

PROJECT SUMMARIES

CSU Statewide Student Research Competition 2020

****Represents students who, unfortunately, had to withdraw from the Competition due to various constraints imposed upon them by the Competition's last-minute pivot to an online format (in response to COVID-19 social gathering restrictions). We recognize and thank these students for their great efforts, understand their need to withdraw from the Competition, and last, encourage them to find another opportunity to share their work with others!*

Andrés León González, Lindsey Fox, Cal State East Bay
Patient perspectives of transgender health

This study explores transgender and non-binary patients' experiences of receiving transgender-related healthcare in abortion/family planning clinics in the US. Through in-depth interviews, this study of 21 participants found, overall, clinics are well-equipped to handle basic transition-related care and treat clients with competency and respect.

Cesar Contreras, Abraham Bahlubi, Cal State East Bay
The Role of Race and Gender in Salary Negotiations

A survey study that analyzed differences in comfort across race and gender during a salary negotiation. The findings indicated males felt no comfort gap across gender while females felt less comfortable negotiating with males as opposed to other females and genderqueer people. Additionally, a same-race negotiation partner was preferred.

Mica Cabrera, Cal State East Bay
Exploring Antioxidant Capacity in Green Tea Dependent on Types of Water

Using High Performance Liquid Chromatography and UV/Vis spectroscopy, this project explores how water quality affects catechin yield in green tea. Green tea with more alkaline water (containing sodium bicarbonate) yielded less catechins and turned brown more easily than tea prepared with "salt" water (containing calcium and magnesium salts).

Ariel Moline, Cal State East Bay
How does the developmentally regulated enzyme, Glucose-6-Phosphate Isomerase, contribute to stage conversion during Toxoplasma pathogenesis?

Glucose-6-phosphate isomerase is upregulated in the bradyzoite form of *Toxoplasma* and may play an important role in the metabolism of the parasite when undergoing stage-conversion. I believe that a gene knockout of GPI will alter the parasite's ability to grow, differentiate between tachyzoites and bradyzoites, and properly metabolize amylopectin.

Taylor Reinke, *Cal State East Bay*

Using a Social-Emotional Learning Program to Enhance Students' Well-Being

The current research looks into how a social-emotional learning curriculum, Strong Kids 6th-8th, can be influential in teaching the necessary skills to navigate the highs and lows of middle school. The results indicate that implementation of Strong Kids curriculum decreased expression of anger and increased SEL knowledge.

Munahil Murrieum, *Cal State East Bay*

Building Energy Performance Prediction using Machine Learning: A Data- Driven Decision-Making Framework for Energy Retrofits

Initial step in building energy efficiency improvement is to predict its consumption. This study presents a framework that evaluates and selects the most relevant features regarding building energy performance and develops an energy consumption predictive model using these features. The R-square value of model is 67.0% which supports model validity.

Claudia Romero Medina, Sena Harley, Daniel Den Briones, Jorge Gonzalez,
Cal State East Bay

Bilateral Bone Strength Differences in Division II Female Volleyball Players

The purpose of this study is to determine bilateral bone strength differences in the radii of Division II female volleyball players via peripheral quantitative computed tomography (pQCT). Results concluded that DII female volleyball players have similar characteristics in bone architecture and size in the dominant and non-dominant radius.

*****Vishwani V. Naidu**, *Cal State East Bay*

The Emergency Response of Community-Based Organizations In Puerto Rico after Hurricane María

The project focused on older adults with disabilities and the support provided by community-based organizations (CBOs) after hurricane María, in Puerto Rico, a unique context for disaster research. We interviewed older adults about their

experiences, and we surveyed local CBOs about their response. Older adults and CBOs face significant hurdles.

Derek Schmidt, Cal State East Bay

The Folk Music Paradox: The Transformation of European Folk Music Into the Innovation of 20th C. Music

By looking at five 20th century European composers - Sibelius, Falla, Bartók, Stravinsky, and Hába - utilizing music scholarship from the 19th to the 21st centuries and comparative analysis techniques, we see that these composers forged new paths into modernity, paradoxically drawing from the old in order to achieve the new.

Lisa Ouyang, Cal State East Bay

Peripherally-restricted opioids restore normal activity without disruptive side effects in rats with chronic inflammatory pain

We hypothesized that opioids that work outside the brain produce pain relief without side effects. Low doses of loperamide produce pain relief and restore wheel running activity after inflammatory pain in rats, but high doses impair activity. Low loperamide doses may be a novel way to treat pain and restore activity without side effects in humans.

Maddie Roman, Cal Poly San Luis Obispo

Banksy: A Conversation Beyond the Wall

To fill a gap in literature on the contemporary phenomenon known as street art, I combined background research and a survey to discover if a controversial anonymous street artist can create real art and what underlying meanings of Banksy's work resonate with the public.

Katleen Ivey, Cal Poly San Luis Obispo

Thermal Ecology of the Federally Endangered Blunt-nosed Leopard Lizard (*Gambelia sila*)

The thermal ecology and microhabitat use of the federally endangered lizard, *Gambelia sila*, was studied using temperature-sensitive radio-telemetry, preferred body temperature, and upper thermal tolerance data. We calculated the number of hours their activity is currently restricted and predicted how climate change may impact activity time.

Mykayla Latronica, Cal Poly San Luis Obispo

Reduction of human pathogens, *E. coli* O157:H7, *Salmonella* and *Listeria monocytogenes*, in contaminated agricultural soil by glucosinolate hydrolysis products in mustard seed meal

The purpose of this research is to determine the effects of mustard seed meal on agricultural soil contaminated with *E. coli* O157:H7, *Salmonella*, and *Listeria monocytogenes*. Significant pathogen reductions were observed in soil treated with 1.0 and 1.5 g mustard seed meal over 72 h, with log reductions ranging from 2.5 – 6.6 log CFU/g.

Nicole Zeltser, *Cal Poly San Luis Obispo*

High-fat fructose diet is associated with neuronal loss in juvenile Iberian pigs

To investigate the effect of the western diet on brain development in a pediatric model, Iberian piglets were fed a chronic diet high in fat and fructose. Staining of frontal cortex tissue revealed signs of brain injury, which was not associated with brain insulin resistance.

Jenna Williams, Tracy Doan, *Cal Poly San Luis Obispo*

Assessment of Modeling Strategies for Lightly Reinforced Concrete Structural Walls

A recent large scale experimental test at Cal Poly led to the discovery of an unanticipated structural wall failure. The authors explored how to reduce the large number of once deemed irrecoverable, abandoned, concrete buildings by implementing new modeling techniques that accurately predict structural wall behavior.

Ryan Kohls, Joshua Grassel, *Cal Poly San Luis Obispo*

Production Planning in Integrated Circuit Supply Chains

Current production planning for IC supply chains don't account for binning (the process of sorting ICs into different categories based on performance). Existing solutions like MRP don't account for the high variability observed in IC manufacturing, so we developed a more accurate discrete event simulation model based on the Dirichlet distribution.

Kelly Condron, *Cal Poly San Luis Obispo*

The impact of CalFresh Outreach on food security status among Cal Poly students

The objective of this study was to assess the impact of CalFresh participation among Cal Poly students. Utilizing the validated USDA's ix-Item Food Security Survey, food insecurity in the past 30 days was measured at baseline, three months, and six

months. Among participants receiving CalFresh, food insecurity decreased significantly by 63%.

Cami Christopher, *Cal Poly San Luis Obispo*
Impact of Physical Activity Trajectories on Colon Cancer Risk

We evaluated how maintenance of or changes in physical activity over time impact colon cancer risk, using latent class models to identify physical activity trajectories and hazard regression analysis. Maintaining and increasing physical activity levels through life is crucial to minimize colon cancer risk, while decreasing levels increases risk.

Fionna Fahey, *Cal Poly San Luis Obispo*
Feminist Epistemologies of Sex Work: (Re)memberance in Practice

Recent legislation has continued the trend in marginalizing sex workers. Theorizers in Black and Indigenous Feminisms crafted methodologies to (re)member histories lost to larger structures of violence. As a predominantly white, and wealthy city, this project gives meaning to systems that enact this violence and highlights sex workers' resilience.

Elide Herrera Valdez, *Cal Poly San Luis Obispo*
Evaporation-Driven Capillary Flow in Paper-Based Microfluidic Devices

Evaporation-driven capillary flow (EDCF) was studied for the first time in paper-based microfluidic devices. A mathematical model for describing the rate of EDCF in paper was developed and validated. The rate was found to be affected by the design of the device and the environmental conditions.

Alvin Wong, Isaias Martinez, Randell Monzon, Michelle Allende, *Cal Poly Pomona*
Populist Discourse in African President Speech

Our project analyzes the varying levels of populist discourse employed by African leaders. We utilized qualitative and quantitative analysis in order to examine the intricate nature of populism; so far, we found that populism exists in South Africa, and we plan on explaining what impact populism has on politics around the globe.

Lelyzaveta Slarve, *Cal Poly Pomona*
Effects of Type II Diabetes Mellitus on Pharmacokinetics of Liposomal Amphotericin B in Mice

This study evaluated the effects of type 2 diabetes mellitus (T2DM) on pharmacokinetics of liposomal amphotericin B (L-AmB) in mice. T2DM mice had higher drug levels in liver, lungs, and spleen, and lower drug levels in serum, kidneys, and fat vs. control mice. This data suggests that current L-AmB dosing may not be ideal for T2DM individuals.

*****Kenneth Rangel*, Zuhayr Khan, Cal Poly Pomona**

The Effect of Environmental Enrichment on the Number of NADPH-d Positive Interneurons in the Dentate Gyrus of the Dorsal Rat Hippocampus

The overall results suggest a new mechanism of physiological homeostasis; with an increased demand for energy from new-born dentate granule cells and increased input from an enriched environment, the brain will regulate its energy expenditure via an increase in either the activity of existing NADPH-d+ interneurons, or their actual number.

Cailin Kuchenbecker, Guillermo Marquez, Cal Poly Pomona

Should Business Faculty Encourage Their Undergraduate Students to Participate in Research?

This project investigates factors that influence the effectiveness of research participation among undergraduate students learning marketing. We surveyed students who were survey takers for business studies and found that research participation does help students learn marketing concepts better and faculty should encourage research participation.

Joel Lee, Jaime Castro, Cal Poly Pomona

BANSHE UAV

The BANSHE UAV project aims to maximize the endurance of an uninhabited aerial vehicle in an interdisciplinary project of engineering undergraduates. The UAV investigates the efficacy of replacing components of the original aircraft structure with power storage and generation systems to improve power to weight and strength to weight ratios.

Chase Hargrove, David Calderon, Harrison Porter, Lisbeth Pelayo, Cal Poly Pomona

Aluminum Metal Matrix Composites – Processing and Stability

The melt infiltration technique is a cost-effective method to produce lightweight,

aluminum-based metal matrix composites (MMCs) with tailorable wear and corrosion resistance. Composite materials was analyzed using optical and scanning electron microscopy. Lastly, corrosion and wear studies of MMCs and relevant metallic alloys were carried out.

Jacob Norman, Jaymn Singh, Jordyn Park, Matt Irwin, Cal Poly Pomona
Oxide Scales on Metallic Alloys

The objective of this study was to characterize oxide films during early stages of oxidation at high temperatures. Obtaining insights into film characteristics is expected to lead to a better understanding of their growth mechanisms. The surface of the oxide films were characterized using spectral reflectometry, ellipsometry, and XRD.

Aaron Narag, Ega Herlim, Andrew Wilson, Benjamin Kong, Christopher Salerno, Ronnell Lim, Nicole Garcia, Joseph Kiriakos, Cal Poly Pomona
Testing of Thermal Energy Storage using Reverse Osmosis Concentrate

This research looks at the economic viability of using Reverse Osmosis Concentrate (ROC) as a Thermal Energy Storage (TES) medium for use in Concentrating Solar Plants (CSPs). The research finds ROC as a promising TES solution with the proposed system having a levelized cost of around \$9/kWh and solid state energy storage efficiency of 42%.

Lorena Bennett, Cal Poly Pomona
Solids Analysis of a UASB-HRAP System in Brazil

The purpose of this research was to conduct a solids analysis on a UASB-HRAP wastewater treatment system in Brazil. Results showed a robust, sustainable system that met Brazilian standards, but improvements should be made to meet US standards. A strong correlation was found between desludging of the UASB and performance in removing solids.

Lauren Ybarra, Cal Poly Pomona
Factory Farming: A Violation of Human Rights

Although factory farming has provided our society with multiple benefits, the system continues to directly violate employee's and the public right's every day. Thus, this current system must undergo dramatic changes or be entirely abolished so that we are no longer encouraging, perpetuating, or causing these right's violations.

Nicole Bernal, Jeremy Alexander, CSU Channel Islands

Appropriating Without Earmarks: Institutional Reform and the Law of Unintended Consequences

Aim: To better understand the issue of congressional earmarks and how they affect the congressional appropriations process.

Major Findings: Regular order has been affected within the Senate, there has been an increase in limitation riders, and bills have increasingly been rolled together as omnibus bills. These lead to disorder in Congress.

Chase Baker and Chase Khedmatgozar, *CSU Channel Islands*

Screening the Effects of Brain Targeting Compounds on a Multisensory Behavioral Assay in *C. elegans*.

There are currently gaps in the understanding of how drugs and compounds target the brain to treat various neurological diseases. To understand this, we use the worm, *Caenorhabditis elegans*, in a decision-making paradigm to gain insight into drug-brain interactions in mood disorders.

Natalie Shink, *CSU Channel Islands*

Investigation of Neuropeptides and their Receptors in mediating multi-sensory behavior in *C. elegans*

We use *C. elegans* to examine a multi-sensory behavior, where we expose the worm to both attractive food and repulsive cues then assess food-leaving during exposure to this repellent. This study will aim to identify new neuropeptide receptor genes to analyze the deeper functions at the molecular level and see what might be happening in humans.

*****Angelica Zavala, Heather Artinian, *CSU Channel Islands***

Engineering Drought Tolerant Plants via Small Intrinsically Disordered Proteins

Our research's long-term goal is to learn enough about how organisms are naturally stress resistant, and how they can be made stress resistant in order to gather information that could be used in practical ways to combat the effects of climate change.

*****Taylor Grindey, Karmyn Luong, *CSU Channel Islands***

Special Education Litigation and Privilege Project: The Effects of "Wealth" in Special Education Litigation Outcomes

We studied special education cases where both parties partially won. We coded the

presence of an attorney, translator, types of relief families received, and used districts' free/reduced meal data as a proxy for district wealth. We show students who enjoy more privilege gain more favorable outcomes such as reimbursements.

Adrian Nguyen, Casey Jo, Taylor Sprague, John Wang, Cal Maritime Academy
Creative Approaches For Wind Power Generation

Students are challenged to design and build a generator by hand that produces the best power generation results, using manufacturing processes such as 3D printing. Several students came together and created an improved radial flux generator, utilizing previous design experiences.

Rosa Hunt, CSU San Marcos

Was it you, the other Zazz, or that Flurp? Children's Moral Evaluation of Self-Serving and Prosocial Lies in the Context of Social Groups.

Children's (4-6 years) evaluations of self-serving and prosocial lies within a social group context were investigated. 46 children were introduced to novel social groups and evaluated their different lying behaviors. Prosocial lies were evaluated less harshly than self-serving lies, but social group information did not impact evaluations.

*****Yesenia Mora, CSU San Marcos**

The Effect of "Wing-Flashing" Behavior on Prey Capture Efficiency in San Clemente Loggerhead Shrikes

Our research is on the effect wing flashing has on prey and capture efficiency. We analyzed videos of twenty-eight Loggerhead Shrikes hunting and recorded whether wing flashing was associated with prey capture efficiency and prey reactions. The results suggest that wing flashing influences the prey and increases the shrike's capture efficiency.

Kianna Avilez, CSU San Marcos

Effectiveness of Bilingual Instruction Training at Sustaining a Strong Bilingual Teacher Identity

Study compares the trajectories of teacher identity and bilingual teacher identity (BTI) of credential students receiving additional bilingual instruction (BILA) with non-BILA students across time. Results showed that both groups had high BTI during their program. BILA maintained a high BTI while non-BILA students had a significant decrease in BTI.

Kyra Terry, *CSU San Marcos*

Increasing Identification with Computer Science While Sustaining Gender Identity among High School Girls

74 high school girls (69% Hispanic) participated in an intervention to increase computer science identity. Across the 10-week intervention program, their computer science identity increased without a significant decrease in their gender identity. This study highlights the potential of interventions to engage young women in computer science.

Cassidy Cooper, *CSU San Marcos*

The Thermal Physiology and Metabolic Rates of *Archocentrus nigrofasciatus* Acclimated to a Large Daily Temperature Fluctuation Reflects its Success as an Invasive Species

To assess the impact of variable temperatures on physiology, we measured thermal tolerance and metabolic responses for fish acclimated to three different thermal regimes.

*****Sarah Bricke**, *CSU San Marcos*

Undines at the Salton Sea

The purpose of this research is to examine the effects of trauma and to investigate the ways that it is represented in visual art. The work of contemporary female artists are analyzed, informing a long-term art project.

*****Jamie DeRevere**, *CSU San Marcos*

The effect of Ethnicity on Changes in Cardiorespiratory Fitness in Response to Short-Term High Intensity Interval Training (HIIT)

Aim: To determine if ethnicity alters physiological responses to HIIT in sedentary women. Caucasian and Hispanic participants completed 3 wks of HIIT, VO₂max and cardiac output were measured pre and post training. Results showed no group by training interaction for VO₂max. Stroke volume and cardiac output had no group by training interaction.

Joseph Esparza, *CSU San Marcos*

Revising Birmingham: The Natural Law and Just War Traditions in Martin Luther King Jr's Letter From a Birmingham Jail

This project examines the intellectual underpinnings of Martin Luther King Jr's "Letter from a Birmingham Jail." It traces first his reliance on the natural law tradition as a justification for civil disobedience. Secondly, it argues the just war tradition was used as a framework for creating a nonviolent campaign.

Karen Ngo, CSU San Marcos

Aggregation of HEK 293 Tumorigenic Cell Line Using Sound Waves of Varying Frequencies

A coded microcontroller and piezoelectric transducer were used to produce sound waves, allowing for non-invasive aggregation of HEK 293 tumorigenic cell line. By placing cells in a fabricated sound chamber, it was discovered that 523.25 hertz would allow for rapid movement and aggregation of cells.

Emily Lyon, CSU San Marcos

A microwave assisted gold-catalyzed substitution reaction of benzylic alcohols with benzimidazole

Reporting on the progress that has been made toward optimizing a reaction that uses gold catalysis and microwave radiation to synthesize benzimidazole derivatives.

Jacob Richardson, CSU Bakersfield

Affirmative Consent Policy and Conceptualization of Consent for Gay Men

This qualitative study uses 10 depth interviews with cisgender gay men to try and understand how gay men perceive affirmative consent policies, while also exploring how they conceptualize consent, as a way to critically analyze affirmative consent policies as a form of governmentality with an implicitly heterosexist bias.

Jaycie Fickle, CSU Bakersfield

Xylem structure and hydraulic function in the roots and stems of chaparral shrub species in the Sierra Nevada

I hypothesized that plant hydraulics will differ among the different organs of the plants because of their different functions within the plant and the environment of their surroundings. Differences were observed in resistance between the stems of different species, but these differences were not observed in the roots of different species.

Abigail Klein, CSU Bakersfield

Characterization of Full-Length Lysyl Oxidase

Overexpression of soluble forms of lysyl oxidase have led to successful enzyme crystallization, which will facilitate the structural characterization of this elusive enzyme.

Anthony Ponce, *CSU Bakersfield*

Water Quality and Economic Growth: Testing the Environmental Kuznets Curve for US Counties

This study seeks to reaffirm whether an EKC pattern exists for the United States throughout various points in time, testing the EKC for water contamination at the county level. This study also discusses the economic implications behind pollution intensive activities.

Travis Peterson, *CSU Bakersfield*

Ethics and Time Travel in Virtual Reality

"Critical Choice" is a virtual reality video game utilizing ethical choices to produce an illusion of time travel in the user's mind. This is significant because users can engage in moral choices in an immersive yet safe environment, and experience an illusion of time travel.

Chase Gause, *CSU Bakersfield*

Exploring the Role of Anticipatory Processing on Micro Delayed Feedback

Anticipation of feedback for a response given on a test that has been delayed for just a few seconds can potentially increase the likelihood of recalling it later, even for incorrect answers.

Paul Blanco, *CSU Bakersfield*

Wireless Solid Set Canopy Delivery System for Tree-Cooling

Warmer temperatures are impacting pistachios required chill hours. We conduct research using a misting system to reduce the impact. The system is fully automated and monitors current temperatures, triggering the misters if the readings approach a threshold. Preliminary tests have shown the ability to reduce ambient temperatures up to 15° F

Sumaiya Olia, *CSU Bakersfield*

Endostatin Administration Effects on PECAM-1 of the Medial Prefrontal Cortex in Relation to Estrous Phases

Estrous phase samples were obtained from female rats who reduced alcohol dependent behaviour when administered endostatin. These samples were compared with control vehicles and amongst rats who did not display the same levels of alcohol dependency. The results found that alcohol was responsible for changes in estrous cycles of female rats.

Natalie Hernandez, CSU Bakersfield

The Life Cycle of a Self-Sacrificial Mother Vampire

Self-sacrificial motherhood in Stephenie Meyer's "Twilight Saga" and Anne Rice's "Interview with the Vampire" is influenced by medical innovation, feminist theory, and Gothic literature.

Cindy Rodriguez, CSU Bakersfield

Wildfire impacts on soil physical properties: 2016 Erskine Fire, CA

Wildfires cause significant damage, as can the flooding and debris flows that occur in the aftermath of the fires. Post-fire alterations in soil physical properties and the surface cover influence the landscape years after the fire has passed and have been linked to the occurrence of debris flow events.

Kyle Palazzolo, CSU Chico

When Mortars Speak Volumes: Assessing the Influence of Mortar Cavity Size on Processing Efficiency

This experiment tested whether increasing the volume of a mortar cavity improves acorn meal production. A technological investment model was applied to predict the grinding-use that should have been anticipated for large mortars. These data indicate that greater volume may have been preferred when processing a large amount of acorns at one time.

Arely Saldana, CSU Chico

Pre-Trial Media and Passive Voice: Effects of Mock Jury Decision Making

The study examines how passive voice in pre-trial media affects mock jury deliberations. Participants are randomly assigned to three groups; The first two read one of two versions of pre-trial media. All participants then read a mock trial script and reach a verdict as jurors. Data collection is in process; results are expected by the end of April.

*****Stephanye Frias, CSU Chico**

Investigating the Effect of microRNA-375 on Pancreatic Beta-Cell Mass, Proliferation, and Insulin Secretion

Little is known about how pancreatic beta-cells, the producers of insulin, are being physiologically affected in Type 2 diabetes. In order to help understand the etiology of T2D and how beta-cells are being affected, I am investigating microRNA-375, as it has been shown to regulate genes and mechanisms involved with T2D.

Leandra Boodoo, CSU Chico

Bat Presence and Foraging Patterns over California Vernal Pools: The Pilot

A pilot study was initiated to assess feasibility of studying bat foraging patterns over California vernal pool landscapes as a master's thesis using acoustic recording techniques at Vina Plains Preserve. Preliminary results from 20 April 2019 through 31 August 2019 suggest seasonal variation in bat presence and foraging activity.

Jacob Ewald, CSU Chico

Species Boundaries in Two Northern California Monkeyflowers

I am studying the evolutionary relationship between two closely-related monkeyflower species using hybrid crosses, reciprocal transplants, and genetic analysis. My preliminary results indicate the two species are distinguishable only by vegetative traits. I am now examining these traits in hybrids to see if hybrids are detectable in nature.

Stephanie Parker, CSU Chico

Rudimentary Social Behavior and Spatial Distribution of Exuviae of the Gall-Inducing Aphid, *Tamalia coweni*

Galling aphid species exhibits a variation in behavior of exuviae arrangement within the gall. This study quantifies the differences in spatial arrangement and seeks the factors driving the variation. Despite similar gall size, exoskeletons are arranged in clusters on *Arctostaphylos viscida* and are more randomly distributed on *A. manzanita*.

Kallie Griffin, CSU Chico

Novel Antagonist of Growth Receptor-Bound Protein-2 (GRB2) Inhibits Proliferation of Chronic Myeloid Leukemia (CML) Cells

Novel Antagonist, NHD2-15, specifically binds GRB2 and inhibits BCR-ABL1 proliferation pathways. NHD2-15 causes decreased proliferation of human leukemia cells and offers a potential cancer therapy.

Claire Monahan, CSU Chico

Post-Fire Regeneration of Common California Foothill Woody Plants

Wildfire suppression, while vital for infrastructure protection, has positive and negative impacts on ecosystems. This project investigates these impacts on common California foothill woody plants.

Juan Vega, CSU Chico

This Happened in a Matter of a Single Generation: From Farmer to Retired Capitalist, the Life of Charles H. Lindsey 1841-1923

This project traces the life of Charles H. Lindsley, a veteran of the American Civil War who spent most of his life on farms but retired as a "capitalist" in a burgeoning city in California. Although his life was unconventional, Charles continuously demonstrated that he was pragmatic and adaptable.

James Calvo, CSU Chico

Nanomaterials for Water Remediation

Metal-organic frameworks are a class of novel nanomaterials known for their nanoporosity and synthetic tunability. We synthesized and tested four metal-organic frameworks, ZIF-8, ZIF-67, UiO-66, and UiO-66-NH₂ for their capacity to uptake a biologically disruptive anionic organic dye from aqueous solution.

Cassie Mingoia, Kallie Miller, Elisabeth Lawson, CSU Dominguez Hills

Maneuvering the Minefield: The Lived Experience of Dating for Individuals with Congenital Disabilities

Our phenomenological study examined the lived experience of dating for individuals with congenital physical disabilities. Through semi-structured interviews, our research discovered the following 5 themes: self-image, managing perceptions, ignorance versus open-mindedness, safety and trust, and dating logistics.

Margott Dela Cruz, Gabrielle Makrdichian, Yadira Ramirez, Ceferino Vinas, CSU Dominguez Hills

www.fakenews.you: Cognition's Influence on People's Reactions to False Internet Information

The study aimed to analyze the influence of cognitive factors on the production and consumption of online misinformation via SurveyMonkey.com. Hierarchical regression

analyses showed executive dysfunction predicted online-related behaviors (i.e., generation of false information, rare faking behaviors, and sharing and exchanging false information).

Saray Valenzuela Jaime, *CSU Dominguez Hills*

A mindful approach to improving work performance among college students

The purpose of this study is to examine whether mindfulness can be utilized as a tool to help college students manage emotions while also improving work productivity. Using a parallel mediation, results showed that students who practice mindfulness scored lower on negative affect measures and higher on work productivity.

Ann Lobo, *CSU Dominguez Hills*

Assessing the function of genes involved in aromatic compound metabolism in *Escherichia coli* survival

We determined the essentiality of genes involved in metabolism in *E. coli* during Long-Term Stationary Phase. Using growth assays, we demonstrate that the genes tested play a role in survival during LTSP, but are not essential. Further experiments are necessary to determine the relationship between these genes and *E. coli* survival.

Michael Aguilera, *CSU Dominguez Hills*

Revealing the hidden risks in gig work: From the perspective of Uber and Lyft drivers

In this study, we propose a typology of work-related risks -- digital, physical, economic, socio-psychological, and employment -- in Uber and Lyft driving from workers' perspective. The proposed typology is based on our review of extant studies and analysis of gig worker interview and survey data.

Jose Espinoza, *CSU Dominguez Hills*

Illustrating Historical Truth Through Visual Research

This visual research is a critique of president Donald Trump's administration and their mistreatment of undocumented immigrants. Iconography and motifs borrowed from various Mesoamerican artifacts depict the harsh treatment of migrant workers serving to merge the ancient past with modern history.

Ciara Nagao, Kelsey Santos, Madison Werchowsky, *CSU Dominguez Hills*

Experiences of Occupational Therapists Working with High-Needs, High-Risk Youth
Our qualitative study sought to understand the experiences of occupational therapists

servicing high-needs, high-risk youth. We collected data through interviews with seven occupational therapists and identified four themes. We found that therapists carry a fervent passion for the profession to serve this population and address their unique needs.

Amy Verneti, Hilary Vedder, Kathy Nguyen, Jasmine Okamoto, *CSU Dominguez Hills*

Through the lens of veterans with symptoms of Post-Traumatic Stress Disorder (PTSD): The impact on perceived quality of life

Using a photovoice methodology, we explored the perceived quality of life of veterans with symptoms of post-traumatic stress disorder. Through our research, the following themes emerged: We're not who we used to be, I feel like we're forgotten, Getting help is a whole different thing, and I feel safer being a volunteer than I do being an employee.

Bryan Cantero, *CSU Dominguez Hills*

Mexican (American) Corridista students: Resisting educational oppression through Corridos

Drawing from a corridista consciousness framework and through oral interviews, I argue that Mexican-American male student experiences/interactions with corridos are a form of resistance in higher education. Additionally, students emerge as counter-narrative creators of their communities in the U.S. despite anti-immigrant sentiments and rhetoric.

Omar Santizo, Claire Ladan, *CSU Dominguez Hills*

Hacking Electrochemistry: Improving undergraduate chemistry education analyzing biochemical redox analytes using a student-built potentiostat

Belmont Research Group has successfully developed a robust, low-cost potentiostat, the Teensystat, capable of detecting potassium ferricyanide, ascorbic acid, and acetaminophen. Via the experiment, students calibrate the device to determine an unknown concentration of a reversible, irreversible or quasi-reversible redox analyte of their choice.

Devon Lee, *CSU Fresno*

Particulate Matter Composition as a Determinant of Subcellular ROS Production

Our studies aim to determine the relative contributions of common, highly concentrated compounds found in samples of PM_{2.5} to the generation of oxidative

stress in alveolar macrophages.

*****Elliot Meme, CSU Fresno**

An Examination of Ethical Decision Making Differences Between Reserve Officer Training Corps and Civilian College Students

The study aimed to investigate general business EDM difference between ROTC and non-ROTC students using the sensemaking model of EDM. Results were not in line with the hypotheses of ROTC students exhibiting higher quality EDM practices, but significant differences were found in the number of causes identified and criticality of causes variables.

Manuel Collazo IV, CSU Fresno

On the Size, Composition, and Impact of the Gig Economy in the U.S.

Some see jobs in the gig economy as the future of work as we know it. Others worry about their quality and security. Analyzing data from the May 2017 Contingent Worker Survey (BLS), I find no significant differences between gig workers and traditional workers in average weekly earnings or the probability of having benefits.

Alvir Sangha, CSU Fresno

Improving Future Elementary Teachers' Scientific Explanations by Adopting Guided-Inquiry Approaches in Physical Science Laboratory Curriculum

This study displays how a guided-inquiry laboratory curriculum aligned with the NGSS supports pre-service elementary teachers' scientific explanations. Methods include quantitative analysis of nine open response items on pre/post assessments. Data analysis displays that the laboratory structure supports significant gains in scientific explanations.

Robert Wong, Sumanjit Gill, CSU Fresno

A Data-Centric Approach to Taming the Message Dissemination in the Internet of Vehicles

This research aims to minimize resource consumption and add security in the Internet of Vehicles. The approach applied a minimum spanning tree algorithm (PRIMS) and a previously proposed security scheme (PPDAS) on communications. Results indicated minimal overhead and reductions in: network congestion, packet loss, and time and power consumption.

Nicholas Olveda, CSU Fresno

Luteolin derivatives selectively suppress androgen receptor-positive LNCaP prostate cancer cell proliferation

Luteolin has been demonstrated to have capability in suppressing prostate cancer cell proliferation in cell models and in reducing tumor size in mice models. Fifteen new optimized Luteolin analogs, 7-O-substituted-3',4',5-O-tertramethyluteolins have been designed and synthesized from commercially available hesperidin.

***** Jennifer Gonzalez, CSU Fresno**

Grain Size Analysis of Sediment from The Canterbury Basin, New Zealand, to Determine the Impact of Global Sea Level Change on Deposition Cyclicity

The goal of this research project is to determine the impact of global sea level change on deposition cyclicity through grain size analysis of sediment from the Canterbury Basin, New Zealand. Grain size analysis is used to determine the percentages of different grain sizes within a sediment.

Dylan Serpas, CSU Fullerton

Group cognitive rehabilitation for community-dwelling survivors of traumatic brain injury

Traumatic brain injury survivors experience affective and cognitive deficiencies, complicating reintegration into pre-injury community roles. Currently, no standardized treatments exist; thus, the current study empirically tested and supports an accessible and cost and time-effective treatment, group cognitive rehabilitation.

Edwin Aguilar, CSU Fullerton

Exploring the limits of promiscuity of microbial RFAP synthase, a potential target for anti-obesity drug treatment

A new protocol which identifies compounds by exact mass was developed to (i) detect selected RFAP synthase inhibitors (p-aminobenzoic acid analogs) and the known products, (ii) determine the Km for p-hydroxybenzoic acid after optimizing conditions of product formation & (iii) explore the limits of substrate promiscuity by detecting other products.

Amber Myers, CSU Fullerton

Characterizing the source and function of lipid droplet accumulation in fly macrophages

Macrophages engorged with lipids are a hallmark of inflammatory activation, evident

in many inflammatory diseases. My research reveals that this process in *Drosophila* relies on macrophages acquiring lipid-filled vesicles from adipose tissue. This finding has potential to reveal macrophage-metabolism-based treatments for widespread diseases.

Larissa Smulders, CSU Fullerton

Boosting cancer therapy by blocking a protein's travel to the cell surface

Tumor cells show increased resistance to radiation therapy if the protein HspA1A is localized at the cell surface. By determining that phospholipids aid in the recruitment of HspA1A, my research established the foundation to develop a drug to stop the cell surface localization of HspA1A and boost cancer therapy.

Elizabeth Hitch, CSU Fullerton

Determining the role of linker regions in Polypyrimidine Tract Binding Protein 2 neuronal splicing regulation

Given that PTBP2 is essential during neuronal cell development, my research aims to identify regions of PTBP2 important for neuronal splicing regulation. Results of these findings will enable us to find novel proteins involved in regulating PTBP2 function, which can serve as therapeutic targets in drug design for nervous system-specific diseases.

Jordan Thompson, CSU Fullerton

Investigation of amino acid and dipeptide inhibitors for botulism

Tactile synthesis of amino acid and dipeptide scaffolds as a method to inhibit the botulinum neurotoxin protease, the toxic agent of botulism. The disease causes paralysis of the nervous system and can be weaponized into a bioterrorism agent. Therefore, countermeasures are urgently needed to treat populations infected with botulism.

Samir Mulgaonkar, CSU Fullerton

Reducing automobile greenhouse gas emissions using generative design process and additive manufacturing

Integrating generative design and additive manufacturing, substantial weight was eliminated from an original cast iron brake caliper, decreasing its mass from 7.4 lbs to 4.5 lbs. The application of this design in real-life situations can reduce the mass of vehicles and aid in diminishing greenhouse gas emissions substantively and successfully.

Abdulmohsen Aleissa, Abdallah Almodhyan, CSU Fullerton

Wildfire-averting forecast and early response system: Numerically estimating fire behavior for streamlined wildfire suppression

Climate change results in increasingly deadly wildfires, compelling global intervention. The Wildfire-averting forecast and early response system (WAFERS) is an innovative approach to wildfire fighting that provides an affordable, accessible, and streamlined means to predict fire spread, potentially saving lives and land in the process.

William Terry, CSU Fullerton

Quotients of matrix spaces

Taking quotients of complex 2×2 matrix space by subgroups – $SL(2, C)$, $U(2)$, and $SU(2)$ – results in topologies that are no longer Hausdorff. Since these quotient spaces are entirely new, connections could yield new perspectives in our understanding of physics and provide new ways of thinking about spacetime.

Beda Castillo, CSU Long Beach

The Under and Over Management of Nepali Domestic workers

The relationship between the migration experiences of migrant Nepali domestic workers and the policies regulating their labor sector are analyzed to highlight how structural inequalities and institutional policy gaps are contributing to vulnerable migration experiences by simultaneously “under-managing” and “over-managing” domestic workers.

Nicholas Roy, CSU Long Beach

Port Drayage Disruptions

Port managers want to reduce disruptive events when making structural changes. We help by analyzing the correlates of disruptions using a logistic regression model and fixed effects. We conclude that large municipally controlled ports have a reduced likelihood of disruptions and interventions involving hinterland routes are the most disruptive.

Briana Stanley, CSU Long Beach

Natural Disasters: A Visual Dialogue

"Natural Disasters: A Visual Dialogue" is a drawing installation project based on two separate sites on two different continents. The two sites are Kaikoura, New Zealand and Santa Barbara, California: two locations known for their picturesque scenery

despite recent natural disasters.

Alexander Ordonez, *CSU Long Beach*

The Supports System for Change: A Conceptual Framework to Support Reassigned, Veteran Elementary School Teachers and Beyond

This study provides an understanding and organization of supports to help veteran elementary school teachers with grade level reassignment to improve teacher effectiveness in the classroom, which leads to improved teacher self-efficacy, and in return, raises student achievement.

Jeremy Satterfield, *CSU Long Beach*

Improved Manufacturing Method for Hail Simulates in Impact Testing

This project focuses on the improvement in the methods to create better, more accurate, and repeatable hail simulates. This was done by utilizing a more precise design and more accurate manufacturing methods. In addition, improvements in freezing methods of the ice blanks can greatly reduce the imperfections that reduce the reliability of the Data.

Josh Murillo, *CSU Long Beach*

The Effects of Eating Habits on Levels of Stress in Pregnant Women: Role of Socioeconomic Factors

Study examined whether healthy eating behaviors were associated with stress levels pregnant in women and whether this relationship was influenced by different socioeconomic factors. Surveys were given to mothers. Results showed that there was a significant interaction between eating habits on levels of stress when influenced by financial hardship.

*****Anastasia Nesbitt**, *CSU Long Beach*

Existential Risk: A Discourse of Democrazy

This project explores the sociotechnical system surrounding existential risk technologies that have the potential to severely alter human life on earth. I analyze the implicit and explicit discourses of democratic consent conducted by existential risk scientific institutes in their research and development of x-risk techs.

Ricky Lee, *CSU Long Beach*

Wirtinger Width

We create a computationally accessible knot invariant, and show it is equivalent to the classical invariant Gabai width. Then we use our reformulation to write code in Python that calculated for the first time the Gabai width of over 50000 tabulated knots.

Tatev Sarkissyan, *Cal State LA*

Perceptions of Victims of Childhood Physical and Sexual Abuse

This study aimed to examine how participants viewed a victim (male or female) of child abuse (physical, sexual or not mentioned). We provided participants with a vignette followed by an impression formation task, Right-Wing Authoritarianism & Social Dominance orientation scale. Results indicate child abuse victims are viewed negatively.

Jason Sanchez, *Cal State LA*

Biological Father vs. Father Figure Involvement: Mental Health Implications

Utilizing the National Longitudinal Study of Adolescent to Adult Health data set, this research examines the impacts of different father structures in adolescence on adult mental health outcomes. Logistic regression showed RF closeness and more RF activities had a greater effect on long-term mental health outcomes.

John English, *Cal State LA*

Effect of Urban Temperature Gradients on Grassland Microclimate

Urban gradients create drastically different landscapes than natural areas. We examined how an urban gradient in Los Angeles altered plant biodiversity and interaction. We found that diversity decreased with development due to reductions in native species. Additionally, we found that positive interactions between individuals became more important.

Brent Beadell, *Cal State LA*

Inhibition of Biofilm Formation of *Pseudomonas aeruginosa* by Human β -Defensin 2 and Cholesteryl Linoleate is Accompanied by Ultrastructural Lesions of the Bacterial Surface

Atomic force microscopy was used to assess ultrastructural changes of *Pseudomonas aeruginosa* in the presence of human β -Defensin 2 and liposomes containing cholesteryl linoleate. These molecules effected a statistically significant increase in bacterial surface roughness and could inform future novel strategies in antimicrobial drug development.

Maya Horii, Cal State LA

Solid-State Li-Ion Battery Modeling in Python

To analyze and improve solid-state Li-ion batteries, a 1D simulation was created in Python with a Li₃PO₄ electrolyte, a LiCoO₂ positive electrode, and a Li negative electrode. The simulation is capable of predicting charge/discharge curves, overpotential contributions, and Li⁺ concentrations in the positive electrode and electrolyte.

Pratyush Muthukumar, Cal State LA

A Stochastic Time-Series Model for Predicting Financial Trends with NLP

We consider a time series machine learning model that uses both financial text data and financial stock indicators to more accurately predict the volatility of the stock market. By inducing stochasticity through NLP analysis, our novel model outperforms standards, as we can predict 30 days in the future and be accurate within \$4.37 on average.

Arielle Steimer-Barragan, Cal State LA

“Las viudas de las letras: Women Printers in Colonial Mexico”

The overlooked history of women printers in colonial Mexico and their impact on the visual culture marks a significant feat and one that remains obscure. This paper explores the pivotal role of women printers generating a gendered focus in the study of print culture to shed light on their “presente, pero no evidente” mark in history.

*****Weng Kei (Crystal) Loke, CSU Monterey Bay**

Does knowledge lead to wiser decision making? The role of awareness of green certifications, willingness to tradeoff in influencing sustainable hotel booking decisions.

This paper aims to understand how sustainable knowledge (captured through awareness of green certificates) plays a role in consumers' decision-making related to sustainable hotel selection. A mediation model was tested with knowledge and willingness to stay at a sustainable hotel as variables, and willingness to trade-off as the mediator.

Selina Espinoza, CSU Monterey Bay

Cannabis Use and Perceptions Among Veterans with Post-Traumatic Stress Disorder

This exploratory study aims to characterize user profiles and perceptions of cannabis among veterans with and without PTSD through an anonymous self-report survey.

Veterans with PTSD significantly found more relief using cannabis than non-cannabis medications and used significantly more concentrated cannabis products weekly on average.

Nicholas Heyer, *CSU Monterey Bay*

Development of New Genomic Tools and Discovery of Novel Alleles in Human-Specific Paralogs of NOTCH2NL Genes, Associated With Neurodevelopmental Disorders

Our goal is to develop an early detection model for Neurodevelopmental Disorders (e.g., Autism, Schizophrenia) based on human-specific genes that increase the number of neurons in the prefrontal cortex.

Sarah Ricks, *CSU Monterey Bay*

Social Media Use of Mothers in India: Empowering Mother's Spending on Children's Education

My research analyzes the relationship between social media and empowerment of Indian mothers, on educational spending. My study examines how active vs. passive social media usage influences psychological empowerment, and impacts income allocation towards children's education, determining the welfare of future generations.

Jessica Folck, *CSU Monterey Bay*

Electrocardiographic Parameters of Sedated Southern Sea Otters

Electrocardiograms from thirty one sedated southern sea otters (*Enhydra lutris nereis*) were measured and analyzed to create mean and standard deviation of quantitative parameters as well as descriptions of qualitative parameters. These parameters can be used clinically to detect abnormalities in the electrical conductive system of the heart.

Taylor Doty, *CSU Northridge*

Reading between the lines: The effects of reading in virtual reality and other mediums on the visual system

This study aims to use symptom surveys and optometric measurements to compare visual discomfort of reading with virtual reality (VR), computers, tablets, and paper. Symptom surveys and measures of AC/A ratio were given pre and post 30 minutes of reading. Preliminary results show VR users report the most symptoms compared to all other mediums.

Sarah Hwang, *CSU Northridge*

Leveraging Augmented Reality to Promote Mental Health Outcomes in Aging Asian Americans

Although older Asian-Americans are more at-risk of psychological issues such as depression/suicide ideation, utilization of mental health services is the lowest among all racial backgrounds. The current study tests whether the use of Augmented Reality is an efficacious method in promoting mental health outcomes in aging Asian-Americans.

Kevin Ramirez, *CSU Northridge*

Salvadoran Child Soldiers: Their Motives for Emigrating to the United States (1980-1985)

This paper examines how child soldiers in El Salvador navigated Cold War violence within their communities. Using original oral histories and contextualizing them with archival material, it will be argued that the military ultimately pushed young soldiers to desert their official positions and emigrate to the United States in significant numbers.

Ben Chubak, *CSU Northridge*

Evaluating the Importance of Reef-Based Resources for Reproduction in a Temperate Reef Fish

This study examined physiological responses of California sheephead, an ecologically important fish species in California rocky reefs, in response to changing resources. Upon quantifying prey items, examining gut contents and egg counts it was found that when prey items of low dietary value were consumed reproductive output decreased.

Beenish Niazi, *CSU Northridge*

The Struggle to Mitigate Children's Privacy Risks

An examination of the conditions under which parents try to protect their children's online information exchange. Parents of students were interviewed about their online behaviors and their monitoring behaviors with their children. The results show discrepancy between the concerns of parents and their actions to protect their children.

Elyse Durand, *CSU Northridge*

Silent Spring: A New Folk Musical

Silent Spring: A New Folk Musical is based on Rachel Carson's book of the same name. The plot follows Carson, and the dawn of the environmentalist movement. Silent Spring is an immersive folk musical that is equally entertaining and educational. It provides context and evidence to address one of the most contested political debates of our era.

Isaiah Lachica, *CSU Northridge*

Comparing the effects of three different augmented reality-based action-relevant sensory cues on Parkinsonian gait

The purpose of the study is to compare the effects of augmented-reality based action-relevant auditory, visual, and combined audiovisual sensory cues on improving walking ability in those with PD, and to test the usability of a novel AR platform designed to provide these cues.

Rachel Birke, *CSU Northridge*

Yesterday, Tomorrow, and Fantasy: The Cartoon Gothic of Disney's Animated West, 1948-1961

The animated space of Disney's cartoon West, and the mythic structure of Walt Disney as a figure himself, are here implemented in demonstrating the constructed, malleable, and powerful nature of the Cowboy and his mythic space of the West in American culture and politics.

Kevin Ginosian, *CSU Northridge*

Value Vortex: Values in Contemporary Hip-Hop Spreading on Social Media

This project uses digital humanities contextualization graphs to categorize media content and track its relevancy across different social media users. In doing so, this study finds that social values transgress hierarchical social structures and that SM sites break traditional forms of media broadcasting when they allow user participation.

Rachel Hohn, *CSU Northridge*

Downstream Impacts of the Abandoned New Idria Mercury Mine, California Coast Ranges, Ca

We are investigating water and sediment quality downstream from the New Idria Mercury Mine in the California Coast Ranges. Our data indicate that mercury contamination is extensive downstream from the former mine despite preliminary remedial actions conducted by the EPA.

Chloe Welch, CSU Sacramento

Bisphenol A Exposure Differentially Impairs Neurodevelopmental Phenotypes in Wild-type *Drosophila* and in a *Drosophila* Model of Fragile-X Syndrome

Determining if the prevalent environmental chemical, bisphenol A, confers risk of neurodevelopmental disorders by examining relevant neuronal phenotypes in *Drosophila melanogaster*

Ayesha Shabbir, CSU Sacramento

Optimization of reversion assay to elucidate gene amplification mutation in *Acinetobacter baylyi*

In our research project, we use *Acinetobacter baylyi* as a model system to study gene amplification mutations and elucidate their molecular mechanisms using the reversion assay. This can allow us to possibly find solutions to cancer, bacterial antibiotic resistance, and pathogenicity.

Lillian Murphy, CSU Sacramento

Exposure to Hydroxylated Polybrominated Diphenyl Ethers (PBDEs) Impairs Axon Pathfinding in Wild Type *Drosophila*

The goal of our project was to determine how polychlorinated biphenyl either-47 (PBDE-47) and its metabolites impact neurodevelopment. We used *Drosophila* to look at axon pathfinding defects in adult flies following chemical exposure using immunohistochemistry and confocal microscopy. We found 6-OH-BDE-47 had most severe effects on axon pathfinding.

Meredith Galloway, CSU Sacramento

Policies of Promise: What Policies Produce Student Success Outcomes in California Community colleges?

Too few degree-seeking students due so. This study uses fixed-effects, panel regressions to analyze CA community colleges. We interrogate student success rates finding positive impacts for increased class size & EOPS participation, adverse effects for other-than day sections, and bi-directional effects for increases in full-time faculty rates.

Rachael Dal Porto, CSU Sacramento

The use of Rhodamine WT for the characterization of hydraulic residence times in wetlands

Draining wetlands has caused Sacramento-San Joaquin Delta islands to subside and rely on levees. Hydraulic parameters may affect accretion, so tracer experiments were conducted to measure these parameters. Rhodamine WT was the tracer used and soil tests confirmed tracer sorption to the wetland peat and ability of desorption from the soil.

Valeria Gonzalez, *CSU Sacramento*

Preliminary Evaluation of the Suitability of Spanish-Language Hearing Aid User Guides

The study determined the availability, readability, and suitability of Spanish-language hearing aid user guides. Readability was assessed using a readability formula. Hearing aid user guides were assessed using the Suitability of Assessment of Materials. Materials available for the Spanish-speaking population are inadequate and unsuitable.

*****Jennifer Shaver**, *CSU Sacramento*

Queer Community in Christian Churches

This short ethnographic study explores the attitudes toward queer congregants within churches. Drawing from theory and literature regarding the interactions between the queer community and organized religion. The core of the study involved two churches. Interviews and observations indicate fluidity and diversity of attitudes in these churches.

Heather Fletcher, *CSU Sacramento*

We built it, but do students know what it is? Student perceptions of a Programmatic Undergraduate Research Experience (PURE)

Interviews from 25 biology majors reveal students are aware of and understand the goals of a series of conceptually-linked course-based undergraduate research experiences designed and coordinated by faculty. They perceive the project to be both authentic and important, regardless of career goal.

Anthony Perez, *CSU Sacramento*

Synthesis of Non-Native Oligomeric Sugars for Biomedical Applications

Background and methods to the development of carbohydrate active polymers as an antiviral agent.

Elizabeth Rahmani, Holly Timblin, *CSU San Bernardino*

The Mediating Role of Leisure Activities on the Relationship Between Depressive

Symptoms and Cognitive Functioning in Individuals with Parkinson's Disease

This study investigates the mediating role of physical activity on the relationship between cognitive decline and the mood symptoms of depression and anxiety in a sample of individuals that are newly diagnosed with Parkinson's Disease.

Nikolay Maslov, Aaron Keniston, CSU San Bernardino

Understanding the Binding Mode of Falcilysin, an Essential Metalloprotease

The malarial parasite *Plasmodium falciparum* kills close to 405,000 people annually. Falcilysin (FLN) is a poorly understood metalloprotease needed for the parasite's development in the human host. Our team made and tested inhibitors against FLN to study their binding mode. This model will aid in evaluating FLN as a therapeutic target in the future."Plasmodium falciparum" is a name of species and needs to be italicized such that the bolded sentence looks like this: The malarial parasite *Plasmodium falciparum* kills close to 405,000 people annually.

Edward Zakher, CSU San Bernardino

A reason to Move; a State-Wide Story

A nation wide look at the factors that drove migration within the years 2000 and 2015. The research takes data given by the Internal Revenue Service, Environmental Protection Agency, Census and Bureau of Labor Statistics to create a regression analysis in order to understand the motivations between interstate migration.

Matthew Atherton, CSU San Bernardino

The efficiency of using 3D models to teach lifting and rigging concepts to learners of varying spatial ability

Broadly, the purpose of this study is to examine the role of teaching method and spatial ability in learning. Spatial ability was found to be a statistically significant contributor to higher learning outcomes, but the treatment type (3D models, pencil and paper, and a control group) were not. The outliers, however, tell a different story....

Sonia Perez-Gamboa, CSU San Bernardino

Human Recognition using a convolutional long short-term memory (C-LSTM) neural network.

This research aims to improve the performance of the LSTM recurrent neural network deep learning model for sensor-based human activity recognition. We compared the performance of a bidirectional LSTM and convolutional LSTM when given

sensor-based human activity data and found that both architectures perform better than a regular LSTM.

Shane Burrell, *CSU San Bernardino*

Identification in Virtual Environments; Identifying Virtual Reality

The purpose of this study was to examine the phenomenon of identification or character adaptations within virtual environments. This literature review is a precursor to a current qualitative study examining this phenomenon.

Fernando Sanchez, *CSU San Bernardino*

Umm Kulthum and Aural Celebrity

Umm Kulthum, an immensely popular Egyptian singer, has had a long lived career. This research shows that Umm Kulthum is an aural celebrity, which is a person who utilizes sound reproducing technologies, and new media, to disseminate their disembodied voice. In doing so, their celebrity and persona are inextricably tied to their voice.

Natassja Martin, *CSU San Bernardino*

The Memory of the War: A Glance into Public Support for WWII and Vietnam

The Memory of the War: A Glance into Public Support for WWII and Vietnam provides a comparison and analysis of the memory of World War II and the Vietnam war within San Bernardino County. The project looks at local newspapers along with government and private, veteran's surveys to correlate public support to veteran reintegration rates.

Melissa Taha, *CSU San Bernardino*

Shaking the Ground with NASA

The main purpose of this research is to identify geothermal/volcanic SO₂ and CO₂ emissions that potentially came from the Ridgecrest 7.1M earthquake in California on July 5th. These emissions may pose as markers for other trace gases to potentially aid in earthquake activity prediction as well as volcanic activity prediction.

Danielle Simpson, *CSU Stanislaus*

Examining the Relationship Between Physical Activity and Cognitive Function in Older Adults

Participants from a retirement community were asked to report their physical activity,

followed by administration of the WAIS-IV. Results indicated a significant positive correlation between physical activity and two subtests, such that higher levels of physical activity was associated with better working memory and better visuospatial skills.

Arleigh Earnest, Garrett Bozzo and Omar Fernandez, *CSU Stanislaus*
Population Dynamics of Red Hills Roach in Relation to Rainfall and Pool Volume

By taking visual surveys of the Red Hills Roach and by measuring their habitat size, we have more clearly defined relationships between pool volume, rainfall and population size.

Mary Vardeh, Arlena Liryce Gavino, *CSU Stanislaus*
Informing the Need for Critical Thinking in Mathematics

The purpose of this research is to examine if word choice and situational context of a mathematics word problem affects students' perception of word problems.

*****Ashley Bustamante, *CSU Stanislaus***
Synthesis of anomoian B

This study aims to synthesize anomoian B. and to test its antibacterial activity. We recently have produced the three fragments that make up anomoian B. Our next step is to peptide couple fragments 1 and 3. Once successful do an addition mechanism with fragment 2, to reach our final product.

Andy Ponce, Kohl James, Victoria Morado, *CSU Stanislaus*
Finding the Center of the Galaxy

We quantitatively define the center of other galaxies using numerical analysis techniques. Then we develop a process to find the distance between points in the galaxies and their respective centers in an effort to provide a cost-effective method of approximation.

Irene Gonzalez-Herrera, *Humboldt State*
Bully-victimization, depression, and school connectedness in early adolescent students

The primary purpose of this study was to examine school connectedness as a mediator between bully-victimization and depressive symptomatology in early

adolescence. The secondary purpose of the study was to explore how gender and bullying classification groups may relate to levels of reported school connectedness.

Ciara Emery, *Humboldt State*

Bringing climate change home to meet your viewshed: stakeholder perceptions of offshore wind energy in Humboldt County, California

This research explores stakeholder perceptions of offshore wind energy development in Humboldt County, California. My findings show that stakeholders are primarily concerned about environmental impacts. Stakeholders see addressing climate change as a project benefit but are not clear on what it means for localized development.

Carrie Tully, Cody Henrikson, *Humboldt State*

Imagining an Indigenized Campus

Humboldt State University has the largest population of Indigenous students in the CSU system, yet our campus has little to no representation of this. Our question is, what does an Indigenous campus look like, and how can we better serve our Indigenous students, faculty, and community?

Sarah Holden, *Humboldt State*

A Symbol of Hope: An Ethnographic Analysis of Religion and Disaster following the Camp Fire

This is an ethnographic research study of the role of religious organizations during recovery, resilience, and rebuilding following the 2018 Camp Fire in Paradise, California. Findings see religion aiding in material resources, emotional dependency, community encouragement, and memorialization of the collective in the aftermath of a disaster

Haley Huffaker, Elizabeth Osuna, *Humboldt State*

An Autoethnographic Exploration of Resilience among Student Parents in College: Voices of Latina Student Mothers

This study was conducted in order to understand the intersectionality of ethnicity, class, life-span development, motherhood, work, and student responsibilities in identifying risk and protective factors, while also finding ways to provide more support within higher education.

Erin Trent, *Humboldt State*

Detection, Isolation, and Characterization of Rickettsia Species Phylotype G022 from Ixodes pacificus

In this study I. pacificus will be collected and identified as G022-positive by qPCR. Phylotype G022 will then be isolated, with gene sequencing and phylogenetic analyses performed to find the closest homologues. Lastly, the bacteria will be imaged using TEM to visualize where it concentrates in infected ticks.

M. Gohazrua Butler, *Humboldt State*

Transgenic zebrafish labeling chloride transporters, key regulators of brain activity and behavior.

During embryonic brain development, a dramatic decrease in neural activity occurs when a gene encoding a chloride ion pump turns on. Disruption of this process is related to epilepsy and Autism. We used CRISPR in zebrafish to insert a fluorescent marker gene allowing direct imaging of this developmental process.

Michael Academia, *Humboldt State*

Food Provisioning, prey composition, and nesting success of Ospreys in Northwestern California

The objectives of this study were to report on the prey composition of a coastal nesting population of ospreys and measure the relationship between nesting success and food provisioning rates.

Brandon Light, *Humboldt State*

Loss of LGL 1 affects Akt and Girdin in murine neural progenitor cells in a mTOR dependent manner

I am looking into how the loss of LGL 1 could potentially induce tumors through pmTOR, pAKT, and Girdin in murine neural progenitor cells. I used Immunocytochemistry to see protein expression and found that these proteins are more expressed in wildtype LGL 1 cells.

Karin Chao-Bushoven, *Humboldt State*

Why People Donate? Motivation in Major Donors in Higher Education

In 2017, Americans donated over \$43.6B to higher education. While most donor research is conducted at the time of actual philanthropic acts, this work explores the motivation factors in major donors (>\$20,000), who previously gave much-smaller (<\$1,000) gifts and what drives them to continue giving to the same school.

Melanie Nicholls, *San Diego State*

Homeless and Polysubstance Use: A Qualitative Study on Treatment Access Solutions

This qualitative study aimed to explore barriers unstably housed people who use substances face when quitting use. Patrons reported a lack of medically assisted detox and treatment accessibility as barriers to quitting and suggested having someone who could help connect them to resources for treatment, access to Narcan, and peer advocates.

Ivette Lorona, *San Diego State*

The Right to Health Care: Central American Asylum Seekers Passing Through the Mexico-Guatemala Border Region

Funded through the Tinker Grant, the purpose of my preliminary research was to learn about the political climate at the Guatemala-Mexico border region and its impact on the distribution of resources and health services to Central American asylum seekers in Chiapas, Mexico.

*****Melissa Giluso**, *San Diego State*

Computational Discovery of Novel Bacteriophages in the Human Gut Metagenome

We developed a computational pipeline to extract public data from the SRA, perform a cross-assembly, identify abundant, co-occurring contigs, and sort these contigs into genome bins. These methods are proving promising for the discovery of novel phages in the human gut, which can improve our knowledge of human health.

Ana Gomez Ramirez, *San Diego State*

Analyzing trophic structure of island ecosystems using stable isotopes: what is the role of nutrient subsidies from seabird nesting and foraging behavior?

The terrestrial ecosystem of the Coronado Islands has gone through a shift in its nutrient levels, which could be due to a recent increase in seabird population. As seabirds subsidize the islands with their waste, the isotopic signature of terrestrial organisms gets enriched with heavy nitrogen isotopes. Stable isotope analysis tells the story.

Jeffrey Jones, *San Diego State*

Examining the role of High Mobility Group Box 1 (Hmgb1) in cardiomyocyte senescence

Heart disease is devastating due to the heart's inability to regenerate. During development, when Hmgb1 expression is relatively high, myocytes are capable of proliferation and decreased Hmgb1 expression in the adult heart is coordinated with decreased proliferation. Thus, we postulate that Hmgb1 promotes a proliferative environment in the heart.

Darielle Blevins, *San Diego State*
Visualizing Girlhood

Drawing elicited interviews based on Black girls self generated dual self-portraits were analyzed. Major themes included girls' inner selves rendered invisible (i.e. Girls believed their teachers did not know or see their inner selves) or fully visible (i.e. Girls believed their teachers knew and saw their complete selves).

Maricruz Carrillo, *San Diego State*
Fabrication of Ceramic Bone Scaffolds by Solvent Jetting 3D Printing and Sintering Towards Load-Bearing Applications

Porosity is a crucial property of bone scaffolds, however, porosity is inversely related to strength, making replicating load bearing bone a difficult task. Using solvent jetting 3D printing, ceramic cubic and bone scaffold samples with 30% and 50% respective porosities with mechanical strength comparable to bone were successfully fabricated.

Chynna Bowman, *San Diego State*
Using Transmission Electron Microscopy to investigate the effect of pulsed 450 nm blue light on methicillin-resistant *Staphylococcus aureus*

Transmission electron microscopy of pulsed 450nm blue light irradiated MRSA, revealed structural damage to the cell membrane and disruption of cellular content and metabolism.

Laura Lu, *San Francisco State*
Early adversity and young adult coping efficacy are associated with election-related distress in an ethnically diverse sample of young adults

The study found that greater childhood adversity was associated with greater intrusion and avoidance symptoms related to the 2016 US election, whereas current coping efficacy was protective in an ethnically-diverse sample of young adults. When considered together, coping was not associated with avoidance at high levels of childhood adversity.

Benjamin Holt, *San Francisco State*

Marijuana Misinformation: History, Modern Myths, and Current Research Issues

Examining the history of US marijuana misinformation, the perpetuation of modern myths, and the structure of current cannabis research can improve the quality and implementation of health information. This research aims to identify areas for improvement in cannabis science and help consumers evaluate information for their consumption decisions.

Anna Costanza, *San Francisco State*

Participatory risk assessment of humpback whale (*Megaptera novaeangliae*) and leatherback turtle (*Dermochelys coriacea*) bycatch in Northern Peru

We used the Bycatch Risk Assessment, a GIS model, as a means to a low-cost approach to create risk maps of marine megafauna bycatch in Northern Peru. We incorporated 85 local fishermen's experiences using interviews and participatory mapping. Risk maps will empower fishermen and local scientists with visual information.

Ashley Pereira, *San Francisco State*

Nitric Oxide Signals in Regulation of Heart Looping in Chicken Embryos

An early indicator of proper cardiogenesis is morphology of the heart loop. Nitric oxide(NO) signaling's role in heart looping has yet to be investigated.NO levels were manipulated to determine effects on heart loop morphology.We find that NO signaling has regulatory control over heart looping.

Jazmine Logan, *San Francisco State*

Yoruba Theater in the UC and CSU Campus: Analyzing the Pedagogy of West African Theater in California's Public Universities

I conducted a network/data analysis on 32 public universities by collecting information on Yoruba Theater course offerings and its faculty's background as a step towards tracing the academic lineage of African Theater in American universities. Only two universities, UCLA and UCSB, had course offerings explicitly stating Yoruba Theater/Culture.

Katharine Gelinas, *San Francisco State*

Investigating Instructor Talk in Undergraduate Biology Laboratory Classrooms Taught by Graduate Teaching Assistants

An investigation into Instructor Talk, defined as non-content language that focuses on creating the learning environment, that is used by Graduate Teaching Assistants (GTAs) teaching undergraduate biology laboratory classrooms.

Matthew Sweeney, *San Francisco State*

Examining the Efficacy of Social Justice Teacher Preparation Programs for White Teachers

Research explores experiences of White in-service teachers who attended social justice-rooted teacher education programs in the Bay Area. Qualitative methods used to investigate and understand participant experiences. Findings suggest whiteness operates as dominant discourse in TEP; the outward focus on SJ in TE does not guarantee the full inclusion.

Justin Phan, *San Francisco State*

Developing the Next-Generation Neural-Machine Interfaces for Neurorehabilitation Applications by Utilizing Sensor Arrays and Spatial Features

Improve hand gesture recognition in neural-machine interfaces by using spatial features extracted from EMG sensor arrays. Multiple standard and spatial feature sets were extracted from open source EMG datasets and used in pattern recognition algorithms to predict hand gestures. Spatial feature sets achieved highest overall recognition accuracies.

Samuel Benzoni, Charlie Vidal, *San Francisco State*

From the health of structure to that of its occupants

The United States is growing older. This study attempts to innovatively provide solutions by utilizing the vibration of the floor to assist older populations in both responsive and preventive ways.

Viviane (Zurdo) Costa, *San Francisco State*

Temperature-dependent Raman studies of a naturally occurring van der Waals heterostructure

We have studied Raman spectroscopy of Franckeite, a natural van der Waals heterostructure. We acquired Raman signature for excitation sources of different wavelengths, at room temperature, and with increasing temperature.

Rachel Windsor, *San Jose State*

The Moderating Effects of Gender and Occupation on Age Discrimination in Hiring

Using a 2 (age: younger vs. older) x 2 (gender: female vs. male) x 2 (occupation: engineer vs. nurse) incomplete factorial design, this study provides the first evidence that older female applicants would be discriminatory targets as engineers while the older male applicants would be discriminated against as nurses.

Sovannie Len, *San Jose State*

In This Global, Multicultural World: Juggling Cultural Identities and Racial Microaggressions

The study examined the role of ethnic identification in relation to resilience. It also analyzed microaggression's detrimental effects and common types of responses. We found some ethnic identification styles were negatively related to resilience, and that microaggressions were negative overall, with qualitative analysis revealing more nuances.

Apoorva Karekal, *San Jose State*

Development of an optogenetic method to stimulate gamma motor neurons in vitro

Studying gamma motor neurons is challenging as it is hard to specifically stimulate the small gamma but not the alpha motor neurons. We developed an optogenetics technique to preferentially stimulate gamma motor neurons. We confirmed that stimulations at low optical intensity recruit the slow conducting gamma motor neurons only.

Austin Tse, *San Jose State*

Finding Optimal Investment Strategies Using Monte Carlo Simulation

In this research, over 10 million Monte Carlo simulations are used to simulate a game of chance or investment opportunity to discover how varying investment strategies can return drastically different results for a finance manager or the common investor.

Aldrich Mangune, Junlan Lu, Nikhil Saunshi, *San Jose State*

A SERP-Mining Approach for Classification of DNS Requests

We present a machine learning framework that takes as input a DNS request and outputs the content category it belongs to. We evaluate several options for feature engineering and classification to find the most appropriate setup for the specific problem domain. We also propose the SERP mining approach to collect and label an appropriate dataset.

Gurpreet Klar, San Jose State

Development of a microfluidic approach for rapid and continuous detection of pathogens in food and water samples

We leverage strong probe preconcentration using isotachopheresis (ITP) and a controlled sample flow in microfluidic channels to create a stationary and locally concentrated zone of fluorescently labeled bacterial probes within a microchannel, in which the reaction kinetics between the probe and target proteins on the bacteria surface is enhanced.

Grace Shefcik, San Jose State

Assessment of Non-binary Individuals' Self-perception of Voice

This study explores voice-related concerns and experiences within the non-binary population. Non-binary people were surveyed; analysis of responses led to the creation of a tool that experts evaluated for content validity. The result is the first validated tool to measure self-perception of voice and related experiences for non-binary individuals.

Allison Bui, San Jose State

Impaired autonomic and cardiovascular function in children with autism spectrum disorder

Autism Spectrum Disorder (ASD) is a neurological disorder with a high rate of health conditions compared to healthy peers. We analyzed autonomic and cardiovascular responses to exercise in ASD children. Enhanced blood pressure in ASD was due to higher vascular resistance from impaired vascular function without contribution of cardiac output.

Nivedha Murugesan, San Jose State

Evaluating Adaptive Ramp Metering through Partial Least Squares Path Modeling

We use Partial Least Squares Path Modeling to analyze the impact of the freeway Adaptive Ramp Metering (ARM) system on metrics such as traffic, safety, efficiency, and travel time reliability. We find that when compared to a baseline Coordinated Ramp Metering system, the ARM system indeed improves efficiency and travel time reliability.

~~Bianca Valencia Barraza, Sonoma State~~

~~The Lived Experience of the Latinx Formerly Incarcerated in Latinx Communities~~

The purpose of my research is to examine the experience of formerly incarcerated Latinos, by conducting face to face interviews, and focusing on the difficulty of forming relationships with their family/community members and the financial barriers when re-entering back into their communities; potentially leading to emotional distress.

Madison Tinsley, *Sonoma State*

Aesthetic Resistance: The Paintings of the Native American Occupation of Alcatraz Island

This project strives to make the argument that the graffiti-style paintings from the Native American Occupation of Alcatraz Island from 1969 to 1971 serve as a visual diary of resistance, and should be considered and protected as historical paintings due to the significance of the protest.

Reilly Millton, *Sonoma State*

Representations of Biraciality on the American Stage: the Character of Margaret in Nathan Alan Davis' Origin Story

Nathan Alan Davis's important new comedy Origin Story tells the story of Margaret, a young biracial woman who is adopted and doesn't know her birth parents. Performing this rich and layered character at Sonoma State in Fall 2019 created an important opportunity for dialogue about race in our culture and on our campus.

*****Olivia Piazza**, *Sonoma State*

Natural Language Processing for Robotic Navigation Through Unknown Environments

This research project aims to train a robot to navigate unknown environments through reinforced learning using human instructions to produce audio input commands as well as a camera to provide visual context for said commands in the physical environment.

*****Joshua Paine**, *Sonoma State*

Electromagnetic Property Detection of Meta Materials and Meta Surfaces

Develop a reliable, accurate and inexpensive setup that can be adopted by industry as a norm for the study of the electromagnetic properties of metamaterials and metasurfaces.

Alexander McGinnis, Joseph Haun, Anthony Aboumrad, *Sonoma State*

Autonomous Recharging of Aerial Vehicles

Autonomous flight technologies for unmanned aerial vehicles (UAV) have the potential to perform unique operations, but battery life limitations remain a significant challenge. Our research sought to implement an intelligent charging platform capable of executing both the controlled, autonomous landing and subsequent wireless recharging of a UAV.

Andrew Eljumaily, Giovanni Oey, *Sonoma State*

Evaluating the Performance and Energy-Efficiency of Heterogeneous Computing Systems

Using computers containing different processor types to reduce energy consumption from large scale computing applications without reducing the performance provided by these computing systems.

Christopher Everett, Rowan Graening, *Sonoma State*

The Orthographies of Coast Miwok

An exploration of the role of orthography and phonetic transcription in language documentation and revitalization efforts of Coast Miwok, as well as a methodological review of language revitalization and the common problems that occur when trying to revitalize Native American languages. Past orthographies are compared to our own IPA transcriptions.

Joseph McGuire, Jorge Ruiz Gonzalez, *Sonoma State*

Ramp Metering for Minimization of Traffic Emissions

Traffic congestion is both a burdensome and environmentally costly part of modern life. To reduce the carbon emissions produced, we propose the investigation of minimizing this impact through the tool of on-ramp metering, often seen on highways. This has the potential of offering a cheap alternative to larger and more costly measures.