two (2) methods were selected because they allow this project to effectively make causal claims between the variables that impact internal legitimacy. Additionally, this project examines different time periods in Afghanistan, identifying the relationship between government legitimacy and the variables assessed. The preliminary findings suggest ideology, performance, and external support are variables that have the biggest impact in influencing internal legitimacy. Overall, the relevance of this project is connected to recent events in Afghanistan and the need to understand what factors contribute to governments gaining or losing internal legitimacy.

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Forensic Behavioral Science

Submission Number: 126

Oral Presentation

Finding common interests is not as easy as it seems: Examining how real police build rapport with cooperative witnesses

According to Newberry and Stubbs (1990), rapport is defined as a "harmonious sympathetic connection to another", and in order to build rapport three components are needed: mutual attention, positivity, and coordination (Tickle-Degnen & Rosenthal, 1990). The research on police officer rapport with adult witnesses and its effectiveness is not extensive, but previous research has found that officers build rapport with suspects and witnesses via verbal and nonverbal techniques to create a positive interaction (Vallano, Evans, Schreiber Compo, & Kieckhaefer, 2015). To further our knowledge in this area, the current study sought to examine over 80 video-recorded police interviews to see what behaviors they actually utilize to build rapport. Prior research has indicated that officers most often "discuss common interests" (Vallano et al., 2015) however specific details are lacking. For this research, videos were coded for common topics officers discuss with witnesses, whether the officer or witness asked or answered about each topic, and whether or not a common interest was ultimately found. Unsurprisingly, officers asking and witnesses answering was the most common type of exchange, with the reverse rarely occurring. The most common topic discussed was school, with students answering/providing information more often than offers ask about it. Jobs or careers were the next most discussed topic. Surprisingly family was rarely discussed and no one asked about hobbies at all. Perhaps most surprising of all – common interests were only found about 10% of the time.

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Biology

Submission Number: 127

Oral Presentation

Exploring Network of Student Success Change Agents at a 4-Year Majority-Minority Institution

Fewer than 40% of students who enter college intending to earn a STEM degree achieve one. This problem disproportionately affects underrepresented minority students. Calls to improve student learning outcomes and teaching practices have led to numerous student-success initiatives, most of which require the work of faculty and administrators to be implemented. However, few studies investigate communication among faculty and administrators to understand how they exchange information. This makes people involved in student success initiatives "islands of innovation." Folks may communicate only among their own people, and rarely with other people. To broker the desired changes and help students in STEM, researchers suggest analyzing the Social Network data to uncover formal and informal social structures in place. The goal of my study is to explore the social networks of a college of science and mathematics comprising seven departments at a large enrollment medium-research intensive university in the Western U.S. The goal of the analysis is to quantify a web of interconnected people and thereby identify individuals who are key to information exchange. This can help to identify important individuals and help isolated groups talk to others. In this study, we gathered data from 74 faculty and administrators in fall 2021. Participants were asked with whom they discussed student success initiatives, how often, and on what topics. Initial social network analyses document six key "gatekeepers": people linking otherwise disparate sub-groups within the network. These people connect participants from different disciplines together. The network was well-integrated per standard quantitative network measures, including connectedness, degree centrality, and transitivity. The broader application of this work is to contribute to the scarce SNA-related literature exploring people within student success change initiatives, and to suggest ways for communication to improve among student success groups on college campuses.

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Undergraduate

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Electrical and Computer Engineering

Submission Number: 129

Oral Presentation

Multi-User Optical Wireless Communications using Software Defined Radios

The goal of this project is to develop a Visible Light Communication (VLC) system that utilizes Software Defined Radios (SDRs) in a multi-user environment. This will allow multiple photodiode receivers to capture their desired information from a single light emitting diode (LED) transmitter. The system will be implemented through novel modulation techniques and schemes that we are currently developing for SDRs. The source code of the project will be solely implemented through MATLAB and GNU Radio functions and files. The outcome will include a multi-user system that can eventually be married to a multi-cell system, thus providing a testbed that can be used as an open-source, baseline tool for other researchers to use as a resource when studying and developing future VLC technology. Such a modular system that utilizes SDR will increase accessibility, and further advance current research in Visible Light Communications.

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Electrical and Computer Engineering

Submission Number: 130

Oral Presentation

Tree Health Categorization using Drones and Machine Learning

Machine learning is a subcategory of artificial intelligence where data and algorithms are used to identify and analyze patterns, resulting in independent adaptation capabilities. In recent years, some agricultural communities have begun to apply these machine learning models to a concept known as precision farming. Here, information on crops are collected and used to drive agricultural decisions for boosting production. As the agriculture sector continues to expand, the need for more efficient crop monitoring also grows. Our solution uses visual imaging captured from unmanned aerial-vehicles to monitor the health of fruit trees. These top-down images of the orchard will be trimmed and manually categorized into the following classifications: healthy, slightly unhealthy, and unhealthy. These images will then be used to train a machine learning model in order to automate the classification of trees from future images. The UAV will also be guided by an automated flight path module on customized drone hardware. We expect that the drone will be activatable by some sort of signal, and it will travel on it's own course. The data will be parsed using our models, and the system will create an alert if there are any trees that are deemed unhealthy from a visual perspective. Normally the crop owner would have to go out and investigate acres of land on foot or by a land vehicle. With our solution, the results should narrow down potential problem spots for farmers to investigate. This means that farmers can save time and by using drone technology to do fast and regular checks on the crops. The purpose of this project is to provide a first step monitoring solution for crop maintenance. This design will be used on an actual drone and will provide real-time tree classification data.

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Department of Child & Family Science

Submission Number: 132

Poster Presentation

The Dualism of Biculturalism in the Eyes and Lives of Mexican American Emerging Adults

Most research examining biculturalism enters with presuppositions about the nature of the experience. Questionnaire-based studies that prioritize researcher-chosen domains have yielded important insights, including by pointing to the adaptiveness of biculturalism—especially in multicultural environments (Chen & Padilla, 2019; Schwartz & Unger, 2010). Less is known about how young people themselves experience biculturalism and about related domains that they deem important (Ferguson et al., 2020). This study explores the definition and perceived valence, and the perceived advantages and challenges, of biculturalism among Mexican American emerging adults in Fresno.

Twenty-six participants (ages 18-27 years, M = 22.35) took part in in-depth interviews in which they discussed their experiences of biculturalism. Of all participants, 85% were born in the U.S., and 96% had at least one parent born in Mexico. Most participants defined biculturalism as blending Mexican and American cultures, and the overwhelming majority of participants believed biculturalism to be mostly or exclusively positive. Thematic analysis revealed that participants deemed the key advantage of biculturalism to revolve around perceived opportunity as a Mexican American living in the United States (including especially educational opportunity and the opportunity to accrue financial capital). Although participants generally reported having close relationships with their family, a challenge commonly perceived as related to their biculturalism was that of a cultural gap in values and beliefs within the family due to differing levels of acculturation. Additional salient challenges discussed included that of discrimination—particularly within-group discrimination—which threatened both their heritage and American cultural identities.

On the one hand, findings echo quantitative research that points to the adaptive nature of biculturalism. On the other hand, the current inductive approach reveals how and why biculturalism is adaptive from the perspective of bicultural youth, and points to important challenges that warrant further investigation.

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Undergraduate

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Chemistry and Biochemistry

Submission Number: 134

Poster Presentation

Evaluating the Hydrophobic Recovery of Nitrogen and Water Vapor Low Temperature Plasma Modified Silk Fibroin Films

Silk fibroin is a naturally-derived polymer from the cocoon of a silkworm. It has great potential applications for biomedical use due to its strength, biocompatibility, and ability to biodegrade. However, the hydrophobic nature of silk fibroin can cause challenges with cell adhesion = in vivo. Therefore, modification must be performed to improve the surface hydrophilicity. Low-temperature plasma (LTP) modification is a well-established method for the modification of polymers and has the benefits of being a solvent-free, amenable process. Nitrogen and water vapor LTP are both well-documented as strategies to enhance polar functional groups on a polymer's surface. However, LTP-modified polymers have been documented to experience a hydrophobic recovery, in which the polymers revert back to their original more hydrophobic state upon aging, negating the effects of the LTP-modification. The hydrophobic recovery of nitrogen and water vapor LTP-modified silk fibroin has not been previously studied.

The goal of this study is to systematically evaluate the hydrophobic recovery of nitrogen and water vapor LTP treated silk fibroin films. The silk fibroin films were prepared using a well-established method and were LTP-modified using optimized plasma parameters (applied power, pressure, treatment time). Interactions between silk films and water were evaluated with a technique called water contact angle goniometry. Initial results showed that untreated silk films had contact angles of ~70°. After nitrogen LTP treatment and water vapor LTP treatment, the films showed water contact angles of ~35° and ~20°, respectively, demonstrating a significant decrease in hydrophobicity. Films were then aged under ambient conditions up to 6 weeks and analyzed at specific time points (0 days, 7 days, 21 days, and 42 days)

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Psychology

Submission Number: 135

Poster Presentation

A Quiz-Like Intervention to Reduce Political Polarization

Research on depolarization interventions often aim at reducing partisan animosity (e.g., Levendusky, 2017). Yet, with rising political tensions in the US, a greater need to reduce partisan discourse has surfaced. One attempt to tackle such issues came from the Strengthening Democracy Challenge (https://www.strengtheningdemocracychallenge.org), an outsourcing event testing submissions of short online interventions that target (1) partisan animosity, (2) support for anti-democratic attitudes, and or (3) support for partisan violence. In this study, we test our submission to the Strengthening Democracy Challenge to reduce partisan animosity, support for anti-democratic attitudes, and support for partisan violence.

Seventy-two undergraduates participated in a two-part online quiz. Part 1 asked participants to answer four easy questions about American Democracy, while Part 2 tasked subjects to guess the author of several quotes with pro-American and pro-democracy messages from a list of partisans. We hypothesized that after several failed attempts at guessing the author of each quote, subjects will realize that both Democrats and Republicans share pro-America and pro-democracy ideals, leading to a reduction in all polarization variables.

To assess the efficacy of the intervention, a composite score of partisan animosity was created through aggregating scores from a feeling thermometer and dictator game task. Additionally, composite scores for support for anti-democratic attitudes and partisan violence were based on averaging agreement to several statements for each variable.

Our analyses showed that the treatment condition (intervention first, polarization items second) did not find a statistically significant reduction of partisan animosity, support for anti-democratic attitudes, or support for partisan violence composite scores. Yet, differences between the treatment and control conditions (polarization items first, intervention second) were all in the hypothesized direction. We suggest that future depolarization studies use large, representative samples for optimal testing of these variables.

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Biology

Submission Number: 136

Poster Presentation

Population Genetics of Two California Species of Checker Lily (Fritillaria)

Our project focuses on genetics of two local species of wildflowers called checker lilies, Fritillaria atropurpurea and F. pinetorum. Fritillaria is a genus that consists of approximately 140 perennial plants and is known for its huge genome (30-80 Gb of DNA). F. pinetorum is listed as rare by the California Fish and Wildlife Society. Both species are common at 1000-3200 meters elevation in the Western U.S., and both have underground bulbs with 2-5 scales. In F. pinetorum, the flowers are usually erect, whereas in F. atropurpurea the flowers are usually nodding. Another distinction between the two is whether the cauline (stem) leaves exceed the length of the inflorescence (F. pinetorum) or often do not (F. atropurpurea). Aside from these slight and inconsistent morphological differences, the species are generally found in different but contiguous parts of California. Because these two species are morphologically very similar, we are specifically interested in seeing whether F. atropurpurea and F. pinetorum are the same or different species. Because of the large size of the nuclear genome in this group, we are instead utilizing the chloroplast DNA to answer this question. We are conducting DNA extractions, PCR, and gel electrophoresis to test primers for chloroplast regions, including chloroplast microsatellites, that have shown variation in Asian Fritillaria species. We have tested out a few different primers, and our results so far show that primers for the chloroplast region trnC-petN amplify well in our two species, and have enough variation to discriminate between these species and their close California relative F. micrantha. The implications of our work could affect conservation decisions involving F. pinetorum: if we are unable to differentiate these two species, then it would imply that they are still exchanging genes and would not be two different species according to the Biological Species Concept.

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Undergraduate

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Department of Chemistry and Biochemistry

Submission Number: 139

Poster Presentation

Comparing the Contrasting Ground States of Pyrethroids and Pyrethrins

Pyrethroid insecticides are synthetically derived based on the structure of pyrethrin compounds found in chrysanthemum flowers. Both pyrethroids and pyrethrins function as nervous system disruptors on small insects, however pyrethroids are known to have significantly increased stability in contrast to pyrethrins. Pyrethroids are commonly used in both residential and agricultural pesticide management, remaining pervasive in water and soil ecosystems after application. Degradation products for pyrethroids are not well defined and identification could enable more targeted approaches in defining the concentrations of these eco-toxins, therefore a comparison with the lower stability pyrethrins was conducted. We studied the ground state conformation of pyrethroids, Lambda-Cyhalothrin and Cypermethrin, and pyrethrins, Cinerin II and Jasmolin II, using Density Functional Theory. Low energy structures have been isolated using B3LYP with increasing basis sets and accounting for environmental effects through the polarizable continuum model for solvation. Using these structures, the electron orbitals and absorption spectra were compared to determine potential differences in reactivity. Future work will focus on the determination of possible photodegradation pathways based on the excited state electronic structure to illustrate aforementioned compound's contrasting stability.

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Undergraduate

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Chemistry

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Poster Presentation

A comparative study of the photoexcited states of phenylurea herbicides

Photodegradation is one of the primary abiotic mechanisms by which organic molecules can break apart. In the Central Valley, a large quantity of these herbicides are used every year and can adversely affect the environment, particularly through the water supply. After they serve their purpose of killing unnecessary weeds, the herbicides themselves can cause soil and water contamination. They also degrade through many different pathways, forming products which are potentially more toxic than the parent compound and presenting health risks to humans and the environment. The use of photodegradation may make the herbicide's product less harmful to the environment. In this project, the excited states, initial forces, and state derivative forces of several different phenylurea herbicides were calculated using quantum chemical methods to help predict how these molecules degrade. The calculations were done using Q-Chem, a commercially available software package using density functional based methods with Gaussian basis sets (6-311G** and 6-311++G**). Various classes of functional methods (B3LYP, CAM-B3LYP, B88-LYP, and w-B96) were used to compare the structure and properties of the different phenylurea herbicide molecules. As a result of comparing molecules' excited states, it was decided that CAM-B3LYP out of the four functional methods was the best to move forward with the state derivative forces calculations and future works. Many similarities and differences were found between these molecules. If the photodegradation products for a given class of molecules can be accurately predicted, this can potentially lead to developing safer and effective alternatives for widely used pesticides.

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Undergraduate

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Chemistry

Submission Number: 141

Poster Presentation

Licochalcone A for the potential treatment of Triple Negative Breast Cancer (TNBC)

Breast cancer is the second leading cancer death in women. Triple negative breast cancer (TNBC) is an aggressive type of breast cancer that grows quicker and has higher proliferation. TNBC is highly drug resistant and has low prognosis because TNBC has no receptors commonly found in breast cancer, limiting the treatment options for patients. Although chemotherapy is still a viable option, 1 in 4 people diagnosed with TNBC will die. Therefore, it is important to find effective treatments for TNBC. Natural products have been proven to be an excellent resource for the treatment of various cancers. Several natural products including ilamycin E, strictin, salvianolic acid B, chetomin, jatamanvaltrate P, and licochalcone A have been demonstrated by in vitro and in vivo experiments to possess potential in treating TNBC. In this study, licochalcone A (LA) was chosen as our lead compound due to its relatively greater potency and synthetic accessibility. Aiming to optimize the potency of licochalcone A, a group of analogues by replacing the hydroxyphenyl in licochalcone with its bioisosteres will be synthesized and evaluated in cell models. The synthetic methods towards these analogues are currently developed with the first three steps of the reaction sequence completed.

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Undergraduate

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Biology

Submission Number: 144

Poster Presentation

Effects of 2-Cinnamoylthiophene on Zebrafish Development

Organic chalcones are formed by substituting a chalcone's A or B ring with other organic structures. One such derivative is 2-Cinnamoylthiophene, an organic chalcone that displays significant nematicidal activity and holds promise for a novel fumigant. However, its environmental impacts are still poorly characterized. Zebrafish are freshwater vertebrates that develop within hours following fertilization. They are excellent vertebrate model organisms because fertilization and development occur outside the mother, they produce clear eggs that hatch in days, and they have large genomic preservation to other vertebrates. Given these advantages, zebrafish will be used as a model to observe impact of 2-Cinnamoylthiophene exposure throughout development. The zebrafish embryos will be immersed in varying concentrations of organic chalcones in order to determine exposure effects to increased concentration of 2-Cinnamoylthiophene on mortality rates, and morphological and physiological abnormalities. Exposure to increased concentration of chalcone-thirty (2-Cinnamoylthiophene) will induce proportional increases in mortality rates, morphological abnormalities in appearance, earlier hatch times, and abnormal heart rates in zebrafish embryos. The zebrafish embryos will be immersed in water with the tested substance concentration and will be exposed to three different concentrations over a continuous 24 hour period per change of the water. Exposure would occur at 0-2 hours post fertilization (hpf) up to 96 hpf and the morphological characteristics of development that will be tested are abnormal changes in bone and organ development in the embryos, which will be observed via microscopy. Future areas to explore would include a more specific look at specific organs and bones and how they are affected by higher concentrations of the Chalcone. So far, we have established the normal development of zebrafish under controlled conditions and we expect a small number of abnormalities found under normal conditions; we will be looking to see if chalcone 30 increases the frequency of these abnormalities.

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Kinesiology

Submission Number: 145

Poster Presentation

How bone shape changes with body size, a study based on specimens from Fresno State's Vertebrate Collection

Vertebrates have a skeleton to support their body. The larger an animal, the thicker its bones should be if animals want to avoid increasing the load acting on their bones and thereby increasing the risk of bone fractures. Using engineering principles about load bearing, we can make quantitative predictions about how much thicker the bones need to get for a given increase in body size to maintain so-called 'elastic similarity' (maintaining similar bending loads). Previous studies have focused on the upper leg and arm bones of mammals. They found that the bones of larger mammals often do not maintain elastic similarity but geometric similarity, that is: the bones do not get relatively thicker with increasing body size but the bones of larger animals merely increase in size without changing their shape. This study will expand existing data sets by including additional bones and additional species, including bird species, to examine if the main bones in the arms and legs of vertebrates follow the scaling relations predicted by elastic or geometric similarity. We measured four long bones (femur, humerus, tibia, ulna) of 50 species and are currently adding another 50 species; we are also adding data for two more bones (scapula, radius). Our preliminary analysis shows that our data on mammals agree with previous studies, but bird bones scale differently from mammal bones. We also found that the scapula scales differently from long bones. We conclude that the hypotheses proposed in previous studies about bone scaling do not integrate well across bones, species, and vertebrate classes (birds versus mammals) and do not explain how different bones scale within the same limb or for how bone length versus diameter scales with mass.

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Animal Science

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Poster Presentation

Impact of Water Flow Rate on Finishing Pig Performance

This study was conducted to examine the relationship between water flow rate and finish pig performance, to reduce water waste. Water is crucial to pig growth, and may affect average daily feed intake (ADFI) and gain:feed (G:F). Water intake was assessed at three different settings, based on hole diameters of the commercial water nipples (0.80 mm, 1.0 mm, and 2.0 mm). A randomized block design was used to determine which flow rate each waterer needed to be set. A total of 1,227 pigs were utilized in the 84-d trial and placed into 48 pens on a mixed gender basis. Daily water usage was measured for each flow rate. Every 14-d, feed disappearance, water flow rate, and pig weights were recorded on a pen basis. Water flow rates averaged 0.53 L/min, 0.1.03 L/min, and 1.68 L/min for low, medium, and high settings, respectively. Average daily water disappearance for low, medium, and high was 0.20 L/pig, 0.09 L/pig, and 1.18 L/pig, respectively. Daily intake ADFI and G:F ranged from 4.93 kg, 4.96 kg, and 4.99 kg, showing no differences. The ADG was 2.15 kg, 2.18 kg, 2.21 kg, for low, medium, and high treatments, respectively. There is no statistical difference between treatment groups on ADG and ADFI, but there is a positive correlation between ADG and water intake (p<0.05). There is also a trending relation between the flow rate and water intake (p = 0.07). Relationship between treatment and water disappearance indicated that a higher flow rate setting resulted in higher water intake. The positive correlation between ADG and water intake indicated that animals that gained more weight also consumed more water. Water nipples should be checked regularly as a part of barn maintenance, to assure flow rate range meets pig water requirements.

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Chemistry

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Poster Presentation

Synthesis of Niclosamide-Based PROTACs for Prostate Cancer

Prostate cancer is the leading cause of cancer deaths among American men, with 1 in 8 men diagnosed in their lifetime. Most treatments for prostate cancer target androgen receptors (AR), including Androgen Deprivation Therapy (ADT). ADT works by removing androgens by chemical or surgical castration of androgen. However, ADT has been established only to be effective initially. Most patients who underwent ADT later developed castration-resistant prostate cancer (CRPC), which can no longer successfully be treated with ADT. ADT fails to properly treat CRPC due to AR-V7 protein expression of cancer cells, however, when treated with Niclosamide, it was found to be able to downregulate AR-V7 protein expression. The use of Proteolysis Targeting Chimeras (PROTACs) with Niclosamide is envisioned to be an effective AR degrader to treat prostate cancer. PROTACs are heterobifunctional molecules containing a binding unit, linker, and E3 ligase binding domain that target the ubiquitin pathway for allowing degradation of disease-causing proteins. When used with Niclosamide and Von Hippel-Lindau (VHL), an E3 ligase ligand, the synthesis of Niclosamide-PROTACs with different linkers can be produced. A linker between PROTAC and Niclosamide has been synthesized using tetraethylene glycol through the addition of t-butyl-2-bromoacetate. This presentation aims to discuss the synthesis of Niclo-PROTAC linkers in order to develop novel PROTACs for the potential treatment of CRPC.

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Undergraduate

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Submission Number: 151

Poster Presentation

The effects of Presenilin-1(PSEN1) knockdown on longevity, learning, and memory in Drosophila melanogaster model of Alzheimer's disease

Alzheimer's Disease (AD) is a progressive neurodegenerative disease that results in functional and cognitive decline. This study is designed to assess the effects of the dysfunction of presenilin, a gene that is the main cause of familial Alzheimer's disease, in the model organism Drosophila melanogaster. The loss of function in Presenilin-1 is believed to stem from the pathogenic beta-amyloid production. We are studying the dysfunction of the presenilin homolog dPsn in Drosophila melanogaster to assess the behavioral and cognitive functions. Using the Gal4/UAS system, we use RNA interference (RNAi) to knockdown dPsn in the mushroom bodies, ellipsoid body, or pan-neuronally. Ellipsoid body and mushroom bodies have been shown to play an important role in memory, learning, and cognition. To determine the effect on lifespan, flies were collected, and the number of deaths recorded each day. The visual place learning assay was used, or what is called the heat maze behavioral assay, to assess the cognitive and behavioral abilities of the flies. Flies were trained over 10 trials to locate the hidden cool spot using visual cues and were then tested for memory of said location over 3 trials. These findings suggest that the knockdown dPsn has a noticeable impact on longevity and health.

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Biology

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Poster Presentation

Does individual variation in major histocompatibility complex (MHC) class I genes explain West Nile Virus (WNV) infectivity levels in American Robins (Turdus migratorius)?

American robins (Turdus migratorius) are a reservoir host for West Nile Virus (WNV). As a reservoir host, they serve as an intermediate carrier of this pathogen. The avian ecoimmunology lab at Michigan State University infected juvenile robins, naive to WNV to monitor the levels of viral loads throughout an experiment on nutrition and infectivity. Although nutrition had an effect on overall viremia in these birds, there was significant variation in viral loads within treatment groups, which may be explained by underlying genetic effects. The major histocompatibility complex (MHC) is a set of genes that influence the individual variation of immunity in an organism. The aim of this study is to characterize MHC class I to identify and compare viremia of these experimentally infected robins and evaluate if MHC variation can explain differences in infectivity levels. We performed PCR to amplify the MHC class I exon 3 and characterized alleles using high-throughput sequencing. MHC has been sequenced, and we are working on characterizing the MHC class I alleles using a bioinformatics program. Results are pending. This study will allow us to gain knowledge about the underlying genes that influence infectivity and immunity and identify variation in alleles in individuals that may help resist infections.

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Submission Number: 154

Poster Presentation

The Effects of Chalcone 25 Concentrations on the Development of Zebrafish

Zebrafish (Danio rerio) are tropical fish that have been used as model organisms to study embryonic development and how chemicals can affect their morphology and behavior. Their models have significantly improved our ability to study and understand vertebrate developmental biology. Zebrafish are ideal because their embryos are nearly transparent which allows scientists and researchers to examine the development of the organism and its internal structures under different treatments. During previous experiments performed in Dr. Calderon's laboratory at Fresno State, a research group had determined that chalcones 17, 25, and 30 were effective in controlling plant-parasitic nematodes (PPNs). Although these compounds can control PPNs, it has also remained harmless to any human cells. However, we are curious to learn whether any of the chalcones would have an effect on the zebrafish model. Specifically, we want to determine whether chalcone 25 would cause different effects on the zebrafish embryos at different concentrations. In order to visualize the effects of any developmental abnormalities, a proper microscope will be provided to view abnormal effects such as changes in their behavior, length, size, and spinal curvature. Another method of observation is the use of the fluorescent chromophore calcein, which specifically binds to the calcified skeletal structures. By using these methods, we followed the development of the embryo from 17 HPF to 5 days, recording any data and observations every day for about 5 days. At the end of these experiments, we found that the use of chalcone 25 (did/did not) have an effect on the (formation and/or behavior) of the developing embryo. Therefore, our predictions (are fully/are not/are partially) supported by our data. So far, we have established the normal development of zebrafish under controlled condition, and we expect a small number of abnormalities found under normal conditions; we will be looking to see if chalcone 25 increase the frequency of these abnormalities.

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Poster Presentation

Episodic Future Thinking: Differences in Outlook Styles Across Depression and Anxiety

Episodic Future Thinking (EFT)—mentally simulating specific and vivid future scenarios—is a research area that has garnered considerable interest over the last decade. Although a valuable ability for most healthy populations, anxious and depressed individuals often lack the full capacity to use EFT constructively. However, how depression and anxiety relate to EFT is relatively unknown. By further researching this topic, we intend to identify the scope of EFT deficiencies within anxious and depressed populations. Specifically, we are investigating how generalized anxiety disorder (GAD) and depression affect outlook styles on novel future task imagination. Participants are asked to generate scenarios of seven novel tasks conforming to three parameters: undergraduates have not performed the activity, and one can easily imagine themselves performing the task both successfully and poorly. These tasks included: starting an IV in a hospital, piercing someone's ear, directing traffic in a busy intersection, painting a mural, giving someone a tattoo, landing during skydiving, and interviewing to be a Disneyland character. After each event, participants are asked to detail the physical exertion, emotional state, environment, and surroundings they imagined, as well as if they completed the task successfully or poorly. Once data collection is complete, we hypothesize that anxious and depressed individuals will imagine themselves performing novel tasks less successfully than healthy populations. This may highlight how and why people with symptoms of depression or anxiety think about their immediate future through a negative lens.

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Poster Presentation

The Relationship between Media Multitasking and Thought Suppression

Media multitasking is defined as undertaking various media activities in the same time period. This has become a growing phenomenon in the current digital world and has increased in relevancy due to the pandemic. There is a misconception that multitasking is a good strategy that increases productivity. However, previous research has revealed that multitasking reduces one's efficiency and performance on the task at hand because it divides attention. The constant switching of tasks causes a reduction in one's ability to stay focused. The media aspect is crucial because multitasking between technological devices such as smartphones and computers has become a popularized habit. This study looks at how media multitasking correlates with another aspect of attention called cognitive inhibition. This study used The White Bear Suppression Inventory (WBSI) to measure the tendency of inhibiting these unwanted thoughts. The Media Multitasking Index (MMI) will be used to measure the degree of how often one tends to multitask with technology. Another questionnaire utilized in this study is called the Nomophobia Questionnaire (NMP-Q), which measures one's traits of nomophobia. Nomophobia is the fear of being without one's smartphone, this is a crucial measurement for this study because smartphones are the most common technological device used. Data collection is currently in the process, we hypothesize that the MMI and WBSI will have a negative correlation. This implies that those who tend to media multitask often have a harder time inhibiting their intrusive thoughts due to the constant switching of attention.

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Physics

Submission Number: 162

Oral Presentation

Phase Diagram of Valence Transition below 14T and above 2K for Ce1-xPrxOs4Sb12 , x=0.1 and 0.2

Filled skutterudite compounds are described by the chemical formula: LnT4Pn12 where Ln is a rare-earth metal, T is a transition metal, and Pn is a pnictogen. CeOs4Sb12 is a Kondo insulator that exhibits antiferromagnetism due to spin-density wave formation below 1 K. Based on the band-structure calculation, CeOs4Sb12 is suggested to be a candidate for topological insulators, which may have a hole Fermi surface and an electron Fermi surface coexisting at low temperatures. Through our previous study of CeOs4Sb12, we found that the valence transition occurs in this compound, and we have established an intriguing temperature, T-, magnetic field, H, phase diagram in its normal state. Nevertheless, the neighboring isostructural compound PrOs4Sb12 is a heavy-fermion superconductor with a transition temperature at 1.85 K. When Pr substitutes Ce in CeOs4Sb12, a hole-doping is introduced. We plan to study the series of Ce1-xPrxOs4Sb12 to investigate the influence of hole-doping to the valence transition. In this report, we will show the preliminary results of normal state resistivity of two concentrations: x=0.1 and x=0.2 from 300 K to 2 K in magnetic fields ranging from 0 to 14 Tesla as well as the T-H phase diagram updated with the doped samples' resistance data.

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