

# CSU Monterey Bay's 8th Annual Summer Research Symposium

## Research Abstracts

Abstracts listed in presentation order

### Special Presentations

#### Recovery of Black Abalone Populations in Monterey County

Leta Dawson<sup>1</sup>, Alicia Del Toro<sup>1</sup>, Dr. Fiorenza Micheli<sup>2</sup>, & Dr. Alison Haupt<sup>1</sup>

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Effective management and recovery of threatened species requires long-term observations of population dynamics. Human and environmental impacts such as predator-prey interactions, overexploitation, and climate change make population recovery of threatened species more difficult. Black abalone (*Haliotis cracherodii*) are a listed endangered species that have been affected by overexploitation, disease, loss of habitat, and climate change. Abalone are important herbivores within the intertidal and subtidal regions that compete with urchins for habitat and food. As a result of the abalone population decline the fishery was closed in the 1990's and in 2005 CA Fish and Wildlife created the Abalone Recovery and Management Plan (ARMP) that set criteria for the recovery of Black Abalone. A study in 2008 found that abalone densities were stable and that areas with longer duration of protection saw more larger individuals. Fifteen years later we returned to these sites to see if populations and individual species sizes have met any of the criteria set by the ARMP. Our preliminary results are similar to the 2008 study and suggest that population densities remain stable, but still do not meet the ARMP criteria. Observational studies like this one are important in evaluating the effectiveness of management plans for species like the black abalone.

#### Reframing Environmental Education to Include Asian Americans

Wendy Feng<sup>1</sup> & Dr. Phuong Nguyen<sup>2</sup>

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The environmental movement has historically marginalized Asian Americans from conversations of environmental justice even as this fast-growing demographic faces serious challenges. This project will look at the role of education in addressing these shortcomings, specifically the role of education in how to 1) raise environmental awareness; 2) highlight the work that Asian American environmental justice organizations have done, and 3) provide educational workshops to schools and the public. Asian Americans are one of the fastest-growing racial groups in the United States and, while there is a body of academic literature on environmental disparities affecting Asian Americans, less is known about its reach to the masses. This research is critical to ensure that young Asian Americans understand the impact of environmental issues to be better equipped to advocate for their community as leaders.

#### Exploring COVID-19 Vaccine Hesitancy in Seaside, CA, in College-aged Black and Latinx Communities

Amelia Parker<sup>1</sup> & Dr. Vanessa Lopez-Littleton<sup>2</sup>

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SARS-COV-2 (the virus responsible for the COVID-19 global pandemic) continues to place Americans at risk of [severe illness and death](#). The challenge is not simply access to the vaccine but [vaccine hesitancy](#) and [misinformation](#) also play a part. The overwhelming push of misinformation has led to much lower vaccination rates and more direct action needs to be taken to educate our communities. In collaboration with the Seaside Action team, our research team is working to engage local communities in developing strategies to provide information, access, and support to those who are vaccine-hesitant. In the upcoming months, we will focus our efforts on examining vaccine hesitancy among college-age students in a rural agricultural community. We will

examine barriers (e.g., access, misinformation) and facilitators (e.g., self-motivation, requirements for school/work) involved in the uptake of public health information by young adults aged 20-30.

## **The Novel Application of Virtual Reality: Quantifying Patterns in the Distribution of Temperate Kelp Forest Fishes through VR and Traditional Underwater Visual Census**

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Traditional underwater visual census (UVC), where a SCUBA diver records data on a waterproof slate while swimming transects, is established for studying kelp forest fishes. UVC techniques immerse the diver in the environment studied, but constrain the output to what a diver sees during an initial pass through an area. The simultaneous collection of undersea imagery complements the UVC approach by allowing for the careful review of video across multiple viewings. Underwater housings capable of filming in 360° makes the potential coupling of video and UVC more compelling. I have dived to collect imagery in Marine Protected Areas (MPAs) ranging from San Carlos Beach, North Monastery Beach, and South Monastery Beach. I have watched over 500 minutes of imagery that include variation in topographic relief, water depth, and density of kelp forests. Using a frontal hemisphere POV to mimic a diver's perspective, I identified over 7,000 individual fish. This work will be expanded to include a direct comparison between VR and UVC and should offer insights not only into the ecology of kelp forest fishes, but also into the use of VR to uniquely introduce the marine environment to people who do not have the opportunity to experience it.

## **The Issue with Film School**

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Within the entertainment industry, education is a complicated subject. Plenty of people will say that "Film school isn't worth it" but, with job's insisting on degrees related to entertainment, alternate options are scarce. Conversations around the benefit of film degrees tend to have a similar consensus: experience outways academics. Questions then become, how are film students supposed to gain both experience and an education? By delving deeper into the Catch 22 of film school, we see how institutions train our future storytellers to impact the flow of Hollywood and the changes we must make to keep the industry authentic. The goal was to take a combination of personal, peer, and scholarly observation and experience to better understand how the rising film community is being prepared for success. These observations lead to theories around reasonings for the structures seen today and how ideally, programs should be restructured to improve students' chances for success, whilst building upon important storytelling, organizational, and hands on skills. This topic of concern is currently evolving, but by looking into sociological theories and connecting them to the industry, film programs can be more beneficially structured for future film students and the entertainment industry as a whole.

## **Session 1: Department of Biology & Chemistry**

### **Bioremediation of Pesticides: Applying Molecular Genomic Techniques to Uncover Efficient, Eco-friendly Methods of Cleaning Agricultural Waste**

**Avalon Surratt**<sup>1</sup> & Dr. Nataniel Jue<sup>1,2</sup>

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<sup>2</sup>Leafy Greens Cal Grant

Bioremediation, the process of microorganisms breaking down pollutants, overcomes the limitations of traditional pollution remedies. It is less costly, more efficient, and environmentally-friendly since it relies on naturally occurring organic conversions as opposed to induced physicochemical reactions. My research focuses on pinpointing which genes of each bioremediating bacterium enable metabolization of pesticide-sourced carbon. The first step I took to discover the functional genes was extracting DNA from bacteria that had been isolated in 2019 from the bioreactor, a 30x4x3 foot plywood box containing woodchips and water partitioned from Salinas fields along Nashua Road. I used a DNAeasy Power Soil Kit to complete

extractions for nine strains and assessed DNA concentration and fragment size via a Qubit 4 Fluorometer and Advanced Analytical Fragment Analyzer. All concentrations were above 35 microliters per nanogram and all fragment sizes were above 10,000 picometers. I could therefore proceed with NBD104 LSK-SQK109 Genomic DNA Native Barcoding and build a library for sequencing. After building the library I conducted Illumina sequencing and successfully generated a sequence. Tn-seq will be conducted in later experiments to obtain a DNA map of functional genes. This data combined can be developed into revolutionary technology for cleaning toxic agricultural waste.

### **Effect of Different Mesh Materials on the Harvesting of Fog Water**

**Rimki Barua**<sup>1</sup> & Dr. Daniel M. Fernandez<sup>2</sup>

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Fog water can become an important source of water in the future. The method to collect fog water is by using a Standard fog collector (SFC), a rectangular-shaped mesh with an area of 1.00 m<sup>2</sup>. We also use two FM-120's, these are devices that measure the sizes and number of fog particles in the air at a given time. When the fog hits the mesh of the SFC, the fog water droplets get trapped in the mesh and eventually drip down to a trough and rain gauge. For this research, we try to find the most effective mesh for collecting fog water. This would reduce the cost and increase the efficiency of harvesting fog water. We compare the German mesh and the Raschel mesh. To get to the results the raw data was first converted from timed individual tips on the rain gauge into 10-minute intervals data on R studio. I then used this data in excel to calculate the efficiencies of the meshes. Histograms generated to examine the relationship between wind speed and fog efficiencies revealed that the German mesh has a greater collection efficiency. Potential future studies could examine additional types of materials used for the mesh and how they impact the efficiencies.

### **Potential Biofuel Solutions Through the Isolation and Characterization of Novel Catalase Enzymes from Cow Rumen**

**Robert Hays**<sup>1</sup> & Aparna Sreenivasan<sup>1,2</sup>

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Cellulosic biofuels are the major source of renewable energy believed to combat climate change. This is because the bioethanol derived is the only renewable energy source close to the price of oil per unit of energy. The major obstacle of decreasing the cost of bioethanol production is through the difficulty of degrading the hemicellulose and lignin barrier surrounding cellulose. Microbes located within cow rumen are one of the only organisms capable of producing enzymes that can degrade the cellulosic barrier. Although the enzymatic genome has been identified, the genes have not yet been completely mapped nor do we know the functions of these enzymes. The limitation of discovering these enzymes is the number of microbes available within cow rumen, and the amount of genetic data needed to sequence through the genome. To close this gap in knowledge, we will be analyzing a novel enzyme within the genome to test its activity with cellulose. We will do this through the purification of the genomic DNA, amplify the novel catalase gene, clone it into an expression vector, express the protein, and test the activity of the catalase enzyme.

### **Observing Beaked Whale Foraging Behavior with Acoustic Localization**

**Alma M. Leon**<sup>1</sup>, Eric Snyder<sup>2</sup>, Marie Roch<sup>3</sup>, Simone Baumann-Pickering<sup>2</sup>, John Hildebrand<sup>2</sup>, Dr. Sean Wiggins<sup>2</sup>, Dr. Bruce Cornuelle<sup>2</sup>, & Dr. Kait Fraiser<sup>2</sup>

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Cuvier's beaked whales (*Ziphius cavirostris*) are a deep-diving, cosmopolitan species, which are regularly found in underwater acoustic recordings. Since it has been difficult to study them visually, their contribution to the ocean ecosystem is still not fully understood. By localizing *Ziphius cavirostris* echolocation clicks, we can gain insight into their behavior and measure signal characteristics necessary for population density and distribution estimates. Two arrays of four hydrophones were deployed offshore of southern California to collect acoustic data over a four-month period. Echolocation clicks were detected using either a trained neural

network or a high-pass filter and energy threshold. The performance of both the neural network and energy threshold detectors were compared to see which detector would be most effective in localization. Once echolocation clicks were detected, the time-difference of arrival (TDOA) was calculated for each detection on both arrays. A MATLAB interface called *Where's Whaledo* was used to associate echolocation clicks from the same individual whale on both hydrophone arrays and recreate the whale's path in three dimensions. By analyzing the tracks that were formed, we can observe foraging behavior and calculate the necessary signal characteristics to get population density estimations.

### **Assessing the Sensitivity of Indigenous *Pythium* spp. from the Salinas Valley to the Fungicide Mefenoxam**

**Cassandra Tice**<sup>1</sup>, Karla Jasso<sup>1</sup>, Richard Smith<sup>2</sup>, & Dr. Jose Pablo Dundore-Arias<sup>1</sup>

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Pythium wilt of lettuce, primarily caused by the oomycete *Pythium uncinulatum*, has emerged as a major soilborne disease of lettuce in the Salinas Valley, California, with some growers reporting up to 100% crop loss in 2020. In most cases, chemical control is utilized as the sole strategy to control Pythium wilt, with Ridomil Gold (mefenoxam) used as the primary fungicide due to the limited number of commercial products registered for use on leafy greens. Although mefenoxam-insensitive species of *Pythium* have been reported in many crops across the US, this information is lacking for *Pythium* species associated with lettuce. In this experiment, we tested *Pythium* spp. isolates (n=116) obtained from infected lettuce roots for mefenoxam-sensitivity at various concentrations (0, 1, 10 and 100 ug/mL) in *in-vitro* assays by measuring mycelial radial growth over time. Results determined that mefenoxam significantly reduced the growth of the majority of isolates (73.3%), although a small number (26.7%) were insensitive or intermediately sensitive to mefenoxam. Additionally, we observed that the mefenoxam sensitivity of individual isolates was significantly reduced over time. Overall, this research provides novel information and contributes to improve management of Pythium wilt.

### **Effects of Hypoxia on the Physiology of Juvenile Flatfishes**

**Jade Betancourt**<sup>1</sup>, Juliana Cornett<sup>2,3</sup>, & Dr. Cheryl Logan<sup>2</sup>

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Estuaries are crucial in contributing to various functions of ecosystems, including acting as a natural filter for streams and rivers entering the ocean and sheltering a variety of species. Elkhorn Slough, an estuary located in Northern California is a critical nursery habitat for juvenile flatfish. Climate change and eutrophication (excess nutrients) have caused fluctuations in dissolved oxygen (DO) levels, resulting in lowered oxygen levels known as hypoxia. These conditions unfavorably affect the behavior and physiology of flatfish, reducing the species richness and suitable nursery fish habitat. Fortunately, flatfish species have expressed a high tolerance to hypoxia implicating there are mechanisms within the tissue of flatfish used to survive in their environment. Respirometry will be used to determine changes in metabolic rate under varying oxygen levels, from normal to severely low oxygen levels. Ventilation rates will be determined by recording the respirometry trials and counting the number of respirations. To locate the equipped biochemical mechanisms in flatfish which allow the species to survive despite living in hypoxic conditions, blood and tissue samples will be obtained. The data will assist in understanding the impact hypoxia has in the Elkhorn Slough habitat and can be applied to the future survival of other ecosystems.

## **Session 2: Department of Computer Science; Department of Mathematics**

### **Computational Complexity and its Relationship to Energy Efficiency**

**Daniel Jacoby**<sup>1</sup>, Aaron Helman<sup>2</sup>, & Dr. Joshua Gross<sup>1</sup>

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As Computer Science students, we pride ourselves on making efficient code, but we also have no way of measuring the energy our code actually uses so we previously only measured the time it took to execute. But

now, we can! The goal for our project is to build a model to accurately correlate the amount of work a CPU has done with how much energy the CPU has used. We are wanting to specifically find out how much energy a specific algorithm uses during its execution. To achieve this goal we are using a Raspberry Pi, an external temperature sensor, and an external power meter. This allows us to get the CPU temperature, the room temperature, as well as the volts and amps coming into the Raspberry Pi. We developed software to track the energy, heat, and time used for several different sorting algorithms that are typical of student assignments. Using our system and software, we are able to generate graphs and data that shows a positive correlation between energy consumption and the temperature of the CPU and that different algorithms can consume different amounts of energy.

## **Gauging Student Interest: Computer Science Interest Survey Results**

**Keyoni McNair<sup>1</sup>** & Dr. Joshua Gross<sup>1</sup>

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Many groups remain underrepresented in computer science. Understanding our current computer science student population can help in recruiting students in previously overlooked places. We are exploring students' personal interest in various topics. We created and conducted a Student Interest Survey that looked at student interest in three previously studied topics that were seen as significant to computer science success and two topics we believed were not significant.. The topic categories were Mathematics, Writing, Creativity, Athletics, and Public Performance. The survey consisted of different activities in each topic, and the recipient would choose how much they would like to do each activity. At the end of the survey, questions regarding success and intent to study in computer science were asked. The survey was distributed to 68 students in introductory computer science classes. Students in these classes were ambivalent about both mathematics and writing, although we are not yet able to compare them to other groups of students. We saw a dramatically higher interest in Creativity than in Mathematics or Writing. Surprisingly, we saw very high interest in Athletics, which we did not anticipate. Our next steps include a new survey iteration, survey validation, and distribution to different populations.

## **EEG Data with Time vs Frequency Domain**

**Michael Haidar<sup>1</sup>**, Federico Rubino<sup>1</sup>, Daniel Wadell<sup>1</sup>, and Dr. Glenn Bruns<sup>1</sup>

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Machine learning and deep learning are used in the analysis of electroencephalograms (EEG). EEG data represents neuronal activity recorded from the scalp and holds information about cognitive processes. EEG data is typically evaluated within two domains; time or frequency. Deep learning has the advantage of requiring less processing and feature engineering compared to traditional machine learning methods. Our presentation explores the differences between time and frequency domains for the purpose of EEG classification via deep learning.

## **African American Students and their Mathematics College Preparatory Readiness**

**Cobey L. Davis<sup>1</sup>**, Dr. Vanessa Lopez<sup>2</sup>, & Dr. Dennis Kombe<sup>3</sup>

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When the discussion of Mathematics comes to fruition, some enjoy the wonders of the knowledge discovered while others ignore the prominent foundations of subject matter. As we observe the changes and growth in Mathematics, we see a decrease in academic expertise and support for students of color, especially African American Students. African American Students tend to be least inclined to learning the material and more prone to finish and leave. That said, as Mathematics is a significant portion of college preparatory readiness, it's essential to see how African American Students are learning and interpreting Mathematics as they're preparing for a rigorous college curriculum. This study compares African American Students from the Monterey Peninsula Unified School District (MPUSD) and CSUMB, analyzing their readiness in their last year of high school mathematics to their first year of College Mathematics through college preparatory courses. Some expected results may include Observations of African American students' adjustments to the Mathematics curriculum, Preferences of Classroom Structures, and the Regulation of students' support systems.

## Session 3: Psychology Department

### **Cannabis Use and Perceptions Among College Students in California**

Selina Espinoza<sup>1</sup>, Claudia Rocha<sup>1</sup>, Melissa-Ann Lagunas<sup>1</sup>, Courtney Crouse<sup>1</sup>, & Dr. Jennifer L. Lovell<sup>1</sup>

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The majority of the U.S. has medicinal and/or recreational access to cannabis. Using a concurrent mixed-methods survey design, researchers explored cannabis use and perceptions among college students. Of the 203 participants, 61.1% identified as female ( $n = 124$ ) and 46.8% identified as Latinx/Hispanic ( $n = 95$ ). The anonymous self-report survey included demographic questions and scales measuring cannabis use disorder, cannabis consumption, and well-being. Participants answered open-ended questions about the positive, negative, and spiritual impact/s of cannabis on their life and health, and how the COVID-19 pandemic impacted their cannabis use. A paired-sample t-test was used to determine the percent of relief students experienced when using cannabis versus non-cannabis treatments. Students found more relief using cannabis as a treatment ( $M = 5.23$ ,  $SD = 3.30$ ) compared to non-cannabis treatments ( $M = 3.53$ ,  $SD = 2.94$ ),  $t(104) = 4.36$ ,  $p < .001$ ,  $d = .15$ . Researchers used inductive content analysis for qualitative data. The most frequent themes for therapeutic benefits of cannabis included *relaxation/stress reduction* (55%,  $n = 81$ ) and *anxiety symptom/s reduction* (14%,  $n = 21$ ). Results are discussed in the context of how college students' experiences with cannabis inform university professionals about therapeutic uses of cannabis.

### **Mental Health Education in Black Communities**

Brooklyn Greene<sup>1</sup> & Dr. Vanessa Lopez<sup>2</sup>

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Abstract Forthcoming

### **Examining Women's Empowerment in India: Takeaways from Conducting Research and Data Collection Abroad**

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The active use of social media has shown to enhance skills and help with making well-informed decisions. This study focuses on how cultural differences can impact social media use and its effect on empowerment, specifically in India. Indian women that use social media to fulfil their cognitive needs will be better able to exercise the freedom to organize collective action and develop relationships, which in turn can shift their role in their household and result in increased educational spending. This in-depth case study examines the research process taken to collect data in India. Identify the key factors and considerations in the process of planning and executing a research design administered by field administrators and identify how to conduct cross-cultural research in a foreign country. We discuss the importance of setting a timeline and how to acquire participants. Acquiring participants can be difficult in a foreign country. Working with another researcher based in the target country, and providing adequate incentives to the participants can increase success. Part of conducting research involves research practicalities and this case study explores practicalities related to the following areas: 1) preparing for data collection, 2) cultural differences and 3) language barriers.

### **Decreased Physical Activity During the COVID-19 Pandemic Associates with Increased Stress and Anxiety and Impoverished Academic Performance in Undergraduate Students**

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<sup>2</sup>Undergraduate Research Opportunities Center - Big Data to Knowledge Program (BD2K), California State University, Monterey Bay, CA

Undergraduate students from underrepresented communities are known to experience high stress and anxiety levels with potential implications for academic performance. Physical activity can be a determinant factor to reduce stress and anxiety and to improve mental health. Importantly, studies have shown that physical activity has been reduced during the COVID-19 pandemic, thus possibly exacerbating stress and anxiety levels. It is currently unknown whether the COVID-19 pandemic has disproportionately affected physical activity levels in healthy undergraduate students from underrepresented communities and whether this effect is linked to mental health and academic performance. Here, we examine the impact of the COVID-19 pandemic on levels of physical activity, stress and anxiety in underrepresented undergraduate students via online self-reported questionnaires and link these effects to academic performance. Here, we surveyed 237 students via the California State University, Monterey Bay SONA Systems. We observed that the COVID-19 pandemic has reduced physical activity levels and is linked to increased mental health, resulting in decreased academic performance. These results support our hypothesis that physical activity is linked to stress and anxiety, and that encouraging behavioral interventions that increase exercise to promote mental health and improve academic performance in underrepresented undergraduate students is necessary during the COVID-19 pandemic.

### **Exploring The Neural Processes of Perceptual Decision Making**

**Spencer H. Winter<sup>1</sup>**, Dr. Adam Goldring<sup>2</sup>, & Dr. Timothy Hanks<sup>2</sup>

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Decision making affects the daily lives of living beings and is a defining feature of cognitive flexibility. However, the underlying neural mechanisms of decision making are still not fully understood. In order to determine those mechanisms, two portions of the brain are examined; the frontal orienting field (FOF) and the anterior dorsal striatum (ADS). Both of these brain regions have been previously implicated in the decision-making process in rodents. This study hypothesizes that the ADS plays a role in determining how long evidence that is related to perceptual decision making is retained before being discarded, while the FOF plays a role in the decision selection itself based on the information routed via the ADS. In order to map neural responses, rats perform novel auditory change detection tasks to examine the timescale of evidence accumulation. Their neural responses are recorded using Neuropixels probes, which allow simultaneous recording of action potentials from 384 of a total 960 selectable electrodes. This research is part of a years-long effort to more deeply understand the complex functions of the brain with regards to decision making, which has clinical implications for new mental health treatments and avoiding side effects of treatments that influence decision making.

### **Session 4: Department of Marine Science**

#### **Sea Star Species Along the Monterey Peninsula**

**Paige J. Siegel<sup>1</sup>** & Dr. Alison Haupt<sup>1</sup>

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Understanding the populations of different species is a crucial component of understanding ecosystems and creating policies to conserve these ecosystems. Sea stars are an invertebrate within the intertidal that have had declining populations in the past due to diseases, such as sea star wasting syndrome, and thus have caused imbalances within the ecosystem. Sea stars, specifically *Pisaster ochraceus*, are especially essential as they are keystone species that prey on mussels, ultimately enhancing diversity within the intertidal. The data in this study is preliminary research to gain a general understanding as to what species of sea stars inhabit specific areas along the Monterey peninsula: no conclusions will directly be drawn from the data produced. This data will serve as a baseline to help answer future questions such as whether or not sea stars have been recovering from sea star wasting syndrome and why certain sites along the peninsula are more favorable for this recovery. Conducting this study using data collection techniques with transects and quadrats provides an understanding of what techniques are most effective when attempting to understand sea star populations.

## **Everyone's Harvest Research Team: Summer Progress**

**Stephanie Stephens**<sup>1</sup> & Dr. Vanessa Lopez-Littleton<sup>2</sup>

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Abstract Forthcoming

## **The Role of Symbiont Community on Galapagos Coral Thermal Tolerance**

**Paulina Cadena**<sup>1</sup>, Dr. Cheryl Logan<sup>2</sup>, Dr. Margarita Brandt<sup>3</sup>, Caroline Rodriguez<sup>2,4</sup>

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Coral reefs are known for their touristic and economic value, and remain one of the most biodiverse ecosystems on Earth. However, as water temperatures rise due to global warming, coral around the world are experiencing coral bleaching. This process occurs when colorful photosynthetic symbionts that provide corals with food are expelled from the coral itself, leaving only the white coral skeleton. Corals in the Eastern Tropical Pacific, including Galapagos corals, have a long bleaching history suggesting that existing coral communities may represent thermally tolerant survivors, to both heat and cold stress. To understand the mechanisms underlying thermal tolerance, we will quantify coral endosymbiont communities given their role in setting coral thermal tolerance. We will extract DNA from two common symbiont species found on Pocilloporid corals spanning a wide thermal gradient across the Galapagos archipelago. Quantitative PCR will be utilized to determine relative amounts of *Cladicopium* and *Durisdinium* and an ANOVA will be used to determine if symbiont type varies with cold and/or heat tolerance. We expect that coral with more *Durisdinium* will have higher heat tolerance. Understanding mechanisms underlying thermal tolerance may explain the persistence of coral communities in regions with a long history of coral bleaching.

## **Planet of the Urchins: Changes in Density of Purple Sea Urchins, *Strongylocentrotus purpuratus*, Over Time in the Monterey Bay Intertidal**

**Kaitlin Rooney**<sup>1</sup>, **Emily Vidusic**<sup>1</sup>, & Dr. Alison Haupt<sup>1</sup>

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Sea urchins play a key role in kelp forest communities by controlling the abundance of kelp through grazing and by providing food to various predators. In recent years, marine heatwaves and disease have drastically decreased the amount of kelp and sea stars in subtidal zones, leading to an increase in subtidal sea urchins. While much is known about the population increase in subtidal sea urchins, there have been few studies that focus on sea urchin abundance in the intertidal. In this study, we used transects and quadrats to collect density and size structure data on purple sea urchins at various sites along the Monterey Peninsula. We compared this data to previously collected data ranging from 2002-2020. Overall, there has been a significant increase in purple sea urchin density in the Monterey Peninsula intertidal. Sites varied in total urchin density and multiple sites showed severe patchiness in the distribution of urchins. Further studies are needed to better understand why some sites had more urchins than others. This study will provide important information on the status of local species and can be used to inform ongoing conservation efforts.

## **Session 5: College of Business**

### **Esposed Organizational and Team Culture Values as Antecedents of Protection Motivation Among IT Employees**

**Eduardo Aparicio**<sup>1</sup> & Dr. Shwadhin Sharma<sup>1</sup>

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The rapid development of technology and information systems has led to increasing privacy and security-related issues in an organization. Information security and compliance have become a critical issue that needs to be adequately addressed. This paper extends the protection motivation theory by drawing insights from organizational and institutional theory literature to examine how organizational culture and team



culture impact information security compliance. The primary objective of this study is to understand the impact of the dimensions of organizational culture and team culture on the cognitive ability of the employees to appraise threat and coping motivation associated with information security compliance. The study applied structural equation modeling to analyze survey responses of 302 IT employees recruited through Amazon Mechanical Turk (AMT). The result of the study indicates that both organization and team culture impacts employees' cognitive ability to appraise threat and coping which in turn impacts behavioral intention to protect information and comply with security policies. Findings of this study contributes to the information security compliance research by stressing the criticality of developing an information security culture within an organization and within the team the employee is related to.

### **Enforcing the Screen Time and Technology Usage of Children: Evaluating the Impact of Parental Perception of Technology, Locus of Control and Children Daily Usage of Technology**

**Athena Lee<sup>1</sup> & Dr. Shwadhin Sharma<sup>1</sup>**

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Rapid growth of technology (smartphones, screens, and social media) has made parenting more difficult than it already is due to the ease of availability to their kids. Parents believe some internal (i.e. parental guidance) and external (i.e. government agencies, developers, etc.) factors should enforce some form of policy to control and monitor children's screen time and technology usage. We propose a model linking parental perceptions of technology and parental locus of control to their attitude towards their children's use of technology and towards party/parties that should be responsible to monitor and control their kid's screen time and technology usage. Parents were recruited from Amazon Mechanical Turk and applied structural equation modeling to analyze our model and found that parental perceptions of technology (general attitude towards technology, perceived efficacy in technology management, and parental strategy in terms of technology) positively impact their concerns towards children's consumption of technology and screen time. Parents with an external locus of control prefer technology and screen time policies for kids to be developed by the government, external agencies, and creators of such technology. Findings of this study contribute to the development of policies that would assist different interested stakeholders to assist parents with technology problems.

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Abstract Forthcoming

### **Green Skepticism: Examining the Role of Social Media Influencers on Consumer Attitudes Towards Green Brands**

**Erika Hernandez-Gonzalez<sup>1</sup>, Brishna Nader<sup>2</sup>, Iris van Hest<sup>2</sup>, & Dr. Jenny Lin<sup>1</sup>**

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Faces in advertisement is a common design method used to promote social stimuli that communicates emotions, alertness, and intentions. Green advertisement focuses on the relationship between a product and the environment, and may contain characteristics to promote a green lifestyle. Our previous research found that faces in green ads resulted in lower positive attitude towards the ad compared to green ads with no face. This result contradicts past research findings which found that ads with faces conveyed happiness have a positive relation with attitude towards ads, increasing consumer purchasing intentions. In this current study, we examine how brand image plays a role in the effectiveness of using faces in green ads. To study the impact of social media influencer faces on consumer attitudes towards green brands, we use a 2 (brands: green-oriented vs non-green-oriented) \* 2 (with face vs no face) between subject behavioral experiment design. Findings are expected to be helpful for marketers with the use of social media influencers and ad design to effectively deliver green messages to consumers.

## **Business for 2030: A Content Analysis of Firms' Statements on the UN Sustainable Development Goals (SDG)**

**Saray Garcia**<sup>1</sup> & Dr. Ishva Minefee<sup>2</sup>

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Multinational corporations (MNCs) continue to face pressures from stakeholders to assist governments and international organizations in ensuring sustainable development across the globe. In this study, we assess MNCs' communication of their progress on the Business for 2030 initiative, which emphasizes the role of MNCs in achieving the United Nations' Sustainable Development Goals (SDGs). Methodologically, we are conducting a content analysis of sustainability statements by 61 MNCs. Preliminary findings suggest that although many MNCs communicate numeric outcomes related to the SDGs, MNCs often do not offer details on 'how' they achieve those outcomes. We aim to provide recommendations for how MNCs can improve their communication in line with stakeholders' expectations.

## **The Empowering Role of Anti-Domestic Violence Messages: Evaluating the Effectiveness of Public Service Announcements and Social Media Platforms**

**Angelica May A. Amita**<sup>1</sup>, Dr. Jenny Lin<sup>1</sup>, & Taylor Lin<sup>2</sup>

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Domestic Violence has been classified to be a hidden epidemic at the national and global level due to the negative connotations and stigmas attached towards the victim. However, many cases go unreported due to guilt, shame, and other cultural reasons, resulting in detrimental effects on the victims' mental, physical, and emotional state. The intent of this research is to analyze different media platforms. Specifically, through content analysis, we compare traditional media messages such as PSA ads with modern social media messages, to evaluate the effectiveness of these messages in encouraging reporting in bystanders and victims as well as empowering survivors. A total of 13 public service announcement advertisements and 7 social media posts were collected/coded into the following constructs, Messaging, image appeal, emotional triggers, etc. Once coded, we discovered that social media is more effective in relaying messages of DV rather than utilizing advertisements. We will further analyze public responses to these PSA's/social media posts including responses from businesses and organizations to determine sentiments and emotions from viewers via text analysis.

## **Session 6: Department of Biology & Chemistry**

### **Evaluation of Anaerobic Soil Disinfestation and Pathogen Suppressive Microbial Inoculants for Allium White Rot Management**

**Grace Hardy**<sup>1</sup> & Dr. Jose Pablo Dundore-Arias<sup>1</sup>

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Allium white rot (AWR), caused by the fungal pathogen *Sclerotium cepivorum*, inflicts devastating effects on garlic and onion production in the Western United States and worldwide. The pathogen produces small, dormant structures (sclerotia) which can survive in the soil for several decades, even in the absence of a suitable host (*Allium* crop). Treatments being used in commercial production today include applications of various fungicides, or organic and synthetic compounds aimed at stimulating pathogen germination before planting. However, these methods are costly and have shown inconsistent effects, hence the need for alternative sustainable and more effective methods. The main goal of this project is to evaluate the efficacy of anaerobic soil disinfestation (ASD) for management of AWR, and the potential synergistic effect of ASD combined with the addition of adapted antagonistic microbes to further suppress pathogen survival and establishment in the soil. The effect of ASD and microbial inoculants on sclerotia survival and viability will be assessed through pot trials. The results from this research project will provide crucial information for garlic and onion growers regarding the efficacy of these non-chemical strategies to manage AWR, as well as the enhancement of soil health.

## **Raising Covid-19 Awareness for Teens**

**Victoria Ordaz Garcia**<sup>1</sup> & Dr. Naomi Ruth Lee <sup>2</sup>

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The COVID-19 pandemic has highlighted the severe health disparities and disproportionate burden of prevalence, hospitalizations and deaths in the lower socioeconomic stratum and among racial/ethnic minorities. These disparities are due to a multitude of social determinants of disease, including lack of access to care and to culturally appropriate information, and historical trauma-based mistrust in minority populations. Ending the COVID-19 pandemic will require rapid development and implementation of effective strategies to enhance awareness and uptake of preventive measures and improve inclusion of communities disproportionately affected by COVID-19 in research, including intervention studies, and clinical trials of vaccines and therapeutics. Arizona is one of the hardest hit states with one of the highest COVID-19 positivity test rates for adults (19%) as well as pediatric cases in the U.S. and the case rates and deaths are disproportionately higher among Arizona's Latino, American Indian, and African American communities. To address such disparities, we will conduct community-engaged research and outreach to increase COVID-19 awareness and education among communities disproportionately affected by COVID-19 and to reduce misinformation and mistrust.

## **Optimization of Laboratory Methods to Isolate and Characterize Soil *Streptomyces***

**Morgan Raimondo**<sup>1</sup> & Dr. Jose Pablo Dundore-Arias<sup>1</sup>

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Crop diseases caused by soilborne pathogens result in major yield and economic losses and represent a major threat to sustainability of agricultural production in the Salinas Valley. Currently, management of these diseases relies on the use of broad-spectrum synthetic pesticides, however these methods are costly, often ineffective, and have substantial negative effects on soil biodiversity. Numerous microbiome studies have revealed the role of soil microorganisms supporting key ecological processes, and these findings have fueled tremendous interest in harnessing soil microbiome to promote plant growth and natural suppression of plant diseases. However, the effect of production practices selecting those plant-beneficial organisms remains unclear. *Streptomyces* are ubiquitous in soil, and known as prolific producers of broad spectrum antimicrobial compounds, which makes them good candidates for controlling various soilborne pathogens. This project seeks to characterize the composition and functional characteristics of indigenous soil *Streptomyces* communities in relation to different crop production practices. We will assess density and antibiotic inhibitory capacities of *Streptomyces* spp. collected from local soils and measure antagonistic activity against known soilborne pathogens of locally grown crops. This work would enhance understanding of the potential of soil microbiomes and their management as strategies to promote disease suppression, and enable identification of prospective locally-relevant biocontrol organisms.

## **Evolutionary Processes that Drive Fur Color in *Chinchilla lanigera* and Other Rodents**

**Chenelle Guevarra**<sup>1</sup> & Dr. Liz Alter<sup>1</sup>

<sup>1</sup>Department of Biology and Chemistry, California State University Monterey Bay, Seaside CA

Abstract Forthcoming

## **Investigating functional redundancy among PLK receptor kinases in the Arabidopsis root**

**Conor Rickard**<sup>1</sup> & Dr. Jaimie M. Van Norman<sup>2</sup>

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Timing and orientation of cell division is critical for plant tissue and organ patterning and often relies on extrinsic, non-cell-autonomous cues. A leucine-rich repeat receptor-like kinase (LRR-RLK) INFLORESCENCE AND ROOT APICES KINASE (IRK) is polarly localized to the plasma membrane of the endodermis, functioning to restrict stele area and inhibit longitudinal anticlinal divisions (LADs) in root meristems. LRR-RLK most closely related to IRK is PXY/TDR CORRELATED2 (PXC2) which shows similar polarized accumulation as IRK in root cell types and also functions to restrict stele area. Compared to either single mutant, *irk pxc2*

double mutant roots exhibit further increases in endodermal LADs and stele area, indicating redundant activities. Double mutant exhibits abnormal root growth and agravitropism, suggesting broader functions of PXC2 and IRK. We examine if polarly localized kinase PLK6 has similar functions as IRK and PXC2 and examine root growth of triple mutant *irk pxc2 plk6*. If PLK6 is redundant with the other proteins, the triple mutant should have severe root growth defects than *irk pxc2* double mutant, consistent with the hypothesis that root growth and cell division is mediated through a pathway involving IRK and at least two other closely related proteins required for normal root development.

## **Session 7: Department of Applied Environmental Science**

### **Patterns of Longtime Fog Variability at Fort Ord National Reserve**

**Sehar Alinaeem<sup>1</sup>** & Dr. Daniel Fernandez<sup>1</sup>

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California fog is an essential natural meteorological phenomenon that forms as a result of complex reactions involving ocean evaporation, aerosols, atmospheric pressure, temperature gradients, and coastal topography. It is an important water source for many coastal plant communities on the central California coast. Previous research has observed a decrease in summertime fog over the last century, but has rarely investigated the absence of fog in relation to maintaining native plant communities in Monterey County. Many of these rare endemic species reside in Fort Ord Natural Reserve, making it an ideal observation location. Using data from standard fog collectors deployed in Fort Ord Natural Reserve since 2018, our results will be based on the variability in fog liquid water content ( $g/m^3$ ). The collected data will then be analyzed using statistical analysis methods in R-markdown allowing us to observe fog occurrences. Based on short term analyses, we expect to see data that suggests a negative relationship between declining fog incidents and the health of native species, as they lose a water source. Due to the importance of preserving our declining native plant populations, these results have important implications for future scientific research interested in fogs importance to Central California's ecosystems.

### **Indicator Species Composition Depends on River Salinity**

**Alyssa Schaer<sup>1</sup>**, Gretchen Wichman<sup>1</sup>, & Dr. John R. Olson<sup>1</sup>

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Healthy freshwater rivers are populated by aquatic invertebrates from the orders ephemeroptera, plecoptera, and trichoptera often referred to as EPT. However, tidal streams have metacommunities that include freshwater EPT from upstream and marine invertebrates from downstream. We quantified the composition of invertebrates in tidal streams to see how assemblages change across a salinity gradient, from 2596.77 uS/cm to 20270.5 uS/cm. We deployed leaf packs in three tidal streams (Pajaro, Aptos, Baldwin) to sample aquatic and marine invertebrates. Comparing low salinity rivers to high salinity rivers, we observed that the high salinity rivers have less EPT and New Zealand mudsnails. We also observed that high salinity rivers have an increased number of non-EPT invertebrates, including amphipods and isopods. Biologically, this means as salinity increases, we see a decrease in EPT composition. It is expected that many coastal freshwater rivers will experience salinity intrusion resulting from sea-level rise. It is likely that aquatic invertebrate metacommunities will indicate diminishing biological health with increasing tidal influence.

### **Revealing How Wildfires Can Affect River Sediments and Chemistry**

**Alexandra Yokomizo<sup>1</sup>** & Dr. John R. Olson<sup>1</sup>

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With climate change increasing the intensity and frequency of wildfires in California and around the world, it is vital that we learn how they will affect our watersheds. The recent River, Carmel, and Dolan Fires that burned during the summer of 2020 gave me the chance to conduct research to find exactly how the wildfires affected water chemistry and sediments. To do this, we measured nutrient concentrations and sediment sizes at three sites on the Carmel River downstream of the Carmel, Dolan, and River Fires. Water quality samples were collected from the watershed and metadata such as time and temperature was also collected. In the laboratory, we used a Hach calorimeter to measure the concentration of nitrate and phosphates in our water samples. To

measure sediment change, we used the Wolman ‘pebble count’ technique which allows the collector to calculate the percentiles of particle size. We then compared our data with the California Environmental Data Exchange Network (CEDEN), which provided us with data from the Carmel River watersheds before the fires. Generalized linear models were used to examine the impacts of wildfires on the size of sediment and nutrients concentrations and easily compare with data others had found.

## **The Relationship Between Climate Change Concerns and Women’s Intention to Have Children**

**Monica Urias**<sup>1</sup>, Dr. Victoria Derr<sup>1</sup>, & Dr. Steven Kim<sup>2</sup>

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The purpose of this study is to explore women’s perspectives, feelings, and plans on becoming a parent by adoption, foster parenting, or partnership while considering the impacts of climate change. Current studies are considering the impacts of climate change on mental health, but the implications of women’s climate concerns or ecological grief on their interest in reproduction, fostering, or adoption have not yet been considered. An electronic survey was used in hopes of targeting residents of the Pájaro Valley, although other women across California also participated. The project focuses on the women of ages 18-35 to explore women’s intention to have children. We used descriptive statistics and comparative analysis to examine the relationship between level of concern for climate change as compared to the number of intended children. Generally, this pilot study indicates that climate change concern is high and may be chronically contributing to women’s well-being, their thinking, intentions, and ability to plan their future. Concurrent challenges such as COVID-19, racial tension, and wildfires in California may have influenced women’s responses. Future research is warranted to explore manifestations of ecological grief as applied to intentions to have children across a variety of life and maternity stages.

## **The Influence of Salinity on Leaf-litter Breakdown Rates in Tidal Streams**

**Gretchen Wichman**<sup>1</sup> & Dr. John R. Olson<sup>1</sup>

<sup>1</sup>Department of Applied Environmental Science, California State University Monterey Bay, Seaside, CA

Tidal streams connected to estuaries can sequester carbon ten times as quickly as forest. However, aquatic microbial decomposers emit carbon into the atmosphere by breaking down dead, riparian leaves. Our study quantifies the rate of litter breakdown by microbes in tidally influenced stream water across a range of salinities from 5,000-20,000  $\mu\text{S}/\text{cm}$ . At three sites, we deployed leaf packs of a known mass and electrical conductivity (EC) data loggers. Although we did not investigate microbial species richness or abundance, it is likely the fine mesh leaf packs allowed microbes to decompose litter and prevented aquatic invertebrates from decomposing litter. Increasing salinity was associated with increasing breakdown rates, explaining 24% of the variation after accounting for the effects of temperature. This relationship may be the result of increasing abundance and/or efficiency of microbes in higher EC water. There may also be a shift in microbial communities as salinities increase. Coastal freshwater streams will likely experience salinity intrusion from climate-driven sea-level rise and storm surges. We conjecture that increasing salinity in estuaries may lead to greater carbon cycling by microbial communities in coastal streams.

## **Are Small Water Systems Within Monterey County Really Safe to Drink?**

**Judah Young**<sup>1</sup>, Dr. Vanessa Lopez-Littleton<sup>2</sup>, & David Holland<sup>3</sup>

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Local water policy and drinking water standards are constantly changing within the State of California and within different counties. Small water systems are the least funded compared to larger systems; lack full-time staff to manage the system; and can be geographically isolated. Due to these challenges, we aim to seek if the water they produce is safe to drink. We will analyze water samples from various small water systems throughout the Monterey Peninsula and compare them to previous years water quality reports to see if they hold true and are safe to drink.

## Session 8: Psychology Department

### Major and minor differences in experience: How perceived emotions and expression vary between musicians and non-musicians

**Nevan Bell**<sup>1</sup>, & Dr. Jennifer Lovell<sup>1</sup>

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As music becomes more accessible, it has become almost essential to several people due to how integral it may serve in the way we feel, express, and perceive. Previous research alludes to the fact that music is known to positively influence several aspects of cognitive function and the psyche, such as there being increased ability to express and feel emotions. We will use a non-experimental, mixed methods research design to record student perceptions of emotion and expressionism, based on their status as a musician or non-musician and how frequently they listen to music. The project will involve outreach to several departments and programs on campus to allow for a more heterogeneous sample of student perceptions. The goal of the survey distribution is to be able to prove our hypotheses that student perceptions of their emotional wellness are positively affected by the integration of music and that musicians are more inclined to be open to expressing thoughts and emotions as a result of more music listening and training. We hope to raise awareness to the importance of musical listening and/or training in the lives of college students to further increase their ability to express themselves and their emotions.

### Abolitionist Practices in Social Work

**Jennifer Lopez**<sup>1</sup> & Dr. Chrissy Hernandez<sup>2</sup>

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Abstract forthcoming

### Monterey County LGBTQ+ Historical Archives and Special Collections: A Virtual Exhibit

**Nikole Karis**<sup>1</sup>, Megan Dearie<sup>1</sup>, & Dr. David Reichard<sup>2</sup>

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The Monterey County LGBTQ+ History collection includes archival materials donated to Archives and Special Collections at California State University, Monterey Bay (CSUMB) documenting local LGBTQ+ histories. The collection includes local newspapers like *The Paper* and *Demeter*, as well as photographs, flyers, newsletters, personal papers, and oral histories. To provide greater access to these materials, an online exhibit will highlight various themes from the late 1970's to early 2000's in Monterey and surrounding coastal Counties, offering an interactive experience for folks who are interested in local LGBTQ+ history and will later serve as a teaching tool for K-12 educators. Future plans include K-12 curriculum ideas using the materials from the historical archive project which will offer resources and talking points for educators that align with California's FAIR Education Act, requiring the inclusion of LGBTQ+ history. Having greater access to LGBTQ+ history within Monterey and the surrounding Counties would provide a local feel to LGBTQ+ historical curriculums and create a rich and compressive overview of queer history. In this presentation, I will highlight how materials from this collection are being used in various sections of the online exhibit and demonstrate how Monetary's historical archive project hopes to bridge activism and academia.

### What Skills Have You Developed? Psychology Undergrads' Understanding of Their Major Learning Outcomes

**Megan Dearie**<sup>1</sup>, Rodi Edil<sup>1</sup>, Paul Dommert<sup>1</sup>, & Dr. Jennifer Dyer-Seymour<sup>1</sup>

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The B.A. in psychology equips students with skills and knowledge that prepares them to apply principles of psychology at work and in graduate school. Employers report that many new graduates are not proficient in

essential career skills, such as critical thinking and communication (NACE, 2018). We surveyed 81 psychology majors (88% female, 12% male) and asked them to: identify the learning objectives that were most emphasized in their courses, rank the learning objectives from most to least emphasized in their course, rank the learning objectives for their perceived importance to employers, and assess their improvement on those objectives during their time in college. 75% of participants selected critical thinking as one of the most emphasized learning goals in their coursework. About 47% selected communication, knowledge base in psychology, and ethical responsibility as being highly emphasized in their coursework. The top selected learning goals are 4 of 5 MLO's the major is built on. Students ranked professional development as fourth most important to employers and least emphasized MLO within coursework. Assessing psychology undergraduates' knowledge of MLO's could indicate if important skills are being fostered, and if students find these learning outcomes valuable to the workplace demands they face after graduation.

## **Session 9: Department of Marine Science**

### **Animal-Borne Video Analyses of Pursuit Strategies in White Sharks (*Carcharodon carcharias*)**

**Mariah Daniel<sup>1</sup>**, Dr. Taylor Chapple<sup>2</sup>, & Dr. Alison Haupt<sup>1</sup>

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The strategies predators use to pursue their prey are often species or situationally specific and are an interplay of predator and prey behaviors. While these strategies have been described in numerous species including teleost fishes, they have not been well-studied in sharks. White sharks (*Carcharodon carcharias*) are known to exhibit a number of hunting behaviors to access prey, however, the characteristics and types of pursuit strategies they employ during these behaviors have never been fully explored. Videos of sharks pursuing simulated and live prey can provide insight into their visual hunting strategies. In this study, using static and animal-borne video, we analyzed the position and angle of the attack to differentiate between alternative pursuit strategies used by foraging White sharks off the coast of California and South Africa from 2013 to 2019. This study provides first-hand insight into how visual cues are perceived and responded to, and how this interplay may influence White shark predatory behavior.

### **Detecting the Effects of Rising Atmospheric Carbon Dioxide on Ocean Carbon Dioxide in the California Current System using Satellite Remote Sensing Observations**

**Danielle Anderson<sup>1</sup>** & Dr. Sherry Palacios<sup>1</sup>

<sup>1</sup>Department of Marine Science, California State University, Monterey Bay, Seaside, CA

Climate change has record breaking effects on biological systems and chemical processes within our oceans. Phytoplankton are important to the health and functionality of marine environments by regulating ocean biogeochemistry acidification, act as primary producers, and are a food source for oceanic and non-oceanic food chains. Variables such as sea-surface temperature (SST), chlorophyll-a (CHL), and partial pressure of carbon dioxide (pCO<sub>2</sub>) in our ocean are impacted by climate change and also influence phytoplankton activity. Detecting changing patterns of those variables, we can understand the impact of climate change on phytoplankton. This study focuses on creating an empirical algorithm to detect pCO<sub>2</sub> in seawater using satellite remote sensing observations. To build our empirical algorithm, we used *in situ* observations from NOAA Pacific Marine Environmental Laboratory California Current Ecosystem moorings. The model related SST, CHL, and/or salinity to pCO<sub>2</sub> using multiple linear regression. This algorithm was applied to remote sensing observations from the AQUA-MODIS sensor and validated using a test data set of *in situ* observations. This will help us understand how marine environments rely on phytoplankton activity and the impact of climate change on phytoplankton may cause the ocean to become a source or sink of CO<sub>2</sub> in our atmosphere.

### **Ground Truthing of Geostationary Operational Environmental Satellite (GOES) Imagery**

**Vaughn Compas<sup>1</sup>** & Dr. Daniel Fernandez<sup>1</sup>

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Efficient fog detection is essential for the accurate studying of fog. Most fog researchers detect fog via Geostationary Operational Environmental Satellite (GOES) Imagery, or via standardized mesh fog collectors. The GOES system satellites are highly useful for fog detection due to their ability to maintain their position over

a geographical area on earth, while constantly imaging that area with multiple different wavelength bands. Low cloud and fog detection are both included in the second band of GOES imagery. Although GOES imagery is the most time efficient method for detecting fog, there are gaps in the accuracy of the fog detection of GOES imagery, as the difference between low clouds and fog is too similar for GOES to accurately distinguish. In order to investigate this gap, we will compare data that has been compiled from various standardized mesh fog collectors deployed at Fritzsche Army Airfield, allowing us to analyze the efficiency of the GOES imagery method of fog detection. We hypothesize after this analysis, the GOES imagery will show a number of false positive or negative fog events that the data from our standardized mesh fog collectors will prove or disprove.

### **Spatial and Demographic Differences of the Hawaiian Coral Species: *Porites lichen***

**Kaiku Kaholoa**<sup>1</sup>, Caroline Rodriguez<sup>1,2</sup>, Dr. Thomas Oliver<sup>3</sup>, Dr. Stuart Sandin<sup>4</sup>, & Dr. Cheryl A. Logan<sup>1</sup>

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Coral reefs are valuable marine ecosystems that are rapidly declining under climate change. Despite years of documented declines in Hawaiian coral cover, we still do not fully understand the demographic processes underlying these patterns, nor the effects of latitude on coral species. *Porites lichen* is a common reef building species found in the northern section of the Northwestern Hawaiian Island chain, including Kure Atoll (KUR; northernmost), Pearl and Hermes Atoll (PHR; intermediate), and Lisianski (LIS; southernmost). To better understand the drivers of such declines, we measured *P. lichen* vital rates (i.e. growth rate, recruitment, and mortality) across space and time at KUR, PHR, and LIS. The vital rates for *P. lichen* were evaluated using Structure-from-Motion photogrammetry to create 3D models of the reefs. We used 2D representations of the 3D models to outline live patches of *P. lichen*, and calculated the change in area of a minimum of 40 individuals per site in 2016 and 2019. Since there are colder waters at higher latitudes, we hypothesize that *P. lichen* will have more difficulty adapting to climate change conditions and will have less competitive vital rates (decreased growth and recruitment, increased mortality) at KUR compared to LIS and PHR. Preliminary results demonstrate high levels of mortality at KUR and moderate growth at PHR, suggesting that *P. lichen* populations may be less tolerant to climate change at higher latitudes. Overall, our data highlights the importance of latitude on coral reefs, and should be taken into consideration throughout reef management efforts.

### **An Analysis of ROV External Lighting for 3D Modeling of Artificial Substrate**

**Maggie Seida**<sup>1</sup> & Dr. Steve Moore<sup>1</sup>

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Abstract forthcoming

### **Endosymbiont Communities Affect Coral Thermal Tolerance in American Samoa**

**Amalia Seigel**<sup>1</sup>, **Silvia Vasquez**<sup>1</sup>, Melissa Naugle<sup>1,2</sup>, Dr. Thomas Oliver<sup>3</sup> & Dr. Cheryl Logan<sup>1</sup>

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Reef building corals have experienced major global population declines due to ocean warming. Rising sea surface temperature has led to an increase in frequency and severity of coral bleaching events: a process where corals expel their symbiotic algae (zooxanthellae) and lose their vibrant color and primary food source. Recurrent or prolonged bleaching often leads to mortality. Some corals can increase their resistance to bleaching through shifts in their algal communities to favor more heat tolerant symbionts. Preliminary data show that pollution may induce a shift in symbiont community to *Durisdinium*, a more heat-tolerant symbiont, in *Acropora hyacinthus*, a common reef-building species in Tutuila, American Samoa. We examined symbiont communities in 10 coral colonies from sites around Tutuila, ranging from low, moderate, to high pollution levels. Quantitative PCR was used to determine relative abundance of *Cladocopium*, a heat sensitive symbiont, and *Durisdinium*. An ANOVA will be used to examine whether *Durisdinium* is more abundant than *Cladocopium* at sites with higher pollution levels. Understanding the relationship between zooxanthellae clades and thermal



tolerance will provide insight into the pollution-driven variation in heat tolerance in corals around Tutuila. Understanding the underlying mechanisms that drive thermotolerance will aid in coral reef restoration and protection efforts.

## **Session 10: Department of Cinematic Arts & Technology; Schools of Humanities & Communication, Social & Behavioral Sciences, Global Studies, and World Language & Cultures**

### **The Localization of History and Civics in Salinas Ethnic Studies Classrooms**

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The Localization of History and Civics in Salinas Ethnic Studies Classrooms is a multi-year collaborative project between the Salinas Union High School District, Milpa Collective, Xago Juarez of Building Healthy Communities, and California State University, Monterey Bay. The project utilizes a participatory action research (PAR) approach to collectively ask: How does the localization of history and civics content deepen Ethnic Studies methodology for students, teachers, and community members? Our approaches to this research include a Youth Participatory Action Research (YPAR) project consisting of a pre and post autohistoria exchange between CSUMB students and Salinas youth; community-centered archival research; a YPAR handbook for teachers and students, a photovoice process, and a program evaluation of the collaboration. The methods and process will center the Salinas community that has been underrepresented and marginalized. Through a co-construction of learning and understanding of a community-centered archives approach we will preserve the history of these communities. Engaging Salinas students in Ethnic Studies classes with pressing community issues and assets will provide meaningful learning opportunities for students to engage in historical interpretation. Through inquiry and methodological apprenticeships, students, teachers, and community members will better understand the social and structural inequalities as well as enhance their community.

### **Within the Blood Line: A Comparison of African American and Native American Educational Experiences**

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It is said that one of the main purposes of universities and institutions is “the preservation and transmission of culture,” so how is it that we have written academia that excludes and suppresses diverse student populations. The navigation of American higher education is increasingly changing and most of the time it is an inflexible environment for students who identify as multicultural due to systemic injustices, imposter syndrome, and historical trauma. This research focuses heavily on available literature that defines and explores the educational history and experiences of African American and Native American students in higher education. The future and further exploration of this project will include students with multicultural identities, specifically those who identify as Afro-Indigenous, who charter different experiences that are often underexplored in current academia. Within the Bloodline is intended to be a collection of research on Afro-Indigenous peoples, detailing their unexplained academic narrative while analysing different research models that can and will be utilized to understand the educational and social experiences of students in higher education.

### **Animation: A Credible Investment Education**

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Educating young people, especially people of color and women, about the stock market is becoming increasingly difficult. Prior research done on this topic reveals that more and more young people are turning to social media platforms such as Tik Tok for investment education. Many influencers on these platforms are not

credible resources for education and often lead young people to interact with the stock market in dangerous ways. Our research project aims to utilize resources from both the CSUMB College of Business and the Department of Cinematic Arts & Technology to create verified content that can counteract the negative aspects of an online investment education. We gathered information about how young people at CSUMB are becoming educated about the stock market online. We did this by having business school students participate in an anonymous survey that helped narrow down their investment education and what they would gravitate towards online. We will use this information to help create a series of credible animated videos that can be implemented into a classroom setting. Once the videos are created, we expect to release them onto various platforms and strategize how we can garner the most viewership and following.

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Abstract Forthcoming

### **The Effects of Training and Language Learning Background on Japanese Sound Recognition by English Native Speakers**

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One of the factors of success in acquiring a second language depends on the similarity between the language structures in the first and second languages (Bialystok, 1997). The differences in phonemic contrasts between Japanese and English make it difficult for English native speakers to auditorily distinguish Japanese sounds, such as long vowels and geminate consonants. This study aims to identify how well English native speakers are able to differentiate those unique Japanese sounds by performing a sound recognition test utilizing Oguma's (2000) research result. The participants then complete a shadowing practice, a second language learning technique used to enhance speech production and auditory discrimination skills, and a post-test to measure the effectiveness of the training. A total of 29 English-speaking university students participated in this experiment, all of whom are either taking an intermediate or advanced Japanese language course at California State University, Monterey Bay. When comparing the average of pre- and post-test scores, post-test scores were higher for both intermediate and advanced students but not statistically significant. This study also explored the relationships between participants' test performance and language learning background such as length of the study and age of onset and found a weak positive correlation between them.

### **"I want to get off"; Hookup Motives Among LGBTQ+ Young Adults**

**Ulises Duenaz<sup>1</sup>**

<sup>1</sup>School of Humanities & Communication

Abstract Forthcoming

## **Session 11: Department of Kinesiology; Department of Health, Human Services and Public Policy; STEM Education**

### **Reproductive Health Challenges: The Barriers to Access an Abortion**

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Reproductive health is a sensitive and controversial subject for many individuals to discuss openly with others. Within this subject, the topic of abortion has been and has stayed as controversial throughout the years by society and the government. Restrictions regarding abortions can be constantly found in courts at the state and federal level. For the many women who take the difficult decision to have an abortion, they often find themselves with barriers to access one. This is a difficult and draining process to the body and mind where these barriers only make it more challenging for these women to receive the care they need. To answer the question of barriers and what is impacting women in order to receive an abortion, qualitative research will be

performed. This will be achieved via peer-review articles by compiling the data and information found by other researchers to have a clearer understanding of common barriers overall regardless of the women's age, race and ethnicity.

### **Addressing Anti-Black Racism: Critical Consciousness for Equity and Advocates**

**Jennifer Berberian<sup>1</sup> & Dr. Vanessa Lopez- Littleton<sup>1</sup>**

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Anti-Black racism, a type of racial prejudice aimed at Black people, remains embedded in US institutions. Without intentional efforts to disrupt anti-Black racism, it will remain an enduring feature of American society. Addressing anti-Black racism within nonprofit organizations requires supporting personnel to develop a level of critical consciousness around anti-Black racism. This study examines the outcomes of an anti-Black racism learning experiences designed to address organizational culture around issues related to race and racism. The learning experience included five dialogic-based virtual sessions where participants were asked to explore their personal experiences with anti-Black racism and develop an action plan for eliminating anti-Black racism within their organization. The non-profit organization is located in a rural community on California's Central Coast. The mission of the organization is focused around racial justice with a desire to grow their capacity to serve an increasingly diverse and complex population. While the majority of the staff and populations served are Latinx, there is a growing need for service to and support of the local Black co

### **Innovations and Iterations in Middle School Life Science Curriculum**

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The COVID-19 pandemic has exacerbated issues related to screen time and its effect on children. However, there is a gap in this research that fails to address new or modified educational practices that could be created to reduce screen time. Existing research on screen time during the COVID-19 pandemic demonstrates the necessity for outdoor activity now that students lead a sedentary lifestyle. Using a mixed-methods research design to investigate screen time during the COVID-19 pandemic, we analyzed a 2019 data set from the S-STEM survey and will compare the data to the S-STEM survey that will be collected in Fall 2021. To evaluate ideas on learning and limiting screen time from a population of 5<sup>th</sup> graders, we collected assessment data. We will use descriptive statistics and inferential statistics to analyze our results. We anticipate that there will be multiple iterations of curriculum development and limiting screen time during and after the pandemic. Based on our data, we predict that lesson plans emphasizing outdoor education will contain little to no screen time, helping students reduce screen time overall and potentially prevent underlying health effects caused by prolonged screen use.

### **The Cost of Stem Education: How Much Should We Be Spending?**

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How should money be spent on education to make efficient use of available funds? This issue has become exacerbated by the pandemic and loss of jobs and funds provided by the government. Common measures of success are spending per state and number of degrees in the workforce. Though there is a trend to use active learning methods in primary grades, there is a gap in knowledge on how to effectively fund productive learning environments. This study will use a mixed method approach. Data collected from a 2019 S-STEM Survey was analyzed and will be compared to a follow-up survey performed and released later this year. This data looks at 5<sup>th</sup> grade student attitudes and demographics. Information into student financial situations and interest in STEM fields along with data provided by the National Science Foundation will allow insight into education spending trends in our geographical area. We anticipate finding a cost-effective way to implement active learning. Iterations of cost-effective lessons will engage both late elementary and middle school students in the Monterey and Salinas area using active learning methods while reducing costs for students, teachers and families.

## **Variables that Could Lead the CSUMB Makerspace to New Opportunities**

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Identity formation has long been established as an important developmental goal of the college years. To adequately support students' strong psychological need to explore and affirm their different social identities, it is important to understand how those identities develop and intersect. In order to persist in their education, all students need to feel they are in a campus community that supports and values them, where learning opportunities are developmental, and where they feel a strong sense of identity and affinity with the school. The feeling that they are cared about and seen as part of the campus community is tied to students' sense of belonging; this feeling in turn is tied to student persistence. By learning how makerspaces across all 23 CSU college campuses function and operate, CSUMB could use these ideas to incorporate new activities and ways of learning to their students and other student groups. A Makerspace integrates exploration, community-building, and identity into campus. By investigating and identifying the variations in Makerspaces across the California State University System, we will identify best practices shared among campus as well as new opportunities to implement in the CSUMB Makerspace. As a mixed methods study, this effort will include both quantitative and qualitative methods.