CSU MONTEREY BAY PRESENTS

the 7th Annual

FALL RESEARCH COMPETITION

THE UNDERGRADUATE RESEARCH OPPORTUNITIES CENTER

ALUMNI & VISITORS CENTER, ZOOM

THURSDAY, NOVEMBER 18, 2021

3:00 – 6:00 PM

Undergraduate Research Opportunities Center
UROC
California State University, Monterey Bay

- Program -

- Welcome -

The Fall Undergraduate Research, Scholarship, and Creative Activity Competition is designed to highlight scholarly work at CSUMB. Modeled after the CSU Student Research Competition, students, under the guidance of one or more faculty members within their department, or multiple departments for interdisciplinary projects, are eligible to submit a project to be considered for the competition.

All presenters, especially winning presenters, will be strongly encouraged to apply for the statewide CSU Student Research Competition, held each spring to promote and recognize outstanding student accomplishments throughout the 23 campuses of the CSU system.

To learn more about the CSU Student Research Competition visit:
https://tinyurl.com/CSUSRC

UROC FUN FACTS

51

UROC students have won prestigious national scholarships & fellowships including:

- 25 NSF Graduate Research Fellowship Program (GRFP) awards and 8 honorable mentions
- 18 Sally Casanova Pre-doctoral Scholars and 4 honorable mentions
- 6 Goldwater Scholar and 7 Honorable Mentions

500+

Students research presentations at national conferences funded by UROC.

800+

Number of students who have been in UROC professional development programs.

113

20% of UROC alumni completed graduate degrees
Professional degrees: 7
Master's degrees: 95
Doctorate degrees: 11

82%

Of UROC students have been from traditionally underrepresented groups including:
42% Traditionally underrepresented minority
45% First-generation in college
44% Pell Grant recipients
41% Transfer students

2000+

Number of funded undergraduate research opportunities for CSUMB students.

- Judges -

Jose Pablo Dundore-Arias, Assistant Professor, Department of Biology & Chemistry, CSUMB

Dr. JP Dundore-Arias, Assistant Professor of Plant Pathology, received his B.Sc. in Agronomy from the University of Costa Rica. He completed his M.S. and Ph.D. degrees in Plant Pathology with a minor in Entomology at Iowa State University and the University of Wisconsin-Madison, respectively. He later received a Postdoctoral Fellowship from the National Science Foundation to conduct research related to agricultural microbiomes at the University of Minnesota. His research interests center on investigating the biology, ecology and management of plant-associated microbes, with the ultimate goal of developing practical applications for enhancing plant and soil health and promoting biological suppression of plant pathogens.

Jenny Lin, Assistant Professor, College of Business, CSUMB

Dr. Meng-Hsien (Jenny) Lin studies individual differences in sensory (olfaction, haptic, visual) perceptions and its impact on consumer decision making and consumer well-being outcomes using a combination of surveys, behavioral experiments, neuroscience methods and in-depth interviews. Her other research interests involve understanding children's cognitive and emotional processing of online advertising and the influence of social media with the focus of empowering parents (mothers in particular) through understanding their use of social media. Dr. Lin's work has been published in European Journal of Marketing, Journal of Advertising, Journal of Consumer Affairs and other outlets. Her research has implications for marketers, retailers, advertisers, and public policymakers.

Kelly Medina-López, Assistant Professor, School of Humanities & Communication, CSUMB

Dr. Kelly Medina-López, Assistant Professor of Composition Studies in the School of Humanities and Communication, has a PhD in Rhetoric and Professional Communication with an emphasis in Cultural Rhetorics and Composition Studies from New Mexico State University. Her research interests include decolonial research methods, critical making, Chicanx/Latinx rhetorics, border studies, and language politics. You can find her writing in Constellations: A Cultural Rhetorics Publishing Space, the edited collection Querencia: Essays on the New Mexico Homeland, and two forthcoming publications, Latinx Rhetoric and Writing Studies and Decolonial Conversations in Posthuman and New Material Rhetorics.

Erin Ramirez, Assistant Professor, Department of Education and Leadership, CSUMB

Dr. Erin Ramirez, Program Coordinator of Secondary Teacher Education in the Department of Education and Leadership, teaches post-grad courses in English methods, literacy, cross-disciplinary methods, and Masters level research methods. She also mentors Masters' students through their thesis projects. Most recently, she received a 4.89 million dollar Department of Education grant to increase the recruitment/retention of new teachers from underrepresented populations, increase k-12 student literacy and STEM achievement, and provide professional development to teachers throughout Monterey County. Her research interests include teacher self-efficacy, content-area literacy, secondary literacy instruction, student reading achievement, teacher education, and research methods.

Yvette Lopez Brooks, Mayor for the City of Capitola, Guest Judge

Yvette Lopez Brooks is from San Jose, CA and the first Latina Mayor for the City of Capitola. In 2006, Yvette received a Bachelor of Arts in Sociology and a minor in Education from the University of Santa Cruz. In addition, Yvette is the Executive Director for the non-profit, Your Future Is Our Business, a wife and proud mother of a seven year old. Since her tenure on the City Council, Yvette has created strong policy with a focus on equity. She successfully created a Code of Conduct, allocated funding for Anti Bias training for Council Members and Staff and banned the sales of flavored tobacco products. Yvette is a member of the Executive Board of Directors for the League of Cities, LAFCO, Capitola's Finance Advisory Council, the Monterey Bay National Marine Sanctuary Foundation, The Children's Network, Childhood Advisory Council and the Central Coast Early Childhood Advocacy Network. As a policy maker, Yvette is committed to building a safe and healthy community.

- Schedule -

Opening Remarks | 3:00 - 3:05

Avalon Surratt | 3:05 - 3:20
Bioremediation of Pesticides: Applying Molecular Genomic Techniques to Uncover Efficient, Eco-friendly Methods of Cleaning Toxic Agricultural Waste

Morgan Raimondo| 3:20 - 3:35
Characterizing The Composition and Function of Soilborne Streptomyces from the Salinas Valley

Jocelyn Chavez Diaz | 3:35 - 3:50
Bilingual Heritage Speakers and Their Formed Identity in the United States

Alicia Del Toro| 3:50 - 4:05
Population Densities of Black Abalone Along the Monterey Peninsula

Break

Saray Garcia*| 4:15 - 4:30
Business For 2030: A Content Analysis of Firm's Statements on The UN Sustainable Development Goals (SDG)

Erika Hernandez-Gonzalez| 4:30 - 4:44
Green Skepticism: Examining the Role of Social Media Influencers on Consumer Attitudes Towards Green Brands

Charles Scrivner| 4:45 - 5:00
Discriminating Green, Benthic Endmembers in Coastal Systems Using Novel Hyperspectral Satellite Imagery

Break

Lily Amador & Korina McKinley| 5:10 - 5:25
Location Of History and Civics in Salinas Ethnic Studies Classrooms

Spencer Winter| 5:25 - 5:40
Adults Neurogenesis in the Fish Model Speckled Sanddab

Alma Leon| 5:40 - 5:55
Observing Beaked Whale Foraging Behavior with Acoustic Localization

Awards and Closing Remarks | 5:55 - 6:00

*Presentation will be virtual, not in person.

- Presenters -

Bioremediation of Pesticides: Applying Molecular Genomic Techniques to Uncover Efficient, Eco-Friendly Methods of Cleaning Toxic Agricultural Waste

Avalon Surratt & Dr. Nathaniel Jue
Department of Biology and Chemistry, California State University, Monterey Bay

Bioremediation, the process of microorganisms breaking down pollutants, overcomes the limitations of traditional pollution remedies. It is more efficient and eco-friendly since it relies on naturally occurring organic conversions as opposed to induced physicochemical reactions. Therefore, it is a desirable method for cleaning toxic agricultural waste. My research focuses on bacteria microorganisms that can remediate the pollutant pesticide. I am identifying the functional genes that enable the bacteria to metabolize carbon sourced from pesticides in order to divulge the genetic mechanisms of bioremediation. This identification began with my extraction of DNA of bacteria that grew in a bacterial growth promoter containing Salinas Valley agricultural runoff and thus were likely to source carbon from pesticides. I used a DNAeasy Power Soil Kit to complete DNA extractions of nine strains. I then 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, 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.

Characterizing the Composition and Function of Soilborne Streptomyces from the Salinas Valley

Morgan Raimondo & Dr. JP Dundore-Arias
Department of Biology and Chemistry, California State University, Monterey Bay

Soilborne pathogens represent a major threat to the sustainability of agricultural production in the Salinas Valley by causing crop diseases that result in major yield and economic losses. Current management of crop diseases relies on the use of broad-spectrum synthetic pesticides that are expensive, frequently ineffective, and negatively impact the soil microbiome. Soil microorganisms perform key roles by increasing soil nutrient availability, enhancing plant growth, and suppressing pathogens. However, it remains unclear if improvements are driven by the action of specific microbial populations, and if the effects from specific production practices select for plant-beneficial organisms. Streptomyces are bacteria ubiquitous in soil and are prolific producers of antibacterial and antifungal compounds, making them good candidates for inhibiting the growth of plant pathogens. This project seeks to characterize the composition and functional characteristics of indigenous soil Streptomyces using optimized methods from summer research as they relate to different crop production practices. We have accumulated soil samples representative of systems and fields with a history of disease infestation or lack thereof, and have initiated characterization of the Streptomyces community composition and inhibitory capacities against common pathogens. Results regarding the measurements of densities and inhibitory abilities will be collected over the coming weeks. This work which is part of a larger project would enhance our understanding of the roles of soil microbiomes on agricultural productivity, provide insight into possible strategies for optimizing the establishment of pathogen suppressive soil microbial communities, and enable the identification of prospective locally relevant biocontrol agents.

Bilingual Heritage Speakers and Their Formed Identity in the United States

Jocelyn Chavez Diaz[1] & Dr. Lamar Graham[2]
[1]School of World Languages and Cultures. California State University, Monterey Bay
[2]Department of Romance Studies, University of North Carolina at Chapel Hill

Spanish is one of the fastest-growing languages in the United States, with more than 37 million speakers (Pew Research Center). Because of this, the number of Spanish-English bilingual speakers continues to grow and bilingualism affects the way an individual ethnically identifies. In the context of the United States, a heritage speaker is a person who has learned a minority language (like Spanish) at home, but is educated in the majority language of English. Heritage speakers vary widely based on their ability to speak the language of their ancestral homeland. This research amplifies the importance of knowing a second language and how it impacts Heritage Speakers' identity. My presentation includes a descriptive analysis of separate studies done on bilingualism and self-identification. Authors such as Potowski (2004) and Geerlings et al. (2014) have compared several groups of Spanish speakers and their preferences on how to self-identify. Potowski and Geerlings et al. demonstrate that heritage speakers tend to identify themselves with their dominant language. For example, if the individual is Spanish dominant, then they will identify as person rather than an American. Ultimately, this project will draw attention to the importance of speaking a second language, and how this may affect one's formed identity. In contemporary times, equity, diversity, and racial justice are at the forefront of our social and political dialogues, and my research contributes to these key conversations.

Population Densities of Black Abalone Along the Monterey Peninsula

Alicia Del Toro[1], Leta Dawson[1], Dr. Fiorenza Micheli[2], & Dr. Alison Haupt[1]
[1]Department of Marine Science, California State University, Monterey Bay
[2]Hopkins Marine Station, Stanford University

Abalone fisheries south of San Francisco have been closed since 1997; however, populations in the Monterey Bay have not seen enough improvement to reopen these fisheries. Despite fisheries closures, black abalone (*Haliotis cracherodii*) were moved from the species of concern list to the endangered list under the US Endangered Species Act (ESA). In 2003, the Department of Fish and Wildlife established the Abalone Recovery and Management Program and a study in 2002 found that black abalone in Monterey Bay did not meet any of the recovery criteria. For this study, we examined black abalone densities at seven locations along the Monterey Peninsula on the central coast of California: Pescadero Point, China Rock, Sea Palm, Carmel Point, Point Pinos, Hopkins Marine Station, and Cannery Row. Our main focus is to determine if black abalone populations have further declined or now meet the recovery criteria outlined in the ARMP. This semester we will run statistical analysis to determine trends in black abalone populations. By using previous data, as well as data from this year, we will compare the black abalone populations over time using several sites along the Monterey Peninsula. With our findings, we will gain a better understanding of the local black abalone communities and how to better protect this endangered species.

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

Saray Garcia[1] & Dr. Ishva Minefee[2]
[1]College of Business, California State University, Monterey Bay
[2]Gies College of Business, University of Illinois, Urbana-Champaign

Multinational corporations (MNCs) continue to face pressures from stakeholders to assist governments and international organizations in ensuring sustainable development across the globe. Adoption of the United Nations' Sustainable Development Goals (SDGs) started in 2016, but researchers have yet to see how MNCs specifically address or investigate "how" the goals are implemented and communicated. Through a content analysis, we assess 61 MNCs' communication of their progress on the Business for 2030 initiative, which emphasizes the role of MNCs in helping to achieve the SDGs. Among our preliminary findings, four distinct themes encompass the SDG initiatives taken by MNCs: the use of evidence-based statements, the lack of specificity in communication, the importance of public-private partnerships, and the adoption of sustainable practices in corporate strategy. In particular, we found an abundance of evidence-based statements that detail various firms' initiatives towards pre-SDG initiatives, including timestamps dating before 2015, providing internal company demographics, and stating management commitments. also suggests that although many MNCs communicate numeric outcomes related to the SDGs, they often do not offer details on how they achieve those outcomes. Thus, we aim to provide recommendations for improving MNCs' communication in line with stakeholders' expectations.

Green Skepticism: Examining the Role of social media influencers on consumer attitudes towards green brands

Erika Hernandez-Gonzalez[1], Brishna Nader[2], Iris van Hest[2], & Dr. Jenny Lin[1]
[1]College of Business, California State University, Monterey Bay
[2]Department of Business, Fontys University of Applied Science, Eindhoven

Faces in an advertisement are a common design method to promote social stimuli that communicate emotions, alertness, and intentions. The green ad focuses on the relationship between a product and the environment and may contain characteristics to promote a green lifestyle. Companies found that they gained a competitive edge when they claimed that their product, services, and practices were considered "green." The unethical application of companies claiming to be a "green" business is known as greenwashing, causing many customers to become wary of green claims in general, also known as green skepticism. Our previous research, which included an eye-tracking and behavioral study, found that faces in green ads resulted in a lower positive attitude than green ads with no face. This result contradicts past research findings, which found that ads with faces that conveyed happiness positively correlated with attitude towards ads, increasing consumer purchasing intentions. In this current study, we examine how brand image plays a role in using faces in green ads. To study the impact of social media influencer faces on consumer attitudes green brands, we use a 2 (brands: green-oriented vs. non-green-oriented) by 2 (ad design: 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 deliver green messages to consumers effectively.

Discriminating Green, Benthic Endmembers in Coastal Systems Using Novel Hyperspectral Satellite Imagery

Charles Scrivner[1,2], Dr. Heidi Dierssen[3], & Dr. Sherry Palacios[1]
[1]Department of Marine Sciences, California State University, Monterey Bay
[2]Mystic Aquarium-University of Connecticut Research Experience for Undergraduates
[3] Department of Marine Sciences, University of Connecticut

The benthic macroalgae Cladophora has been displacing ecologically critical eelgrass (*Zostera marina*) beds in Connecticut shoreline environments, decreasing available protective environments for marine organisms. Due to a worldwide decline, eelgrass beds are often monitored using remote sensing reflectance imagery; the presence of Cladophora, another green benthic plant with similar spectral reflectance to eelgrass, complicates the applicability of this approach in Long Island Sound. However, a new generation of hyperspectral ocean color satellite sensors may provide the necessary spectral resolution to discriminate between similarly "green" endmembers Cladophora and eelgrass. This project assesses the capabilities of hyperspectral ocean color satellite sensors in distinguishing two green benthic endmembers in coastal waters. Field measurements of multiple parameters were collected from Little Narragansett Bay along the Connecticut and Rhode Island shoreline for model development, including remote sensing reflectance, benthic endmember reflectance, phytoplankton and colored dissolved organic matter (CDOM) absorption and particulate backscattering. Various empirical and semi-analytical algorithms are being evaluated to map eelgrass and Cladophora from novel hyperspectral PRISMA imagery obtained from Little Narragansett Bay at 30m resolution. Here, a simple decision tree approach will be presented to discriminate between Cladophora, eelgrass, and sand bottom types based on field measurements. The results of this study will be one of the first benthic retrievals of its kind using this new hyperspectral satellite remote sensing technology and will lead the way for future global missions including NASA's upcoming PACE and SBG satellites.

Localization of History and Civics in Salinas Ethnic Studies Classrooms

Korina McKinley[1], Lily Amador[1], & Dr. Chrissy Hernandez[2]
[1]Psychology Department, California State University, Monterey Bay
[2]Service Learning Institute, California State University, Monterey Bay

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.

Adult Neurogenesis in The Fish Model Speckled Sanddab

Spencer H. Winter[1], Dr. Cheryl Logan[2,3], Dr. Scott Hamilton[3], & Dr. Zurine De Miguel[1]
[1]Department of Psychology, California State University, Monterey Bay
[2]Department of Marine Science, California State University Monterey Bay
[3]Ichthyology Department at Moss Landing Marine Laboratories, San Jose State University

Previously thought to be limited to early development, it is now known that adults of many species are able to generate new neurons via neuronal stem cells. Neurogenesis, the creation of these newborn neurons, is a key process of neuroplasticity, the ability of the brain to grow and reorganize. In contrast with mammals, many fish display more abundant adult neurogenesis with up to 16 distinct and well-defined neurogenic niches. When mature, neurons generated in these niches are indistinguishable from perinatal-generated neurons, as they can integrate into the brain circuitry, receive functional inputs, and display morphological and electrophysiological properties. The widespread and abundant cell proliferation in fish makes them ideal models to study neurogenesis in the vertebrate brain. We aim to develop a brain map of the neurogenic zones in a new nonstandard and ethologically relevant fish model, the speckled sanddab (*Citharichthys stigmaeus*), a species native to Monterey Bay. To this end, we will first determine whether cell proliferation exists in the brain of the sanddab. Newborn cells in the brain will be labeled with two thymidine analogs. (5-bromo-2'-deoxyuridine (BrdU) and 5-ethynyl-2'-deoxyuridine (EdU). Brain slices will be processed by immunohistochemistry and visualized via confocal microscopy. Further studies will be necessary to identify the cell fate of these new cells and to identify the neurogenic niches. The knowledge gained from our studies can be used to determine whether neuroplasticity processes in the speckled sanddab contribute to physiological and behavioral adaptations in a constantly changing environment, with potential implications for survival

Observing Beaked Whale Foraging Behavior with Acoustic Localization

Alma M. Leon[1], Eric Snyder[2], Marie Roch[3], Simone Baumann-Pickering[2], John Hildebrand[2], Dr. Sean Wiggins[2], Dr. Bruce Cornuelle[2], & Dr. Kait Fraiser[2]
[1]Department of Biology and Chemistry, California State University, Monterey Bay
[2]Scripps Institution of Oceanography, University of California, San Diego
[3]Department of Computer Science, San Diego State University

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 ocean ecosystems is still not fully understood. By localizing Zc 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 a high-pass filter and energy threshold. 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. This method allowed us to produce multiple whale tracks. However, the high number of false detections from dolphin sounds limited the number of usable beaked whale encounters. Future work may include developing a detector that removes dolphin sounds based on differences in dolphin and beaked whale signal characteristics. By analyzing the tracks that were successfully obtained, we can observe foraging behavior and calculate the necessary signal characteristics to get population density estimations. These methods can be applied to other datasets, allowing us to compare beaked behavior at different sites and under different conditions.

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