Kellogg Honors College

CONVOCATION CEREMONY

Class of 2023
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About the Honors Research Experience

The Honors Research Experience is a mentored investigation or creative inquiry that seeks to make a scholarly or artistic contribution to knowledge. The goal is for students to demonstrate a deep understanding of a topic or issue in the academic interests of their choosing. Kellogg Honors College students are required to complete at least one experience during their college tenure.

The Kellogg Honors College gratefully acknowledges the Honors Research Experience mentors:

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*Mentored Multiple Students
Cal Poly Pomona Solar
Author(s): Cameron Abdoh
Faculty Mentor(s): Dr. Kenneth Lamb

Using fossil fuels as an energy source is not a sustainable solution. It is a consumable resource as well as being harmful to the environment. To mitigate the damage to the environment, it is in the best interest of Cal Poly Pomona to use electricity generated from renewable resources. One possible method would be to install solar panels on the roofs of campus buildings and use solar energy to power the building. This study is to determine if solar panels were to be installed on the roof of building 9 in Cal Poly Pomona, would it be able to power the building? To do this, the study used a sample solar panel, determined how many solar panels can be added to the roof, and found the amount of energy they would generate. It was then compared to the median demand for energy required by college buildings. Since they did not meet the demand, additional research was used to determine what steps can be reasonably taken to implement solar panels to the building in the future.

Effects of Unsymmetric Amine(bis)phenol Ligands and Molybdenum Complexes in the Deoxydehydration Reaction
Author(s): Fernando Alfaro
Faculty Mentor(s): Dr. Alex John

The preservation of limited fossil fuels available is essential due to the substantial number of resources and time it takes to form petrochemicals; thus, different alternatives are being studied to produce chemical feedstock. In the past years, scientists have studied the different strategies for the use of biomass as a source of energy allowing the use of a more accessible renewable resource. Although the use of biomass is prominent for the future of renewable energy, it is highly oxygenated complicating the production of platform chemicals. Therefore, several methods involving the removal of these oxygens have been developed, including the deoxydehydration reaction (DODH). The DODH reaction is currently under study because it successfully removes vicinal diols from a molecule in the form of water producing an olefin as a product. A reducing agent is often required along a transition metal catalyst to produce the desired alkene product. Several studies conducted have shown that rhenium (Re) is the most efficient metal catalyst for the DODH reaction.
Effects of Unsymmetric Amine(bis)phenol Ligands and Molybdenum Complexes in the Deoxydehydration Reaction (cont.)

Author(s): Fernando Alfaro  
Faculty Mentor(s): Dr. Alex John

However, the use of Re complicates industrial upscaling due to its high price. An alternative metal that has been studied is Molybdenum (Mo) due to its similar chemical characteristics with Re, also being inexpensive and more abundant. This study focuses on the multi-step synthesis of unsymmetric ligands and molybdenum-centered complexes as a viable alternative for the DODH reactions. The auxiliary ligands will feature an electron-donating and electron-withdrawing group on the para position, studying the electronic effect in DODH. Characterization of each ligand and (Mo) complex species was done through 1H NMR, IR, and X-ray chromatography.

Effectiveness of a Diabetes Prevention Program in a Library Setting

Author(s): Nairi Azazian  
Faculty Mentor(s): Dr. Juanity Jellyman

With the growing prevalence of diabetes, it is becoming evident that Type 2 diabetes and its complications are a major worldwide public health problem (Wu et al., 2014). In the current study, we determined the feasibility of offering a free, yearlong, in-person CDC-recognized diabetes prevention program (DPP) in a diverse Los Angeles County community shortly after the social isolation of the COVID-19 pandemic. We hypothesized that participation in the DPP would reduce diabetes risk through weight loss, increased physical activity, and decreased percentage of glycosylated hemoglobin (HbA1C%) to less than 5.7%. Weekly meetings of the diabetes prevention program were held in a library in Altadena, California. Weight and activity minutes were collected weekly. Biometrics, including waist and hip circumference, and HbA1c%, were measured at 0, 6, and 12 months in 5 pre-diabetic participants. Body weight, waist, and hip circumference, and the number of minutes spent engaged in physical activity each week didn't change when comparing months 0 and 12. Participant HbA1c% tended to decrease from 5.9±0.1% (pre-diabetic) at 0 months to 5.7±0.2% (pre-diabetic) at 6 months, and 5.4±0.4% (healthy) at 12 months. Although these data did not reach statistical significance (P= 0.057), it appears that participation in the DPP lifestyle intervention program in a library setting did decrease the risk of Type 2 diabetes as evidenced by HbA1c% within a normal healthy range.
**Fight for Environmental Justice in Pomona**

**Author(s):** Stephanie Cabral  
**Faculty Mentor(s):** Dr. Elli Menounou

Environmental Justice is defined by the state of California as "...the fair treatment of people of all races, cultures, and income with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies. This is still a pressing issue in the city of Pomona as much of its population falls in the ninetieth percentile of prevalent asthma rates in the state of California as a result of highly polluted areas. Historical and ongoing acts of environmental racism as seen in redlining influence how healthy communities are to this day. This project uses the medium of documentary filmmaking and storytelling to examine how community organizations have taken steps to fight for environmental justice in Pomona to ensure a healthier future. The organizations showcased are varied in their approaches to achieving environmental justice. Some of their approaches include organizing protests against polluting factories, collaborating with state environmental task forces to produce planning strategies, and creating green spaces. Through their work, the organizations are participating in the political process and influencing the government to create environmental justice. Overall, environmental justice is an important issue in Pomona, and community-led efforts are leading the city and state to take steps to address the needs and concerns of its residents and ensure that everyone has an equal opportunity to live and work in a healthy and safe environment.

**Slit-Scanning Confocal Fluorescence Microscope**

**Author(s):** Chad Carlile  
**Faculty Mentor(s):** Dr. Timothy Corcoran

Fluorescence microscopy uses a laser to excite a fluorophore to release light. A pinhole then filters the out-of-focus light to image the immediate plane of focus. A major limitation of fluorescence microscopy is photobleaching which results in fluorophores being permanently lost. Every optical component of the microscope also causes losses. This project eliminates the scan lens which suffers from relatively high losses and cost. The component was replaced by mirrors mounted onto motors to move the laser and scan the sample. These components are both cheaper and have a lower light loss than the scan lens. The pinhole was replaced by a slit to scan a full line on the sample allowing for a 2D image of the sample to be obtained in a single pass. The resulting fluorescence microscope reduces the amount of light lost and increases the number of images that can be taken of a sample before it is destroyed.
Power Spectral Estimation Using Nonuniform Fast Fourier Transform

Author(s): Joanna Cornejo
Faculty Mentor(s): Dr. James Kang

The frequency content of an analog signal can be found by uniformly sampling the analog signal, and then applying Discrete Fourier Transform (DFT). The fast Fourier Transform is an efficient algorithm to calculate DFT. The number of complex multiplications required by the Fast Fourier Transform (FFT) algorithm is in the order of N log(N) compared to N^2 for direct calculation. When the samples are taken at nonuniform intervals, the Fast Fourier Transform does not apply. For the nonuniformly sampled signals, Nonuniform Fast Fourier Transform (NUFFT) is applied. Like the FFT, the NUFFT reduces the number of complex multiplications to the order of N log(N). In this research, different types of NUFFT will be analyzed and implemented. Then the NUFFT will be applied to power spectral estimation of various signals.

International Reaction to the Soviet Invasion of Czechoslovakia: Defense and Reorganization of the Status Quo

Author(s): Conor Entus
Faculty Mentor(s): Dr. Robert Lewis

The Soviet invasion of Czechoslovakia in the late 1960s was largely ignored by western countries despite the fact that Czechoslovakia was, at the time, moving in a political direction that would likely have been friendlier to the west. In fact, the only powers to aggressively speak out against it were in the Communist world. In this essay, I will explain how this period was marked by a shift in the status quo and a move towards detente between the Eastern and Western blocs. This incentivized Western nations to not interfere when the Soviets invaded Czechoslovakia whereas communist countries like China and Romania who had something to gain from altering the established status quo had more reason to speak out against the invasion. I will start by providing background on the event itself before moving into an analysis of the historiography of the subject. Once that is done, I will explain the motivations and actions of the Western powers, the states that toed the Soviet line, and the Communist states who went against Moscow, even if they only did so through their rhetoric. Ultimately, the Soviet aligned states and the West were more interested in protecting the status quo than interest in establishing a detente while China wanted to supplant the Soviet Union as the principal communist power and Romania simply wanted to establish friendlier terms with the west.
Development of an In-Group/Out-Group Manipulation for Experimental Studies

Author(s): Keila Estrada

Faculty Mentor(s): Dr. Sara Langford

The Fundamental Attribution Error (FAE) and the Ultimate Attribution Error (UAE) are two psychological behaviors that have been widely studied. The FAE refers to the tendency of individuals to attribute their own behavior to situational causes while attributing other people’s behavior to their character. On the other hand, the UAE refers to the error in which individuals attribute their own good behavior to their good character, but attribute others' good behavior to situational causes. The main difference between the two errors is that the UAE explicitly considers the valence of the observed behavior, while the FAE does not. Another difference is that the UAE explicitly predicts outcomes based on group membership, while the FAE does not. When it comes to "good" behavior, the theories conflict, with the FAE attributing one's own good behavior to the situation and others' good behavior to their character, while the UAE attributes one's own good behavior to their good character and others' good behavior to their situation. To effectively compare these theories, it will be necessary to use consistent study conditions and participants. This study aims to examine the methodologies used in the study of FAE and UAE and propose an optimal method for comparing the two.

Improving Canvas with a Tamper Monkey Script

Author(s): Rachel Goodrich

Faculty Mentor(s): Dr. Ben Steichen

Cal Poly Pomona’s recent switch of Learning Management Systems (LMS), from Blackboard to Canvas, was considered unfavorable by many students. This new system was unfamiliar and appeared to lack features that students wanted. By seeing this, I was inspired to create my own script that could potentially add in some of these features. I surveyed students on what issues Canvas has and created a script that addressed some of their issues. Upon receiving survey results, I found that many of the features that students thought were missing were already implemented in Canvas, but not known to students.
The Impact of Personality on Technology Acceptance: A Study on TikTok Shopping Users

Author(s): Emily Han
Faculty Mentor(s): Dr. Yubo Fu

With the increase of technology usage in our everyday lives through personal devices, we can also see a similar pattern in the increasing prevalence of social media. Since social media is undoubtedly one of the leading factors for technological usage, there are numerous social media platforms that generate millions of users. One example of such a platform (that will be highlighted throughout the study) is TikTok. TikTok is a more recent form of social media that is also one of the more popular ones. This study aims to examine the relationship between personality and technology acceptance. Instead of incorporating the big five personality traits, though the big five personalities have been studied during the literature review stage, the study instead uses the sixteen Myers-Briggs Type Indicator (MBTI) personality results to determine whether there is an impact on shopping on TikTok. The sixteen MBTI personality results are listed as ISTJ, ISFJ, INFJ, INTJ, ISTP, ISFP, INFP, INTP, ESTP, ESFP, ENFP, ENTP, ESTJ, ESFJ, ENFJ, and ENTJ with varied factors of extroversion, introversion, sensing, intuition, feeling, thinking, perceiving, and judging. The characteristics of Technological Self-Efficacy (TSE), MBTI, Perceived Usefulness (PU), Ease of Use (EOU), Perceived Enjoyment (PE), Attitude Towards Using TikTok (ATT), and Intention to Shop on TikTok (INT) are explored. To further determine the relationship between personality and technology acceptance, field research was carried out on 101 university students. The results show an interesting relationship between MBTI personality and technology acceptance through shopping on TikTok, and implications of the findings are discussed.

Analysis of Successful Completion of Endurance Horses and Riders Undergoing the Tevis Cup 160-km Ride from 2016-2021

Author(s): Maranda Nicole Hernandez
Faculty Mentor(s): Dr. Holly Greene

From showmanship to racing, the fastest growing Federation Equestre Internationale discipline, second to show-jumping, is endurance riding. A popular endurance ride that was established in 1955 is the Tevis Cup, a 160-km ride from Truckee to Auburn, traversing through the Sierra Nevada Mountain range (AERC).
Analysis of Successful Completion of Endurance Horses and Riders Undergoing the Tevis Cup 160-km Ride from 2016-2021 (cont.)

Author(s): Maranda Nicole Hernandez  
Faculty Mentor(s): Dr. Holly Greene

The Tevis cup is a diverse ride composed of elite riders from various backgrounds, styles, and horse breeds. Throughout the ride, there are checkpoints called "holds" to record the horse's health, vital signs, and undergo a veterinarian assessment to get approval before continuing the ride. Depending on assessment, horses may be "pulled" from the ride due to the inability to reach defined health requirements. The rider's main goal is to ensure the horse is healthy, well-conditioned, and finishes under the allotted time without getting pulled. The current study focuses on correlations in completion rates, competitor history, and weather of the Tevis Cup from 2016 to 2021. Results show that completion rates have been consistent, with the prominent finishing horses being geldings and horses of the Arabian breed. Statistics indicate that horses who have completed the ride have fewer overall kilometers in a season versus those who were pulled. Weather data will also be used to indicate correlations between the daily forecast, horses pulled, and completion rates. Examining the results of the ride data and identifying patterns can help condition horses to be healthier for endurance rides and help complete the Tevis Cup ride for future endurance riders.

SLAM and Object Detection for Search and Rescue Using UAVs in Indoor Environments

Author(s): Bryant Hong  
Faculty Mentor(s): Dr. Subodh Bhandari

Innovations in unmanned aerial vehicle (UAV) technology have grown significantly to reduce the need for traditionally human-operated vehicles to perform dull and dangerous tasks. Due to their lower cost, agility, and small size, UAVs can be cost-effectively used in many applications including search and rescue operations in indoor environments during natural disasters. This project discusses about the research being done for the three-dimensional (3-D) mapping of GPS-denied indoor environments for autonomous navigation of UAVs using Simultaneous Localization and Mapping (SLAM) algorithms. SLAM refers to a method of generating a map of an unknown environment by detecting distinct features in that environment while being able to keep track of where the vehicle running this algorithm has been within the same map.
SLAM and Object Detection for Search and Rescue Using UAVs in Indoor Environments (cont.)

Author(s): Bryant Hong  
Faculty Mentor(s): Dr. Subodh Bhandari

Intel’s RealSense Visual SLAM algorithm was used in this research due to its ability to produce accurate 3-D maps of indoor environments with Inertial Measurement Unit (IMU) data and computer vision techniques. Target detection was accomplished using the NVIDIA Inference platform and the You Only Look Once (YOLOv3) deep learning algorithm to accurately detect and classify objects in the view of the onboard camera. This project will show the results of these techniques including the results in simulation environments and the results of individual component testing. The accuracy and limitations of these algorithms will be discussed. Once found satisfactory in ground testing, the algorithms will be tested in flight.


Author(s): Karen Iribe Garibay  
Faculty Mentor(s): Dr. Chantal Van Esch

The labor force occupancy in the United States is on the cusp of change. In recent years the workforce has had to accommodate the most racially and ethnically diverse generation (Parker & Igielnik, 2020) known as Generation Z. Unlike its predecessors, Gen Z is radically changing the foundation of workplace culture as well as the techniques and practices that managers across a multitude of fields use to attract, develop, and retain employees, specifically in Human Resource Management (HRM). No longer is power or financial motivation enough for a generation that values and subsequently demands all employers embrace their organization's values, such as diversity, inclusion, and employee wellness. Thus, Generation Z’s impact on the HRM process and the changes brought forth in each HRM criteria, such as recruitment, motivation, development, and retention, are vital to understanding better how to cohesively adapt, elaborate, and implement HRM strategies to reach organizational goals during the presented changes. The objective is not to alienate or uphold one generation above the other but to consider the benefits and consequences of the changing labor force and the need for HRM to adapt its management practices to encompass its organization's employees.
Author(s): Karen Iribe Garibay
Faculty Mentor(s): Dr. Chantal Van Esch
The future of human capital lies within Generation Z; however, it is only by understanding the increasing generational diversity within the labor force, and its perspective, needs, values, and motivations can true the potential be harnessed for future organizational success.

Generating Electricity from Ocean Waves
Author(s): Arya Joshi
Faculty Mentor(s): Dr. Carlos Castro Candelas
Most of the electricity generated around the world derives from fossil fuels, a type of energy source that has proven to be the largest contributor to climate change. In an effort to transition towards sustainable energy, this project presents an affordable new process of generating electricity from one of the largest, yet relatively untapped, sources of renewable energy: ocean waves. Specifically, this project is focused on developing a proof of concept model of a cost-effective Oscillating Water Column (OWC) device that can be pre-assembled and situated on a shoreline to generate electricity from the ebb and flow of ocean waves. In order to achieve fruition, an appropriate DC generator was first selected with a low starting torque and a high RPM rating. Afterward, several Wells turbine models with different airfoil parameters (NACA 0021 and Joukovsky 0021) were 3D printed and attached to the generator. The efficiency of each turbine was tested independently at 3 different controlled wind speeds. The data was then used to select an appropriate Wells turbine, and a detailed SolidWorks model was designed for the shoreline OWC. Further continuation of the project shall comprise of manufacturing the OWC device, and the prototype shall be tested at the beach to determine economic and technical viability. As a proof-of-concept model, it is anticipated that the OWC device will generate between 1W - 3W of power, thus proving an innovative method of tapping into a new and promising renewable energy resource.
Racial Bias in Computer-Aided Diagnosis

Author(s): Ketan Joshi  
Faculty Mentor(s): Dr. Amar Raheja

Racial bias prevalent in computer-aided diagnostic systems can have drastic consequences resulting in potential misdiagnosis. Image-detecting machine learning models are starting to be integrated into these systems, but they must be cognizant of the training process and dataset used. Because models rely heavily on the dataset they are trained on, analyzing and engineering the data needs to consider making sure the data is not one-sided or biased towards one particular race due to minute and biological differences in X-Ray image appearance. Many machine learning models exist depending on the type of problem domain or task being done. In the case of image detection, the DenseNet model proves to be best fitting for the scenario of chest X-rays. The objective of this experiment is to observe any differences in model accuracy based on the training scenario being applied, such as training models with datasets primarily consisting of one particular race as well as a dataset being of equal proportion and seeing how it performs on a diverse dataset.

Self-Sustained Unmanned Aerial Vehicles

Author(s): Ana Jurado  
Faculty Mentor(s): Dr. Farbod Khoshnoud

Interest in clean and renewable energy is at an all-time high as the environmental benefits, among other advantages of these energy sources, far outweigh those of fossil fuels. One source of clean energy that is gaining more attention, as its costs continue to decrease, is solar energy. Solar panels are becoming more accessible to all and are now being used in various applications, not just their traditional use of providing power to buildings. Along with this rise in interest and use of solar energy, there is a rise in the interest and use of small unmanned aerial vehicles, better known as drones. Drones are now not only used for pleasure, but they are finding their way into various industries as they are compact and can easily accomplish different tasks. Their use is becoming more common, but a major problem with these is their flight time, as it is very limited. This project is proposed to examine how solar energy can aid in lengthening the flight time of unmanned aerial vehicles. Utilizing lighter-than-air drones, filled with helium, with solar panels mounted on them, the use of solar energy to lengthen the flight time of the drone is examined.
Acute Skeletal Muscle Hemodynamic Response to Percussive Massage Treatment

Author(s): Katrina Kao
Faculty Mentor(s): Dr. Edward Jo

Percussive massage treatment (PMT) involves mechanical vibration usually applied with a handheld device mechanically similar to a jigsaw. PMT is often implemented as part of a pre-exercise or inter-set routine in an effort to "prime" the muscle for subsequent activity. A warm-up or inter-set rest is in part intended to improve oxygen supply to the muscles involved in the subsequent exercise. However, to our knowledge, the impact of PMT on muscle hemodynamics and oxygenation has yet to be investigated. This exploratory study examined the effects of a single PMT application on lower body muscle hemodynamics and oxygenation as measured by near-infrared spectroscopy (NIRS). Thirty male and female subjects received a 5-minute PMT application on the quadriceps of their dominant leg after 15 minutes of rest. Skeletal muscle oxygen saturation (SmO2), total hemoglobin (THb), oxy-hemoglobin (Oxy-Hb), and deoxy-hemoglobin (Deoxy-Hb) were measured for 5 minutes prior to and for 10 minutes following the PMT application using NIRS-based muscle oximeters. Concurrent measurements on the contralateral quadriceps were administered serving as the control. Data were analyzed using a two-way ANOVA with a significance set at p<0.05. RESULTS: There was a significant time x treatment interaction for all dependent variables (p<0.0001). PMT resulted in a significant increase in SmO2 from baseline at the 4-, 6-, 8-, and 10-minute post-treatment time points (p<0.003). There was no change in SmO2 from the baseline for the control. THb and Oxy-Hb were significantly elevated at all post-treatment points vs. baseline (p<0.009) with PMT with no changes detected for the control. Lastly, Deoxy-Hb was significantly lower than baseline at 4-, 6-, 8-, and 10-minute post-treatment time points with PMT while no change was demonstrated for control (p<0.003). A single PMT application subsequently improved SmO2 for up to 10 minutes, accompanied by an increase in THb and Oxy-Hb which was disproportionate to the decrease in Deoxy-Hb. These outcomes may be indicative of increased muscle oxygen availability and consumption which could translate to enhanced performance. However, further investigation is necessary to substantiate these potential effects.
Medicinal Mushrooms for Cognition and Mood: A Review of Human Clinical Trials

Author(s): Yaelle Lee
Faculty Mentor(s): Dr. Erik Froyen

Medicinal mushrooms have been used since ancient times to treat disease and promote general health and well-being. Various health-promoting properties have since been confirmed with studies demonstrating immunomodulatory, anti-cancer, anti-viral, anti-bacterial, anti-inflammatory, neuroprotective, and cardioprotective activity among other properties. An additional interest in the use of mushroom nutraceuticals for mental health and cognition enhancement has also developed with various dietary supplement companies advertising their mushroom products with claims of improved memory, focus, and mood. However, research is still in its early stages with few human clinical trials to support these claims. The purpose of this review is to compile and examine the evidence for beneficial effects on the mind by medicinal mushrooms, specifically regarding the domains of cognition and mood, by reviewing human clinical trials. This review reveals trends of improvement in well-being by *G. lucidum* in the context of taxing disease states, improvement in cognitive function *H. erinaceus* in the context of cognitive decline, and general improvement in depression and anxiety by *H. erinaceus*. Potential mechanisms and limitations due to research design are also discussed. This review provides further clarity on the validity of health claims made by supplement companies and calls for future research in these areas.

Morphological Characteristics of the Placenta of Arabian Mares Foaling at the W.K. Kellogg Arabian Horse Center

Author(s): Ivanna Marroquin
Faculty Mentor(s): Dr. Juanita Jellyman

The current study determined the morphological characteristics of the placenta of Arabian mares. Nine pregnant mares housed at the Cal Poly Pomona W.K. Kellogg Arabian Horse Center were used in the study. Mares were observed during foaling via digital cameras and the placenta was collected immediately after it was delivered. The weights of the placenta and umbilical cord, the number of umbilical cord vessels, and number of twists identified on the umbilical cord were recorded.
The Fidelity of an OYO Fitness Based Program to Improve Physical Functioning in Older Adults

Author(s): Taylor Morris

Faculty Mentor(s): Dr. Zakkoyya Lewis-Trammell & Dr. Lara Killick

The present study investigates the fidelity of an OYO fitness-based program. Partnering with Hillcrest Retirement Community in La Verne, the goal is to assess their senior fitness program. The objective of this research project is to determine if the program is taught as intended as well as measure the physical function of the participants. Eight participants were recruited between the ages of seventy-four to eighty-eight to participate in two weekly forty-five-minute-long fitness sessions for a total of eight weeks. Each participant used an OYO personal gym with different resistance levels to complete a full-body workout. To assess the program's fidelity, the quality of delivery of the program was tested by using an instructor feedback analysis to determine the intended purpose and time analysis to capture the level of participants' engagement. The findings concluded for the time analysis data, an average of 79% of the eight-week workout sessions involved the participants engaged in the activity, 11% involved the participants receiving instruction, and 9% involved the participants engaging in management. The findings concluded for the instructor feedback analysis the largest prevalence of target feedback for all OYO fitness sessions was intended for the whole class. The largest prevalence of purpose feedback for all OYO fitness sessions was intended for behavior. This pilot study will be expanded based on further research and feedback so that improvements and adjustments can be made so that the study can be implemented at future retirement locations.

Effectiveness of Accounting on Businesses and Individuals

Author(s): May Naing

Faculty Mentor(s): Dr. Magdy Farag

Accounting is a valuable tool for every business. It helps businesses reach the superior goal if the transactions and statements are free of material errors. An effective accounting system is vital for the business and the individual because it will provide a fair and sufficient presentation to the investors and stockholders. This is why accountants must ensure that the transactions are recorded, reconciled, and summarized effectively and efficiently.
The Effects of Metformin on the Development of Human Mesenchymal Stem Cells

Author(s): Jamie Ng
Faculty Mentor(s): Dr. Yuanxiang (Ansel) Zhao

Metformin is commonly prescribed for individuals with type 2 diabetes. The objective of this capstone project is to examine the effects of metformin on the development of human mesenchymal stem cells (hMSCs) after short- or long-period of exposure. HMSCs normally exist in tissues such as the adipose tissue and bone marrow where they help maintain tissue homeostasis. These cells can be isolated and expanded in vitro (outside the body), and when given the appropriate stimuli, can differentiate into functionally specialized mature cells such as adipocytes (fat cells) and osteocytes (bone cells). To examine the effects of metformin on hMSCs, cells were cultured continuously without (control) or with metformin (1 µg/mL, 5 µg/mL, and 25 µg/mL) for 25, 43 or 90 days, when cells were assayed and compared among different treatment groups for their ability to proliferate and to differentiate into adipocytes and osteocytes.

Preliminary data indicated that metformin at 1 µg/mL significantly promoted proliferation in comparison to the control regardless of the pretreatment duration, whereas metformin at 5 or 25 µg/mL exhibited inhibitory (25-day pretreatment) or no significant effect (43-day and 90-day). The observed effect however was abolished when metformin treatment was discontinued during the proliferation assay, indicating that pre-exposure to metformin alone did not inherently affect the cells’ proliferation capacity and that metformin itself likely exerted a dosage-dependent effect on hMSCs proliferation. Differentiation assays were carried out for all treatment groups after 25-, 43- or 90-day of treatment, and results are withheld pending completion of all imaging and quantification.

Congressional Internship: Methods U.S. Senators
Gather Constituent Feedback

Author(s): Melane Olmeda
Faculty Mentor(s): Dr. Laureen Hom

Elected officials are voted to serve and represent their constituents in whatever governing body they have been selected to serve in. Constituents at the federal, state and local levels play an essential role in elected officials' political careers. They can shape policies, stances, and whether they can serve.
Congressional Internship: Methods U.S. Senators Gather Constituent Feedback (cont.)

Author(s): Melane Olmeda
Faculty Mentor(s): Dr. Laureen Hom

Since constituents play a vital role in government affairs, this study addresses how elected officials receive opinions and feedback in the United States Senate. Drawing from my internship experience at Senator Feinstein's Los Angeles Office, this research evaluates how elected officials communicate feedback requests to their constituents through various media, including their senate.gov webpages, Twitter, Facebook, and Instagram. My initial finding concluded that among all one hundred United States Senators, they utilized generated email me feature on their Senate.gov page; however, other methods such as mail, phone, and fax were not a staple in every Senate office. Almost all Senators utilize social media platforms, including Twitter, Facebook, and Instagram, except six percent, do not have official Instagram pages. Instagram and Twitter feature only five percent of contact information among them both. Senator Feinstein had diverse outlets for collecting constituent feedback through State and Washington DC mail, phone calls, and fax but lacked social media outreach.

Analyzing Transformer-based AI Agents for Codenames

Author(s): Zhong Ooi
Faculty Mentor(s): Dr. Markus Eger

Codenames, created by Vlaada Chvatil, is a word association game where a player is given 25 words and needs to generate a word and number pair to convey information that connects a subset of the given words to another group of players. This project is an extension of the "Cooperation and Codenames: Understanding Natural Language Processing via Codenames" by Kim et al., which uses Codenames as the medium to test the capabilities of natural language processing models. With a breakthrough in natural language processing through the creation of the transformer, the ability of natural language processing has increased dramatically. This project seeks to use this new technology to build an AI agent to play Codenames and use the medium of Codenames to compare these new agents against the existing baseline. Through this comparison, this project seeks to see if the new technology performs better in single-word sentence similarity when compared to Word2Vec and Glove. The agents will be evaluated based on their performance against AI agents built with and without the same natural language processing model in the backend.
3D Image Classification of the ADNI1 Completed 3Y 1.5T Dataset

Author(s): Jose Ortiz
Faculty Mentor(s): Dr. Honggang Wang

The purpose of this project is to be able to identify whether a subject is cognitively normal (CN), has a mild cognitive impairment (MCI), or has Alzheimer's Disease. It does this by integrating 3D volumetric data from magnetic resonance imaging (MRI) and meta/tabular data to train a joint model using the integrated data in an effort to deliver better predictions. The Alzheimer's Disease Neuroimaging Initiative (ADNI), provides the dataset used in this project, namely the "ADNI1 Completed 3Y 1.5T." The imaging data is loaded into a built 3D convoluted neural network (CNN) which implements the NiBabel library to process the MRI scans. The metadata is prepared using OneHotEncoder and fed into a two-layer neural network with normalization and a ReLU activation. The process is expected to deliver a ROC AUC score of approximately 0.85, leaving room for improvement. Future efforts include using a more robust platform, such as cloud computing to handle training on larger datasets, which would lead to better results.

The Ethical Concerns of Deep Brain Stimulation

Author(s): Catherine Palacios
Faculty Mentor(s): Dr. Claudia Garcia-Des Lauriers

Within the field of medicine, there have been many noteworthy innovations that have helped fulfill the promises of the Hippocratic oath, however, none are quite as extraordinary and complex as Deep Brain Stimulation (DBS). DBS is a surgical treatment that implants electrodes within targeted areas of the brain that when activated by a neuro-pacemaker delivers electric shocks to inhibit neurons in those hyperactive parts of the brain. DBS is primarily used to treat motor disorders like Parkinson's disease, essential tremors, medication-resistant epilepsy, dystonia, etc. Although this treatment is unable to cure these motor-related diseases, the potential to relieve one or several impairing symptoms has proven to be a worthy treatment to pursue. After receiving FDA approval in 2002, DBS is concurrently being used to treat mood disorders and psychiatric disorders such as treatment for refractory depression and obsessive-compulsive disorder respectively.
The Ethical Concerns of Deep Brain Stimulation (cont.)

Author(s): Catherine Palacios

Faculty Mentor(s): Dr. Claudia Garcia-Des Lauriers

Although this treatment provides symptomatic relief it is clear that there are certain side effects and potential risks that may arise and cause more harm than good. Moreover, there is a general ethical concern regarding psychological discontinuity, mental competence, responsibility for action and identity crises in patients who undergo this procedure.

Design of a 3D Printable Robotic Arm for In-Orbit Repairs via CubeSat Platforms

Author(s): Federico Parres

Faculty Mentor(s): Dr. Tarek Elsharhawy

With the increased accessibility to space travel and orbital-based science experiments brought on by private launch providers, the ability to maintain long-term orbital missions via in-situ repair and refueling has become economically viable. While large aerospace companies have the capital to expend hundreds of millions of dollars on missions such as Orbital Express and the Mission Extension Vehicle, at the university level, research into in-orbit repair is lacking, expressly due to high costs and lack of adequate technology. In contrast, additive manufacturing, otherwise known as 3D printing, has been increasing in popularity due to its accessibility in both cost and ease of use. To encourage further research into in-orbit repair, a first-of-its-kind, 3D printable robotic arm has been developed, specifically designed to fit within a 6U CubeSat, which undergraduate and graduate teams at Cal Poly Pomona have experience with and access to. An SLA UV-Resin 3D printer was utilized to manufacture components with geometries impossible to create via traditional manufacturing techniques. In addition, topological optimization was used to ensure the components be as lightweight as possible while remaining strong enough to withstand forces exerted by and on the robotic arm. The aforementioned techniques, combined with inverse-kinematics developed in MATLAB and executed by an Arduino, allow the robotic arm to be compact enough to fold within a 3U CubeSat, while still retaining the strength to move freely and manipulate a payload.
**Synthesis of cis-Aminocyclobutanamide Compounds via Reductive Amination**

**Author(s):** Naomi Puglia  
**Faculty Mentor(s):** Dr. Thomas Osberger

In recent years, molecules containing cyclobutanes have shown potential in the medical field. Due to its strained, four-membered ring structure, it restricts the conformation of the molecule, which is useful in substituting a ligand that changes its conformation upon reacting with the target molecule and prevents isomerization of the molecule. In addition, the efficiency of the binding of two molecules increases because of its rigid structure (1). The purpose of this project was to synthesize stereochemically defined amino-substituted cyclobutyl amides to investigate their potential in drug discovery. Starting from 3-oxocyclobutane, two amides were synthesized by coupling with benzylamine and (2-methylthio)aniline, respectively. Reductive amination on N-benzyl-3oxocyclobutane-1-carboxamide was then investigated, where the goal was to experiment with varying reaction conditions to produce higher yields of our product than previous research done by students. To date, it has proven difficult to get clear results from reductive amination using dibenzylamine. Despite efforts to purify the final product with chromatography or debenzylate the mixture via hydrogenation, inconclusive results were obtained. As an alternate approach with more potential for success, reductive amination was attempted on N-(2-(methylthio)phenyl)-3-oxocyclobutane-1-carboxamide. The reducing agents used on this amide were sodium triacetoxyborohydride and sodium borohydride, to compare which produced a higher yield of the amine. The molecules in this research reacted in unpredictable ways that provided more insight into the field of reductive animation with molecules containing cyclobutanes, which will lead to the contribution of eventual breakthroughs in medicine.

**Secret Formula for Cereal Advertising to Kids**

**Author(s):** Emily Quinton  
**Faculty Mentor(s):** Dr. Frank Bryant

Children see anywhere from 20,000 to 40,000 advertisements each year. Approximately 44% of those ads are food-related, with most being breakfast foods. Companies including Kellogg, General Mills, Post Consumer Brands, and more are all using specific tactics to target children, and it works. The marketing that is utilized is often sitting right in front of the consumer's eyes, yet it still may not be noticed.
**Secret Formula for Cereal Advertising to Kids**  
*(cont.)*

**Author(s):** Emily Quinton  
**Faculty Mentor(s):** Dr. Frank Bryant

There are extremely common patterns between each of these brands and how they market their specific breakfast items to children. These patterns can be seen as part of an almost secret formula to capture children's attention and develop that life-long brand loyalty between the company and the child that is so desired. From the layout of products on the shelf, to children's developmental stages, to simply the angle at which a cartoon mascot's eyes are pointed, all of these are techniques used by these food companies to not only attract a child's attention but also enable that attraction to lead to a sale. Over recent years, certain marketing choices companies have made have become frowned upon. These changes, not only legally, but also within society, have impacted to what degree companies can advertise to children. This has led to new legislation and higher expectations from consumers of social responsibility. How these changes will affect the breakfast industry in the future is still unknown as many of the precious techniques have grown to adapt to fit the new needs of the public today.

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**Senate Bill 8**

**Author(s):** Kathleen Ramirez  
**Faculty Mentor(s):** Dr. Maya Stovall

In 2021, a law known as Senate Bill 8 criminalized the act of abortion in Texas. Unlike other abortion bans, SB 8 permits any person who is not an employee of the state to file a lawsuit against those who receive an abortion and those who aid in the process. Abortions after the 6th week of pregnancy, are prohibited. Although, many people are not aware they are pregnant until after their 6th-week term. The exceptions are narrow and limited to circumstantial health reasons, cases of rape and incest are not included. Those involved in the process of aiding in an abortion face a $10,000 fine, if successful. People of color, low-income people, transgender people, and undocumented immigrants are among the vulnerable groups. This research aims to broaden the lens on the complexities of reproductive policies through which people view abortion and to understand social, political, and health implications for vulnerable groups such as people of color, low-income groups, people who are immigrants, and transgender people through theoretical frameworks.
The Gender Pay Gap: The Experiences of Women Faculty Members at Cal Poly Pomona

Author(s): Dinah Ramirez Avitia
Faculty Mentor(s): Dr. Anjana Narayan

Throughout the history of the United States, there has been a persistent issue called the gender pay gap. Women have made significant strides in terms of social and economic status. But despite this phenomenon, the gender pay gap continues to persist. This has inspired me to dive into this topic to provide an overview of this issue. As a Sociology student, I would like to share the results of this study with other students to inform them about this issue. The purpose of this qualitative research was to examine how female faculty members have experienced gender inequality in the workplace to gain a better understanding of the barriers they have encountered. Through this qualitative research, female faculty members from Cal Poly Pomona were given an outlet to express their concerns regarding the gender pay gap, and challenges related to gender inequality and provide their input concerning strategies that may be effective in addressing this issue. The findings that I discovered challenged what I thought I would find by opening my mind to a new horizon where these successful women are emerging. My findings reveal that the faculty members are aware of the gender inequality that exists in our society. But at the same time, they feel grateful to be in the job position they are in. The results indicate that female higher education attainment will not eliminate the gender pay gap completely. But it is a beneficial factor for women in terms of earning higher incomes. This study will enrich our understanding of the gender pay gap and its impact on female faculty members at Cal Poly Pomona.

Interactive Website for Visualizing CRDTs

Author(s): Zane Reis
Faculty Mentor(s): Dr. Lan Yang

Conflict-free replicated data types are an important component of distributed computing. They allow independent applications to update and maintain information without any form of coordination all while ensuring strong eventual consistency of all replicas. While understanding them may sound daunting, CRDTs lend themselves to being easily understood through hands-on interaction. The hope of creating an interactive website is to lower the barrier of entry to understanding this important concept of distributed computing.
Interactive Website for Visualizing CRDTs (cont.)

Author(s): Zane Reis  
Faculty Mentor(s): Dr. Lan Yang

In addition to being able to interact with CRDTs by creating, visualizing, modifying, and merging CRDTs together, a detailed history provides the ability to step through the simulation operation-by-operation in order to reveal the convergent properties of CRDTs. This project was implemented using the back-end framework Spring Boot. While writing this project, it became apparent that it was not readily obvious how to apply a back-end framework to a largely interactive use case. However, a few ingenious design choices and borrowing from interpreter and compiler design allowed for a relatively elegant solution that meets design requirements with respectable performance characteristics.

Detailed Comparative Analysis for Building a Computer

Author(s): Briana Rittel  
Faculty Mentor(s): Dr. Tim Lin

This project focuses on researching, designing, and building a custom-built personal computer. Designing a cohesive computer system involves extensive research of each component and the interrelations between them. It is also beneficial to understand the overview of the entire system and the important specifications of each component. This project involves deciding and documenting the minimum specifications for each component and comparing competitive product components. The resulting custom high-performance personal computer includes an Intel i9 13900K CPU, EVGA GeForce RTX 3080 10GB GPU, G.Skill Trident Z5 RGB CL 32 6400MHz RAM, ASUS ROG STRIX Z690-E motherboard, Seagate Firecuda 530 2TB boot drive, Samsung 980 Pro 2TB secondary drive, Seasonic Prime 80 Plus Gold 1000W power supply, NZXT Kraken Z73 360mm AIO CPU cooler, and nine Lian Li 120mm UNI Fan SL-Infinity fans, all encased in a Lian Li O11 Dynamic EVO case. Researching and building this computer served as a fascinating project full of connections between core engineering backgrounds and practical technology components. The knowledge gained through researching and building this computer is pertinent for a successful career in the technology industry.
The Relationship Between High Fructose Corn Syrup and Alzheimer's Disease

Author(s): Nayeli Rocha
Faculty Mentor(s): Dr. Glen Kageyama

High Fructose Corn Syrup (HFCS) is a common low-cost sweetener made from corn that is often found in processed foods and soft drinks. HFCS contains both fructose and glucose monomers, just like regular sugar. In the 1980s, HFCS was created because while sugarcane and beet sugar were the preferred sweeteners, they became financially unaffordable. Research studies have illustrated that ingesting HFCS over a longer period of time can increase oxidative stress and inflammation in the brain which are associated characteristics of Alzheimer's Disease (AD). Although there may not be a cure for AD, which is a progressive brain disease caused by the accumulation of tau tangles and Aβ amyloid plaques, there is a way to reduce the risk of developing AD. For instance, eliminating HFCS from a balanced diet of whole foods and exercising regularly is beneficial for a decrease in the development of AD. The purpose of this research poster is to create awareness of the detrimental effects of HFCS and its link to an increase in AD in the United States. Although dietary fructose is by itself dangerous, in the brain, about 20% of the brain glucose is converted endogenously to additional fructose via the sorbitol pathway which also contributes to Alzheimer's neuropathy, diabetic peripheral neuropathy, and retinal degeneration. Continued research in identifying the time frame it takes for HFCS to establish AD is crucial as AD is responsible for 60-80% of all diagnosed dementia cases in the United States.

Correlation of Happiness and the Distinct Forms of Prosocial Behavior

Author(s): Fatima Santoyo Vargas
Faculty Mentor(s): Dr. Rachel M. Baumsteiger

This study explores the extent to which different types of prosocial behavior influence happiness. Prosocial Behavior is a social behavior that benefits other people or society as a whole. According to Nancy et. al., examples include whether students comply with social norms, are emotionally supportive, co-operative (involved in community projects for example), volunteering, donating, and helping (helping someone who is hurt for example).(2014) Traditionally, prosocial behaviors are conceptualized and assessed as a unidimensional construct, but recent research suggests they include various distinct forms, reflecting proactive, reactive, and altruistics. (Nostrand & Ojanen, 2018)
Correlation of Happiness and the Distinct Forms of Prosocial Behavior (cont.)

Author(s): Fatima Santoyo Vargas
Faculty Mentor(s): Dr. Rachel M. Baumsteiger

This study will relate to our contemporary understanding of the different types of prosocial behavior which includes reactive, altruistic, or proactive behavior. According to Nostrand & Ojanen, proactive behavior is prosocial behavior that serves a self benefiting purpose, altruistic behavior meanwhile is in regards to voluntary acts motivated by concern for others, while reactive behavior is in response to a state elicited by another individual. That being said, can the reasoning behind participating in prosocial behavior in a more reactive and altruistic behavior be a significant cause for a student to have better mental health than a student who does not get involved with prosocial behavior or just proactive form of prosocial behavior?

The Study on Advanced Placement Exams on Collegiate Academic Performance

Author(s): Madison Sarmiento
Faculty Mentor(s): Dr. Lan Yang

Throughout high school, students are encouraged to take Advanced Placement (AP) tests in order to receive college credit for certain classes, boost their GPA, and give themselves an edge in college applications. These tests range from humanities to STEM subjects and a good score can indicate that the individual may be successful at their chosen undergraduate campus. However, is this assumption true? In this research project, I studied the correlation between Advanced Placement (AP) test scores and a student's collegiate GPA. My goal was to create a random forest classification algorithm that predicts whether or not a student's GPA is above or below a 3.5 based on their AP test scores. I created a survey that collected the major, GPA, and AP test scores from over a hundred students at Cal Poly Pomona. This real data set was then run through my algorithm where the results were analyzed to see if the sample data could be related across campus. It was concluded that there was a moderate correlation between AP scores and a student's GPA based on the average confidence rate of 55-70%. The results have the potential to elevate the field of education as it can show multiple learning paths to student success.
Effect of Caffeine and Artificial Sweetener on the Growth and Biofilm Formation of Lactobacillus Acidophilus

Author(s): Christina Seneviratne  
Faculty Mentor(s): Dr. Jamie Snyder

Caffeine is an addictive substance that is commonly used as an additive in various food products. Drinking large quantities of caffeine for a long time has serious repercussions on mood, attention span, memory, and processing speed. Artificial sweeteners like Splenda are not recognized by the body. The main ingredient in Splenda is sucralose and sucralose does not get broken down or stored by the body. Lactobacillus acidophilus (LA) is a gram-positive biofilm-forming resident bacteria that is found in the human mouth, intestine, and vagina. The biofilm LA forms on bodily surfaces prevents opportunistic and pathogenic bacterial species from harming hosts. This study’s objective is to examine how artificial sweeteners like Splenda and caffeine affect the growth and biofilm formation of LA. To determine the effect of caffeine and Splenda on LA growth, varying concentrations of caffeine were added to a flat bottom 96-well microtiter plate containing LA stock culture in 100µL of MRS media. After 48 hours of incubation, LA growth, and biofilm formation were observed using a spectrophotometer. Biofilm formation was detected using the crystal violet biofilm assay. The method used to detect LA growth was the spectrometer readings of blanks vs experimental groups. All data represented triplicate runs and the results for this experiment were inconclusive for the effect of caffeine and Splenda on biofilm formation as none of the wells contained biofilm. The results for the bacterial growth however, indicated that both Splenda and caffeine had more LA growth than the control samples.

Poly Pantry Dashboard and Visualization

Author(s): Julia Silva  
Faculty Mentor(s): Dr. Greg Placencia

Poly Pantry is a program at California State Polytechnic University, Pomona that serves students impacted by food insecurity. The program provides access to food, hygiene supplies, and community-based resources. It works as a customer-choice pantry where individuals are free to shop for what they need, in order to meet their needs. The program provides a variety of different products to students that vary according to the number of students participating in the program, their needs, and the season.
**Poly Pantry Dashboard and Visualization (cont.)**

**Author(s):** Julia Silva  
**Faculty Mentor(s):** Dr. Greg Placencia

The high amount of variation causes unpredictability to the program. This project aims to improve the unpredictability of the Poly Pantry Program by using data visualization to better perform the program’s operations. The objectives of this project are to create key performance indicators (KPIs) that can be used to monitor Poly Pantry operations more efficiently and establish a Dashboard that will enable Poly Pantry administrators to monitor their operations KPIs more effectively.

**Zooming in on a Simulated Milky Way-Sagittarius Analog Collision**

**Author(s):** Benjamin Snyder  
**Faculty Mentor(s):** Dr. Coral Wheeler

Dwarf galaxies - low-mass galaxies distinct from star clusters by the presence of a dark matter halo - are some of the most intriguing objects in our universe. Interactions between larger host galaxies such as our Milky Way and their dwarf galaxy satellites are thought to play a key role in the evolution of the satellites - affecting everything from stellar structure to star formation. However, simulations of these collisions have thus far been either too low in resolution to study the impact on the dwarf in sufficient detail, or have been idealized - lacking the important effects of large-scale structure possible only in a cosmological simulation. By performing particle-splitting on a FIRE (Feedback In Realistic Environments) cosmological zoom-in simulation of a Milky Way-Sagittarius analog collision, we can achieve higher resolution locally around the collision site, and study in more detail than ever before what effects mergers like these might have on the dwarf galaxy and its own "ultra-faint" satellite galaxies. This project involves developing a particle counting algorithm that determines how many stars, gas, and dark matter particles from the host galaxy come within a certain radius of the satellite. We present the number of interacting particles for various threshold radii in a FIRE dwarf-dwarf merger simulation as a test case for our particle counting algorithm, as well as initial results for a Milky Way-Sagittarius analog merger. Future work will include determining how far we can feasibly increase the collision-site resolution, and identifying the appropriate simulation parameters to run the simulation with particle-splitting.
Gnosticism and Orthodox Christianity

Author(s): Grant Srun
Faculty Mentor(s): Dr. Dennis Quinn

Understanding Gnosticism guides our understanding of Christianity and the role it plays in the modern world. Gnosticism is often used as an umbrella term to describe a wide variety of ideologies that arose around the first six centuries of the common era. They are classified into specific categories based on their content and the author that wrote them. This is not dissimilar to how taxonomy is used in biology. Within taxonomy, there are many organisms that are not easily categorized, are miscategorized or are placed into catch-all categories. The same can be said about Gnosticism. Many of the cosmological beliefs regarding Gnosticism vary greatly within different Gnostic schools of thought. In this project, I applied my understanding of biological taxonomy to better understand how Gnostic traditions can be differentiated. Furthermore, I applied these concepts to comprehend how beliefs within different cultures and religions have influenced one another and evolved into the beliefs of modern Orthodox Christianity.

Simulating Traffic Volumes of Different Interchange Designs Using VISSIM and Assessing Interchange Safety Using SSAM

Author(s): Yoshihito Takagi
Faculty Mentor(s): Dr. Wen Cheng

Highway Interchanges are utilized by millions of drivers every day and can significantly affect the quality of life for those who use them every day. These interchanges must balance the high volume of vehicles with the necessary safety standards to make sure all users can have a safe and efficient journey to their destination. This author seeks to understand the benefits of different interchange designs using computer simulations and identifying conflict points. There are two interchanges being simulated, both connected to Interstate 215 in San Bernardino County. The first interchange utilizes a partial cloverleaf design while the second interchange uses a single exit design. Simulating the traffic on both interchanges will illuminate the benefits and drawbacks of each design.
The Bioethical Implications of Psychedelic Drug Development

Author(s): Leonardo Tavormina
Faculty Mentor(s): Dr. Claudia Garcia-Des Lauriers

Pschedelics are a type of substance that has the potential to greatly alter perception, affect cognitive functions, and potentially cause hallucinations if taken in large enough quantities. Humans have been using psychedelics for thousands of years for a variety of spiritual, cultural, and recreational purposes. Although many societies knew of and used psychedelics, Europeans remained largely ignorant of their existence until the 1900s. In the late 1950s and early 1960s, more people in the West became aware of LSD and psilocybin. The substances became more readily available which allowed more individuals to experience the drug themselves and form their own opinions about the nature of the psychedelics. Hallucinogens became a key part of the 1960s counterculture movement in the United States and were associated with other controversial cultural changes occurring during this time such as the rise of the hippie movement and anti-war sentiment. The federal government began to criminalize the consumption and distribution of psychedelic substances because officials believed that psychedelics and the countercultural movement associated with them as a threat to the establishment and its authority. This had the additional consequence of causing funding for related research to be halted. Much of this research demonstrated that psychedelics may have the potential to provide health benefits to those suffering from mental illnesses such as addiction and depression. The changing culture in the United States may provide an opportunity for a new generation of scientists to resume psychedelic research and potentially discover new, effective ways to treat mental illness.

The Measured Effect of Habitat Type on Otolith Surface Area and Roundness: Bottom-Feeding Species reveal Morphometric Influence

Author(s): James Thompson
Faculty Mentor(s): Dr. Jen Bright, Won Choi

Current knowledge of Teleost otoliths warrants its own sub-field within ichthyological study, primarily centered around the contributing factors to various morphometric traits. It is currently well-documented that these structures accrue slowly over time, keeping a detailed record of the fish's life history, and are shaped by a plethora of factors such as salinity, biomineralization, growth rate, and species.
The Measured Effect of Habitat Type on Otolith Surface Area and Roundness: Bottom-Feeding Species reveal Morphometric Influence

Author(s): James Thompson
Faculty Mentor(s): Dr. Jen Bright, Won Choi

Otolithology is a continuously growing subfield within ichthyology, however previous research primarily concentrated on age-dating, metabolic and allometric processes, and geochemical analysis, while largely neglecting habitual factors and examining interhabital relationships in otolith morphometrics. I use morphometric data of 293 sagittal otoliths, representing 21 different species and four habitat types, from ICM Barcelona's AFORO database to investigate habitual variation in the related morphometric characteristics of otolith surface area and roundness. Contrary to what has been previously believed, otoliths from seafloor-dwelling demersal and bathydemersal species were shown to be rounder and have greater surface area compared to their pelagic counterparts. My findings indicate that habitual factors serve a significant role in shaping otolith morphology, with allometry more greatly affecting the surface area as opposed to roundness. The role and extent of specific factors influencing each habitat type that contribute to otolith morphology are not well-understood and future research should focus on how the accretionary process and biological function of otoliths are collectively altered by the fish's habitat and surroundings, which could have implications in combating climate change and managing fish populations.

Healthcare Disparities for Those That are 65 Years and Older

Author(s): Brandon Valadez
Faculty Mentor(s): Dr. Jamie Snyder

For those that are 65 years of age and older, they are unfortunately experiencing disparities in healthcare. Overall, Medicare is a good solution to provide medical coverage for those that no longer are able to receive it through their employer. Although, the changes that have been enacted have not been at the same pace as the rising population of older individuals in the United States. This age group can have several barriers to accessing healthcare, such as finding locations where their insurance is accepted.
Healthcare Disparities for Those That are 65 Years and Older (cont.)

Author(s): Brandon Valadez
Faculty Mentor(s): Dr. Jamie Snyder

In addition, providers that do accept Medicare may have to see more patients than their counterparts that are private or cash only due to the stringent requirements in documentation as well as lower reimbursement rates. This can, in turn, reduce the quality of care during a visit as it may be shortened. Furthermore, the shortage of geriatric providers is only adding to the disparity. If there are not enough providers that have the special training tailored to this population, the accessibility of quality care is diminished. The U.S. can help bridge the gap between those that are 65 years and older and quality healthcare by reassessing reimbursement rates between Medicare and providers as well as recruiting more recently graduated physicians to the specialty of Geriatric Medicine. If providers can be paid as much as their more lucrative counterparts, it can increase the number of providers that tailor to the older population, reducing the disparities that exist for them.

Making Sure Men Graduate: The Impact of Project SUCCESS on its Members

Author(s): Cesar Valdovinos
Faculty Mentor(s): Dr. Hyeryung Hwang & Dr. Rogelio Contreras

Men of color have historically been a vulnerable group in the higher education system. Many drop out when they feel socially isolated in college, feel that they cannot perform academically, or feel that they cannot change the education system to fit their needs. To combat this, Cal Poly Pomona has formed the educational opportunity program Project SUCCESS (PS) to help students feel prepared academically, professionally, and emotionally for the rigors of university life. They accomplish this through peer mentoring, group discussions, free tutoring, community engagement, and cultural/personal development workshops. Through this, the program hopes to foster a new generation of open minded and motivated men who'll further open the gates of academia for future men of color while becoming leaders in communities outside of the university. The main goal of this project is to show how PS has cultivated an environment of scholarly, professional, and cultural prosperity for its members. Excerpts from interviews with alumni and survey data from current students gives clues on what PS has done right and on what PS could do better.
Making Sure Men Graduate: The Impact of Project SUCCESS on Members (cont.)

Author(s): Cesar Valdovinos
Faculty Mentor(s): Dr. Hyeryung Hwang & Dr. Rogelio Contreras

The information gleamed from this analysis shows that PS has made a difference in the lives of members, increasing their confidence in their academic, professional, and social lives at CPP and beyond.

Collegiate Athletics and Perceptions of Depression

Author(s): Mandi Villanueva
Faculty Mentor(s): Dr. Jose Luis Collazo Jr.

This study examines, through an online survey, how the level of stress of involvement in collegiate athletics affects the collegiate athletes attending California State Polytechnic University, Pomona, and their perceptions of depression regarding their mental health. Addressing the number of stressors and perceptions of depression opens opportunities for researchers to gain an understanding of the potential needs of collegiate athletes to ensure overall wellbeing. This study addresses three research questions: 1) How does the level of stress of involvement in collegiate athletics affect the ways that athletes perceive their mental health in terms of anxiety?, 2) How does the level involvement of resources (university, athletic, family, etc.) affect the ways that athletes perceive their mental health in terms of depression? and 3) How does the level of stress of involvement in collegiate athletics affect the ways that female athletes perceive their mental health in terms of depression in comparison to non-female athletes? Data was collected from a sample of collegiate athletes attending Cal Poly Pomona during the Fall 2022 semester. Multiple regression was used to estimate the effect of the independent variables on the dependent variable while holding other variables constant (Allison 1999). Findings show most significantly an increase in the stressors of involvement in a collegiate athlete's life will increase the likelihood of an athlete perceiving feelings of depression. Using these results, university and other support systems may better connect with collegiate athletes by extending resources and outreach, improving their overall wellbeing.
Misinformation Correction in Preschoolers: Exploring the Backfire Effect to Unlicensed Negation

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Today, information can be accessed from anywhere and at any place. The creation of interconnected media outlets has allowed information to spread at a rapid pace, and as a result, the likelihood of being exposed to misinformation is high. Previous research has suggested that beliefs in false information persist after being corrected is what’s known as the continued influence effect. The consequences of this phenomenon in young children are relatively unstudied. The present study examines whether the presence of misinformation influences the effects of negative corrections on preschool-aged children. We recruited 3- to 6-year-old children from in-person preschools and online. Children individually watched a brief slideshow depicting the contents of eight colorful boxes. On each trial, one of the boxes was verbally presented by the teacher character, a child character made a false statement (e.g., "There are marbles in the box") or no statement regarding the contents of the box, and then a second child character provided a correction (e.g., "Actually, there are not marbles in the box") or not. After each sequence, the child was asked what they thought was inside the box. We expect that when children are exposed to misinformation, negative corrections mentions of the target item relative to no correction. However, when not exposed to misinformation, negative corrections are expected to increase mentions of the target item relative to no correction. These results would demonstrate a backfire effect in which a corrections can potentially increase belief in misinformation without prior exposure, particularly in young children.