Student Symposium on Research, Scholarship, and Creative Activities

PRESENTED BY ORSCA

CALIFORNIA STATE UNIVERSITY, LOS ANGELES



SPONSORED BY: NSF CREST CENTER FOR ENERGY AND SUSTAINABILITY
GAMMA EPSILON CHAPTER OF PHI KAPPA PHI

March 8, 2024

Welcome all student participants, faculty mentors, judges, and other guests attending the Annual Student Symposium on Research, Scholarship, and Creative Activity. This annual event allows both undergraduate and graduate students to present their research and scholarly work in a public forum similar to a professional research conference. Students' work spans a wide range of disciplines and represents the dedicated efforts of the many individuals involved in ground-breaking and innovative research and scholarly activity on our campus. We feel you will agree the research and scholarly activities shared today present evidence of the high standards and academic quality of our university.

This year's symposium features 144 oral presentations and poster exhibits. We invite you, first, to choose from among the seven groups of oral presenters at the University-Student Union. Then, you may explore the poster exhibits in the Golden Eagle Ballrooms, where you can interact with the many student researchers who are exhibiting their work. Finally, join us for the reception at Golden Eagle Ballrooms in the afternoon.

Each year, winners of the Cal State LA Symposium will represent CSULA at the Statewide CSU competition with representatives of other California State University campuses. We know our campus will excel again this year at the statewide competition. Winners will participate at Cal Poly San Luis Obispo on April 26 - 27, 2024.

We wish each participant the best, both academically and personally. Faculty mentors and others attending this Symposium, accept our sincere appreciation for your role in the development of ushering in our next generation of creative individuals, scholars, and scientists.

Jeffrey Underwood
Associate Vice President for Research, Scholarship, and Creative Activities

Jason Shiotsugu
Director of Research

Symposium Schedule

ORAL PRESENTATIONS

9:00 AM - 12:15 PM University-Student Union, 3rd Floor
UAS Executive Boardroom, 3rd Floor

POSTER PRESENTATIONS

11:00 AM - 1:00 PM Golden Eagle, 3rd Floor, Ballroom 3

RECEPTION

3:30 PM – 5:00 PM Golden Eagle, 3rd Floor, Ballroom 2
Awards Reception will begin at 4:00p.m.

Symposium Schedule

ORAL PRESENTATIONS

9:00 a.m. - 12:15 p.m. University-Student Union, 3rd Floor
UAS Executive Boardroom, 3rd Floor

Group 1 ▪ Behavioral and Social Sciences I
▪ University-Student Union – Alhambra Room 305

9:00 Jiawei Xiang
9:15 Darlene Ramirez
9:30 Villiam Ralica
9:45 Aundia Dianat
Break 10:00 – 10:15
10:15 Karina Olmos
10:30 Annabel Reay
10:45 Kimia Lavasani
Break 11:00 – 11:15
11:15 Bryan Gil Zamudio and Citlali Montes
11:30 Jayla Edwards

Group 2 ▪ Behavioral and Social Sciences II
▪ University-Student Union – San Gabriel Room 313

9:00 Melissa Rios
9:15 Selena Morentin
9:30 Janielle Monroy
9:45 Francesca Masi
Break 10:00 – 10:15
10:15 Ayse Durak
10:30 Cristina Zetino
10:45 Jessica Eick
11:00 Neille John Apostol
Break 11:15 – 11:30
11:30 Vivien Romo
11:45 Theresa Marie Bernal
12:00 Noemi De Jesus

Group 3 ▪ Biological Sciences
▪ University-Student Union – Los Angeles A Room 308A

9:00 Michael Zitser
9:15 James Araiza
9:30 Irene Ngo
9:45 Krisha Algoso
Break 10:00 – 10:15
10:15 Tammy Pham
10:30 Aaron Cruz
10:45 Jocelyn Alfaro
11:00 Janette Dzul
Break 11:15 – 11:30
11:30 Kam Hang Chan and Nancy Diaz

Group 4 ▪ Humanities and Letters I
▪ University-Student Union – Montebello Room 309

9:30 Calvin Canfield
9:45 Lilian Salas
10:00 Marineh Mousalu
10:15 Cristina Cortes
Break 10:30 – 10:45
10:45 Marjorie Hunt
11:00 Katherine Haniel Lainez

Group 5 ▪ Humanities and Letters II
▪ University-Student Union – Pasadena Room 307

9:30 Carlos Somoza
9:45 Alex Derbyshire
10:00 Alyssa Herrera
10:15 Frank Sposato
Break 10:30 – 10:45
10:45 Robert Coronado Jr.
11:00 W. James Carter II
11:15 Edward Romero

Group 6 ▪ Engineering and Computer Sciences I
▪ University-Student Union – Los Angeles C Room 308C

9:00 Elizabeth Nunez
9:15 Brandon De Jesus
9:30 Geethanath Duggiralla
9:45 Albert Bernal and Marcello Canova
Break 10:00 – 10:15
10:15 Amirhesam Shakibizadeh
10:30 Matthew Engquist
10:45 Anayely Saguilan
11:00 Cesar Leal

Group 7 ▪ Engineering and Computer Sciences II
▪ UAS Executive Boardroom

9:15 Arpit Vaishya
9:30 Dikshant Sagar
9:45 John Triantafyllos
10:00 Stellina Ao
Break 10:15 – 10:30
10:30 Luis Jimenez Diaz and Isuru Rajapakshe
10:45 Oscar Rodezno, Johan Rodriguez, Osvaldo Mendoza-Alvarez, and Junior Yah Torres

Group 8 ▪ Physical Sciences
▪ University-Student Union – Los Angeles B Room 308B

9:00 Samuel Groysman
9:15 Jordan O'Kelley
9:30 Tony Tran
9:45 Alex Nikolian
Break 10:00 – 10:15
10:15 Larry Rodriguez
10:30 Sailaja Muduganti
10:45 Genesis Barzallo
Break 11:00– 11:15
11:15 Raul Reyes
11:30 Kenneth Stebbing

DR. RAYMOND GARCIA POSTER SESSION

11:00 a.m. – 1:00 p.m. Golden Eagle, 3rd Floor, Ballroom 3

Behavioral and Social Sciences

1. Jarenni Ambriz
2. Nyah Bermea
3. Haley Castello
4. Katie Gekler
5. Karina Gutierrez

6. Giovanna Calderon
7. Shelby Detweiler and Darlene Ramirez
8. Mei Ku, Jordy Ocampo, and Lauren Perez
9. Humberto Hernandez Mendez
10. Natalie Rustrian
11. Ya Hsuan Ting

Biological Sciences

12. Leilani Corleto
13. Isabel Garcia
14. Karli Miller
15. Tiffany Smith
16. Aurora Trejo
17. India Wesley, Robert Juarez, Elijah Ortiz, and Lisya Tanujaya

18. Jason Chen
19. Alfredo Gonzalez
20. Yahan Lin
21. Mariana Prado Martinez
22. Puron Rahman
23. Rachelle Soriano
24. Samantha Rose Teves

Education

25. Jeanette Calderon
26. Sean Erkin
27. Arnold Herrera, Matthew Alvarado, Michael Zhao, and Jeremy Tadeo
28. Shira Levin
29. Chelsea Leyva and Sarina Jade Velsa
30. Sijia Zhou

31. Stephanie Ardiano Longo
32. Ani Avakian
33. Marie Lassaigne
34. Elizabeth Plascencia
35. Ahyeon Shin
36. Anthony Von Schonfeldt

Engineering and Computer Science

37. Alannys Argandona and Sophia Sherzai
38. Kim Kha
39. Gabriel Linecker
40. Frank Moreno
41. Ali Risheh
42. Kaelyn Taking
43. Marlen Trigueros and Arpit Vaishya

44. Henry Amador and Suthawit Udomnopwitthayakul
45. Julia Chavez
46. Boris Lagutin
47. Isabel Lopez
48. Fergus Place
49. Nathan Stoetzel
50. Cathy Trejo

Health, Nutrition, and Clinical Sciences

51. Cristelyn Joyce Chua, Arielle Jonna Guinto, and Xena Cameron Albania
52. Ivan Cobian, Kenobi Donart, and Lauren Perez
53. Charlize De Guzman, Audrey Caringal, Kenneth Manansala, and Taylor Woo
54. Kevin Diego-Perez
55. Tania Galvez
56. Sherena Tan, Sydney La, Elysse Yee, Zeta Marquez, and Lauren La
57. Eddy Boror and Wesam Aref

58. Andre Chan
59. Matthew Christmann
60. Veronika Katona
61. Sabrina Jackson-Zambon, Aida Benitez, Villiam Ralica
62. Reina Evette Ramos, Patrizia Abcede, May Tran, and Kristine Nava
63. Brisa Rodriguez and Ciara Gutierrez

Physical and Mathematical Sciences

64. Rajkin Chakroborty and Ruth Gonzalez
65. Jesus Corona
66. Katherine Ortiz and Timothy Harris
67. Madison Ngo
68. Jyotikaben Patel and Ananya Sharma
69. Nicole Salimbangon
70. Olivia Spanish

71. Sudheendra Gamoji
72. Rayana Ramirez
73. Brandon Ramos
74. Emily Samperio and Mayra Hernandez
75. Tommy Taing
76. Matthew Tang
77. Pavithra Wijeratne

Judges for Oral and Poster Presentations

Gilberto Acosta	Kinesiology and Nutritional Science
Nikola Alenkin	Social Work
Brenda Andrade Rounds	Chemistry and Biochemistry
Austin Attaway	Psychology
James Brady	Anthropology
Mathias Brieu	Mechanical Engineering
Julie Diaz	Chicana/o and Latina/o Studies
Edward Eivers	Biological Sciences
Ndifreke Etim	Public Health
Alireza Farahmand	Geosciences and Environment
Yilin Feng	Technology
Charles Flores	Educational Leadership
Debra Garcia	Psychology
Carlos Godinez	Chemistry and Biochemistry
Hector Gusha	Psychology
Beth Hoffman	Public Health
Rui (Shelley) Hu	Accounting
Harry Kartounian	Marketing
Kidogo Kennedy	Honors College
Seth Kurzban	Social Work
Steve LaDochy	Geosciences and Environment
Shichun Ling	Criminalistics and Criminal Justice
Charles Liu	Electrical and Computer Engineering
Sonya Lopez	Civil Engineering
Abdullah Maruf	Electrical and Computer Engineering
Muhammed Mollah	Marketing
Kim Morland	Kinesiology and Nutritional Science
Socorro Orozco	Curriculum and Instruction

Summer Peng	University Librarian
Edith Porter	Biological Sciences
Gustavo Ramirez	Biological Sciences
Jinae Roa	Biological Sciences
Joshua Ruffin	Criminalistics and Criminal Justice
Jeffrey Santner	Mechanical Engineering
Tatev Sarkissyan	Psychology
Caitlin Scott	Chemistry and Biochemistry
Anthony (Tony) Shaheen	Mathematics
Jason Shiotsugu	Office of Research, Scholarship, and Creative Activities
J. Travis Shutz	History
Gregory Stevens	Public Health
Keirstin Uomoto	Nursing
Tarisi Vunidilo	Chicana/o and Latina/o Studies
Sen Wang	Computer Science
Xin Wen	Chemistry and Biochemistry

This list was created on 03/05/2024; we apologize if you have been omitted.

ORAL PRESENTATIONS

Group 1 ▪ Behavioral and Social Sciences
▪ University-Student Union – Alhambra Room 305

9:00 **Jiawei Xiang**
M.A. Psychology
Darker Skin, Less Pain? Racial Bias on Social Pain Perception Perpetrating Latinx Health Disparity
Faculty Mentor: Dr. Senqi Hu

9:15 **Darlene Ramirez**
M.A. Psychology
Childhood Experiences and Adult Personality: Links between Pampering, Narcissism, Self-Efficacy and Social Interest
Faculty Mentor: Dr. Heidi Riggio

9:30 **Villiam Ralica**
M.A. Psychology
Attitudes toward Abortion and Knowledge of Abortion: Links with Right-Wing Authoritarianism
Faculty Mentor: Dr. Heidi Riggio

9:45 **Aundia Dianat**
B.A. Psychology
The Biasing Nature of Gang Evidence: Inducing Memory Errors for Evidence of Past Criminal Behavior
Faculty Mentor: Dr. Mitchell Eisen

Break 10:00 – 10:15

10:15 **Karina Olmos**
M.S. Forensic Psychology
Mistaken Identifications Can Create Memory Distortion: How Pre-identification Testing, and Post- Identification Feedback Affect Memory Change.
Faculty Mentor: Dr. Mitchell Eisen

10:30 **Annabel Reay**
M.S. Forensic Psychology
Moral Outrage and Decision Making in a Mock Trial
Faculty Mentor: Dr. Alma Olaguez

10:45 **Kimia Lavasani**
M.S. Forensic Psychology
Striving for Fairness: Emotions in Civil Litigation Cases
Faculty Mentor: Dr. Alma Olaguez

Break 11:00 – 11:15

11:15 **Bryan Gil Zamudio and Citlali Montes**
B.A. Psychology
The Dynamics of Group Deliberations in a Mock Trial: A Qualitative Analysis
Faculty Mentor: Dr. Alma Olaguez

11:30 **Jayla Edwards**
M.S. Forensic Psychology
The Impact of Pre- and Post- Visualization Instructions on Witness' Susceptibility to Suggested Misinformation
Faculty Mentor: Dr. Mitchell Eisen

Group 2 ▪ Behavioral and Social Sciences II
▪ University Student Union – San Gabriel Room 313

9:00 **Melissa Rios**
M.A. Psychology
Online Incel Forums: Exploring Sexism and Masculinity Themes
Faculty Mentor: Dr. Heidi Riggio

9:15 **Selena Morentin**
M.A. Sociology
The Impact of IPV on the Academic Success of First Generation College Going Women
Faculty Mentor: Dr. Shweta Adur

9:30 **Janielle Monroy**
M.A. Sociology
Children of Undocumented Parents
Faculty Mentor: Dr. Katie Dingeman

9:45 **Francesca Masi**
M.S. Social Work
The Mental Health Impact of True Crime Media
Faculty Mentors: Dr. Anh-Luu Huynh-Hohnbaum and Dr. Seth Kurzban

Break 10:00 – 10:15

10:15 **Ayse Durak**
M.S. Social Work
How Gender and Sexuality Influence Body Satisfaction
Faculty Mentors: Dr. Anh-Luu Huynh-Hohnbaum and Dr. Seth Kurzban

10:30 **Cristina Zetino**
M.A. Psychology
Social Dominance Orientation as a Mediator between Religiosity and Racism toward African Americans
Faculty Mentor: Dr. Heidi Riggio

10:45 **Jessica Eick**
M.A. Economics
The Effects of Economic Uncertainty on Higher Education Enrollments and Attainments
Faculty Mentor: Dr. Niraj Koirala

11:00 **Neille John Apostol**
M.A. Public Health
Gender moderates social media use's effect on psychological distress in California young adults
Faculty Mentor: Dr. Ndifreke Etim

Break 11:15 – 11:30

11:30 **Vivien Romo**
M.A. Economics
Effects of Uncertainty on Labor Migration: Evidence from the Philippines
Faculty Mentor: Dr. Niraj Koirala

11:45 **Theresa Marie Bernal**
B.S. Kinesiology
Knowledge, Opinions, and Perceived Barriers toward Research among CSULA Undergraduate students
Faculty Mentor: Dr. Leila Rahnama

12:00 **Noemi De Jesus**
M.A. Public Health
Exploring Institutional Preferences for Healthcare Resources among Southeast Asian American Individuals: Insights from the SEA US, HEAR US Study.
Faculty Mentor: Dr. Melanie Sabado-Liwag

Group 3 ▪ Biological Sciences
▪ University-Student Union – Los Angeles A Room 308A

9:00 **Michael Zitser**
B.S. Biochemistry, Minor in Art
Sphingopyxis alaskensis*: a Bacterial Isolate Relevant as a Partner in Manganese Lithotrophy*
Faculty Mentor: Dr. Gustavo Ramírez

9:15 **James Araiza**
M.S. Biology
The Effects of Body Weight Supported Treadmill and Overground Training on the BDNF, TrkB, and CREB expression in Severe Spinal Contused Rodents
Faculty Mentor: Dr. Michael Joseph

9:30 **Irene Ngo**
M.S. Biology
Investigating the role for Rbp2 in regulating the circadian clock in the cyanobacterium Synechococcus elongatus
Faculty Mentor: Dr. Susan Cohen

9:45 **Krisha Algoso**
M.S. Biology
Investigating the Antibacterial Potential of Native Chumash Medicinal Plants
Faculty Mentor: Dr. Kirsten Fisher and Dr. Caryl Ann Becerra

Break 10:00 – 10:15

10:15 **Tammy Pham**
B.S. Biology, General Option
Investigation of nanoplastics neurotoxicity on SH-SY5Y human neuroblastoma cells
Faculty Mentor: Dr. Yixian Wang

10:30 **Aaron Cruz**
M.S. Biology
Blue Light as a Potential Antimicrobial Therapeutic Agent
Faculty Mentor: Dr. Hyunsook Park

10:45 **Jocelyn Alfaro**
M.S. Biology
Locomotor exercise on inflammatory and plasticity markers in severely contused spinal cord injured rodents
Faculty Mentor: Dr. Michael Joseph

11:00 **Janette Dzul**
M.S. Biology
High-quality RNA Extraction from the Acid-fast Bacterium Mycolicibacterium smegmatis, a model organism for Mycobacterium tuberculosis
Faculty Mentor: Dr. Edith Porter

Break 11:15 – 11:30

11:30 **Kam Hang Chan and Nancy Diaz**
M.S. Chemistry, Physical and Analytical Chemistry; B.S. Biology
Method application of using surface plasmon resonance microscopy to monitor activity on S Epi
Faculty Mentors: Dr. Edith Porter and Dr. Yixian Wang

Group 4 ▪ Humanities and Letters I
▪ University-Student Union – Montebello Room 309

9:30 **Calvin Canfield**
M.A. Philosophy
Autism and Gender: What's the Connection?
Faculty Mentor: Dr. Katie Howard

9:45 **Lilian Salas**
B.A. English
Re-examining the Southwest's Literary Landscape: Gothic Literature and Tomás Rivera's …*Y no se lo tragó la tierra/ … And the Earth Did Not Devour Him*
Faculty Mentor: Dr. Matthew Gonzales

10:00 **Marineh Mousalu**
B.A. Anthropology
Dental Wear Indicative of Spinning Found in the Midnight Terror Cave Assemblage
Faculty Mentor: Dr. Michele Bleuze

10:15 **Cristina Cortés**
M.A. Latin American Studies
Mujeres Indígenas: Resistiendo Las Violencias y Protegiendo Sus Territorios
Faculty Mentor: Dr. Sandra Gutierrez de Jesus

Break 10:30 – 10:45

10:45 **Marjorie Hunt**
M.A. History
Flora, Fauna, Terra Firma: Landscapes of Portuguese America in Early Modern European Travelogues
Faculty Mentor: Dr. Kittiya Lee

11:00 **Katherine Haniel Lainez**
M.A. Latin American Studies
Dolorosamente Agradecidos: The Impacts of Parental Out-Migration on Left-Behind Children in Honduras in the 1970s
Faculty Mentor: Dr. Enrique Ochoa

Group 5 ▪ Humanities and Letters II
▪ University-Student Union – Pasadena Room 307

9:30 **Carlos Somoza**
M.A. Latin American Studies
Rhizomes of Resistance: Hip Hop Dreams of Liberation from the Bronx to Puerto Rico and Central America
Faculty Mentor: Dr. Erika Verba

9:45 **Alex Derbyshire**
M.S. Kinesiology
Weight Inclusivity In The Running Industry: A Professional Development Training Program
Faculty Mentors: Dr. Saemi Lee, Dr. Sierra Cordova and Dr. George Crocker

10:00 **Alyssa Herrera**
Post Baccalaureate Women's Gender & Sexuality Studies
Liberation in a Chicana Body
Faculty Mentors: Dr. Dionne Espinoza and Dr. Alejandra Marchevsky

10:15 **Frank Sposato**
M.S. Social Work
The Impact of Education on Rural Ugandan Girls and Their Communities
Faculty Mentor: Dr. Jieru Bai

Break 10:30 – 10:45

10:45 **Robert Coronado Jr.**
M.A. History
Purépecha Polyptychs: Renaissance Triptychs and Episodic Fragmentation in the Relación de Michoácan
Faculty Mentor: Dr. Manuel Aguilar-Moreno

11:00 **W. James Carter II**
B.A. Anthropology I, B.A. Music
A Discourse on Settler Colonialism
Faculty Mentor: Dr. Rafael Gomez

11:15 **Edward Romero**
M.A. Chicano and Latino Studies
South Los Angeles and USC: Conflict of Shared Space in an Urban Environment
Faculty Mentor: Dr. Anita Revilla

Group 6 ▪ Engineering and Computer Sciences I
▪ University-Student Union – Los Angeles C Room 308C

9:00 **Elizabeth Nunez**
M.S. Civil Engineering
Laboratory Investigations into the Effects of Heating on Clay's Mechanical and Hydraulic Changes Using Geophysical Methods
Faculty Mentor: Dr. Wing Shun Kwan

9:15 **Brandon de Jesus**
B.S. Civil Engineering
Comparison of Advanced Hydraulic Properties between Microplastic and Fines in Sands
Faculty Mentors: Dr. Wing Shun Kwan and Dr. Gustavo Menezes

9:30 **Geethanath Duggiralla**
M.S. Materials Science and Engineering
Polythiophene solar cells P-N Junction
Faculty Mentor: Dr. Dianlu Jiang

9:45 **Albert Bernal and Marcello Canova**
B.S. Mechanical Engineering
Validation of an Externally Heated Diverging Channel for Flame Speed Measurement
Faculty Mentor: Dr. Jeffrey Santner

Break 10:00 – 10:15

10:15 **Amirhesam Shakibizadeh**
M.S. Materials Science and Engineering
Process-Induced Texture Formation in 316L Stainless Steel Samples Processed by Wire-Laser Directed Energy Deposition
Faculty Mentor: Dr. Mohsen Eshraghi

10:30 **Matthew Engquist**
M.S. Materials Science
Scan-Strategies in Additive Manufacturing: Can We Control Microstructure?
Faculty Mentor: Dr. Mohsen Eshraghi

10:45 **Anayely Saguilan**
M.S. Mechanical Engineering
Analysis of Fuzzy Control Robustness in a Multi-room Building Testbed
Faculty Mentor: Dr. Arturo Pacheco-Vega

11:00 **Cesar Leal**
M.S. Civil Engineering
Sand Post-Liquefaction Monotonic Responses with Various Loading Directions and Angularity
Faculty Mentor: Dr. Wing Shun Kwan

Group 7 ▪ Engineering and Computer Science II
▪ UAS Executive Boardroom

9:15 **Arpit Vaishya**
M.S. Computer Science
Web Based 3D Remote Interaction Tool
Faculty Mentors: Dr. Navid Amini and Dr. Jung Soo Lim

9:30 **Dikshant Sagar**
M.S. Computer Science
Deep Generative Models for New Ligand Discovery
Faculty Mentor: Dr. Negin Forouzesh

9:45 **John Triantafyllos**
M.S. Civil Engineering
Seismic Design and Performance Testing of Steel Structures with Special Concentrically Braced Frames Using the Cal State LA Shake Table
Faculty Mentor: Dr. Maryam Nazari

10:00 **Stellina Ao**
B.S. Computer Science, Minors in Biomedical Engineering and Mathematics
A Beta Regression Model Using Fractal Dimensionality to Predict Imagined Grip Force from EEG for Applications in Brain-Computer Interfaces
Faculty Mentors: Dr. Deborah Won and Dr. Jie Zhong

Break 10:15 – 10:30

10:30 **Luis Jimenez Diaz and Isuru Rajapakshe**
M.S. Electrical and Computer Engineering
Spectral analysis of changes in brain activity after repetitive transcranial magnetic stimulation to treat major depressive disorder
Faculty Mentor: Dr. Deborah Won

10:45 **Oscar Rodezno, Johan Rodriguez, Osvaldo Mendoza-Alvarez, and Junior Yah Torres**
B.S. Civil Engineering; M.S. Civil Engineering
Advancements in Sustainable Concrete: Experimental Testing of Modified Tire-Derived Aggregate for Seismic Resilience
Faculty Mentor: Dr. Maryam Nazari

Group 8 ▪ Physical Sciences
▪ University-Student Union – Los Angeles B Room 308B

9:00 **Samuel Groysman**
B.S. Biochemistry
Developing Non-Contact Plasmonic Electrochemical Microscopy for High-Resolution Bioanalytical Measurements
Faculty Mentor: Dr. Yixian Wang

9:15 **Jordan O'Kelley**
B.S. Physics, General Option
Simulating Organic Molecules in the Protostellar Disk to Understand the Origins of Life
Faculty Mentor: Dr. Susan Terebey

9:30 **Tony Tran**
M.S. Chemistry
Microplastic Pollution in Huntington Beach: Characterization and Implications for Coastal Waste Management
Faculty Mentor: Dr. Yixian Wang

9:45 **Alex Nikolian**
B.S. General Physics
The Correlation Between Low and High Mass Star Formation: Comparing the Envelope Mass Infall Rate of Low and Intermediate Mass Protostars
Faculty Mentor: Dr. Susan Terebey

Break 10:00 – 10:15

10:15 **Larry Rodriguez**
M.S. Chemistry
Advancing Materials Discovery Via the Prediction of the Electronic Density of States Using a Euclidean Neural Network
Faculty Mentor: Dr. Olaseni Sode

10:30 **Sailaja Muduganti**
M.S. Physics
Efficiency of Dye-sensitized solar cells using Titanium porphyrin Metal-organic frameworks
Faculty Mentors: Dr. Oscar Bernal and Dr. YangYang Liu

10:45 **Genesis Barzallo**
M.S. Chemistry
GCxGC-FID Quantification of Olefins in Alternative Fuels Produced from Plastic Waste Conversion
Faculty Mentor: Dr. Petr Vozka

Break 11:00 – 11:15

11:15 **Raul Reyes**
M.S. Physics
Increasing UIGO sensitivity by Syphoning Heat
Faculty Mentor: Dr. Marina Mondin and Dr. Harry Themann

11:30 **Kenneth Stebbing**
M.S. Physics
Shock Fronts at the Envelope Interface in the Class OiI Protostar L1527
Faculty Mentor: Dr. Susan Terebey

Abstracts of Oral Presentations

Group 1 ▪ Behavioral and Social Sciences I
▪ University-Student Union – Alhambra Room 305

Jiawei Xiang
M.A. Psychology
Darker Skin, Less Pain? Racial Bias on Social Pain Perception Perpetrating Latinx Health Disparity
Faculty Mentor: Dr. Senqi Hu

Literature highlights the influence of racial biases on pain perception, with evidence suggesting Black individuals are frequently deemed less sensitive and in less need of support compared to White individuals (Deska et al., 2018; 2020). However, this line of research has largely omitted other racial minorities, notably Latinx Americans. In two studies (total N = 2062), we investigated whether the racial bias observed in social pain perception extends to Latinx targets. Participants were primed by ten socially aversive scenarios (Trawalter et al., 2012). Following each scenario, they rated the perceived social pain of Black, White, and Latinx targets, sourced from the Chicago Face Database (CFD; Ma et al., 2015) Results indicated that both Latinx and other race participants judged Latinx male (Study 1) and female (Study 2) targets as least sensitive to social pain than Black and White target faces. Crucially, observed racial bias led to the assumption that Latinx require less support than White and Black individuals when dealing with aversion (Study 2). By enhancing the racial inclusion on the racial bias of pain perception literature, the current studies provide insights into the often-underestimated racial disparities affecting Latinx individuals.

Darlene Ramirez
M.A. Psychology
Childhood Experiences and Adult Personality: Links between Pampering, Narcissism, Self-Efficacy and Social Interest
Faculty Mentor: Dr. Heidi Riggio

Being pampered as a child and having no household responsibilities growing up is associated with lower self-efficacy (one's perception of their competence and their ability to perform tasks) (van Ingen et al., 2012; Riggio et al., 2010). Other research indicates that pampering is linked with greater narcissism, a grandiose sense of self-importance, and lower social interest, our connectedness with others (Capron, 2004; Highland et al., 2010). This study examines links between childhood experiences (pampering and household responsibilities), narcissism, self-efficacy, and social interest. Participants are 245 undergraduate students (194 women, *M* age = 24 years) who received 1% extra credit for completing an anonymous online survey including a measure for pampering by both mothers and fathers (Parker et al., 1979), the *Household Responsibility Scale* (Riggio et al., 2010), the *Narcissistic Personality Inventory* (Raskin & Terry, 1988), the *General Self-Efficacy Scale* (Sherer et al., 1982), and the *Social Interest Index* (Greever et al., 1973). Partial correlations controlling for sex, age, race, and social desirability suggest that pampering from mothers indicated having fewer household responsibilities growing up, and pampering from fathers was predictive of narcissistic traits in adulthood. Additionally, results suggest that narcissism is predictive of higher self-efficacy and lower social interest.

Villiam Ralica
M.A. Psychology
Attitudes toward Abortion and Knowledge of Abortion: Links with Right-Wing Authoritarianism
Faculty Mentor: Dr. Heidi Riggio

The political controversy surrounding the overturning of the Supreme Court case *Roe v. Wade* highlights a need for expanded research on political identity and attitudes toward abortion. Crawford (2021) found that political identity moderated the relationship between abortion knowledge and abortion attitudes, with Republicans having less accurate knowledge about abortion and more negative attitudes toward abortion rights. The current study considers the role of right-wing authoritarianism in relationships between political identity and abortion attitudes, as well as between political identity and accurate knowledge of abortion. Participants from Amazon Mechanical Turk (N = 237, 116 women, *M* age = 33.5 years) completed an anonymous online survey for three dollars, which included demographic questions, measures of abortion attitude and knowledge, and the Right-Wing Authoritarianism Scale (Altemeyer, 1983). Results indicate that participants who identified as Republican reported more authoritarian qualities and are less likely to support rights to safe, legal abortion. Political identity was not related to abortion knowledge, however, participants who scored higher on the Right-Wing Authoritarianism Scale reported less accurate knowledge of abortion. Results are discussed in terms of links between authoritarianism and sexism (Christopher & Mull, 2006), and social identity theory (Tajfel & Turner, 1979).

Aundia Dianat

B.A. Psychology
The Biasing Nature of Gang Evidence: Inducing Memory Errors for Evidence of Past Criminal Behavior
Faculty Mentor: Dr. Mitchell Eisen

In legal cases, jurors are instructed to not allow their personal beliefs influence their verdict decision. Despite the explicit instruction to remain unbiased, past research has demonstrated jurors often allow their preconceived notions impact the way they perceive a case. A total of two experiments were conducted, both aiming to investigate how gang affiliation can bias mock jurors' verdicts and lead to memory errors for evidence of past criminal behavior. In Experiment 1, those in the gang condition were significantly more likely to falsely remember hearing testimony about the defendant's criminal history. Experiment 2, based on a more representative sample, found gang evidence also led to more guilty verdicts. Findings from this study extends the literature on juror decision-making by suggesting a defendant's gang affiliation can create false memories for evidence never presented at trial, which might cause jurors to render legally unsound verdicts.

Karina Olmos

M.S. Forensic Psychology
Mistaken Identifications Can Create Memory Distortion: How Pre-identification Testing, and Post- Identification Feedback Affect Memory Change
Faculty Mentor: Dr. Mitchell Eisen

Eisen et al. (2022) demonstrated memory distortion by suggestively leading participants to misidentify an innocent suspect and mistakenly report a face tattoo when the actual culprit had a clean face. It is common practice in actual cases to obtain a description of the culprit prior to making an identification and to admonish witnesses that the culprit may-or-may not be present in the lineup. In previous experiments, Eisen and colleagues found that asking participants to provide a pre-identification description helped reduce the amount of false tattoo reports. On the other hand, this effect was reversed when the misidentification was reinforced with confirming feedback. The present study had participants (*N*=376) witness a carjacking where they were then shown a suggestive lineup where the target suspect (who had a face tattoo) was the only viable option. Participants were randomly assigned to describe the culprit before viewing the lineup and were admonished that the suspect may-or-may not be present. Those who misidentified the target suspect (choosers) were randomly assigned to receive confirming feedback. Logistic regression analyses indicated that those who misidentified the target suspect were more likely to recall the face tattoo, but as expected, confirming feedback reversed this effect.

Annabel Reay

M.S. Forensic Psychology
Moral Outrage and Decision Making in a Mock Trial
Faculty Mentor: Dr. Alma Olaguez

Participants served as mock jurors and were presented with a sexual or physical abuse case to examine decision making in a mock trial. A trial transcript of a female witness (either a child, age 9, or an adult, age 19) being questioned about an instance of abuse was presented to participants; no additional evidence other than the witness' testimony was provided. Jurors are expected to show higher emotional reactivity and moral outrage in the sexual abuse condition and when the witness is a child; furthermore, greater outrage and emotional reactivity are expected to predict more punitive decision making and confidence in one's decisions. Participants filled out an emotional reactivity measure before being presented with the trial transcripts. Following the trial transcripts, participants filled out the same emotional reactivity measure, a moral outrage measure, and gave their verdict decision, verdict justification, and confidence in their decision. Piloting through CSULA's subject pool (N = 89) revealed a strong effect of moral outrage on juror decisions despite other evidence brought forth to weaken the witness' credibility; furthermore, higher moral outrage in a sexual abuse case points to the possible motivation to believe the witness (regardless of age) without considering important case evidence.

Kimia Lavasani

M.S. Forensic Psychology
Striving for Fairness: Emotions in Civil Litigation Cases
Faculty Mentor: Dr. Alma Olaguez

Emotions can bias even the most well-intentioned individuals (Salerno, 2021), which can create unfair trials if left unchecked in jurors. Previous work by Olaguez (2021) on sex abuse cases found emotion regulation instructions (ERi) as useful in mitigating the biasing effects of emotions in jurors; by decreasing emotional reasoning and increasing logical reasoning. The current study expands on such work by examining ERi's influence on jurors in a motorcycle accident case. The study will utilize a 2x2 design, manipulating emotional details of victim statements (Emotional vs. Factual) and ERi (ERi vs. No ERi). The Emotional Case includes accident details and victim's feelings, while the Factual Case solely includes accident details. Four-hundred and fifty undergraduate psychology students from California State University, Los Angeles will be recruited and offered course credit to complete the survey-based study during in-person sessions. The central hypothesis asserts that ERi will lower liability verdicts, award amounts, and emotional reasoning. Preliminary trends (*N* = 24) suggest liability verdicts are higher in the Emotional Case (72.7%)

compared to the Factual Case (46.2%), and lower in the ERi condition (44.4.%) compared with the No ERi condition (66.7%).

Bryan Gil Zamudio and Citlali Montes

B.A. Psychology

The Dynamics of Group Deliberations in a Mock Trial: A Qualitative Analysis

Faculty Mentor: Dr. Alma Olaguez

The current study explores jury deliberations in Child Sexual Abuse (CSA) cases employing an 11-code scheme for qualitative analysis. CSA cases are known to evoke negative emotions (e.g., anger) leading to increased perceptions of guilt (Bright et al., 2006). initial findings have revealed that Emotion Regulation instructions (ERi) can reduce levels of anger in jurors when presented with a CSA case.Participants were divided into small groups on Zoom, deliberating for up to 30 minutes on a CSA case relying solely on the child's testimony. A qualitative analysis of 24 deliberation transcripts investigates the influence of ERi on juror discussion patterns. Each participant's speech was coded using the comprehensive 11-code scheme. The study's qualitative analysis focuses on discerning coding patterns in ERi recipients versus non-recipients. ERi-receiving jurors are expected to demonstrate increased evidence-focused discussions (e.g., Lack of Evidence) while those without ERi may lean towards opinion- focused discussions (e.g., Generalizations). Across groups, most discussions involved generalizations about how children are expected to react in abuse situations (37%). This study contributes valuable insights into the intricate dynamics of juror decision-making, particularly in emotionally charged legal contexts.

Jayla Edwards

M.S. Forensic Psychology

The Impact of Pre- and Post-Visualization Instructions on Witness' Susceptibility to Suggested Misinformation

Faculty Mentor: Dr. Mitchell Eisen

Eisen et al. (2022) demonstrated that when witnesses were led to misidentify an innocent suspect with a facial tattoo using a highly suggestive lineup, many witnesses mistakenly recall that the actual culprit had a facial tattoo. Research examining the cognitive interview (CI) shows its consistency in extracting more accurate details in eyewitness memory reports than any other interview approach (LaPaglia et al., 2014). This study sought to examine whether this consistency would transfer to a study in which participants were fed misinformation and then were asked to imagine the crime. Participants were 725 undergraduate students (female=75.7%) who, after viewing a simulated crime were asked to make an identification from a six-pack lineup wherein there was only one viable choice, and this suspect had a distinct feature (i.e., a face tattoo) that the actual culprit did not have. Choosers were then randomized to receive post- identification confirming feedback and after this, half of all participants received the imagination instructions. Results showed that witnesses who were asked to visualize the crime were significantly more likely to mistakenly report the culprit from the original crime video as having a face tattoo. These findings advance our understanding of how interviewing techniques can affect memory.

Group 2 ▪ Behavioral and Social Sciences II
▪ University-Student Union – San Gabriel Room 313

Melissa Rios
M.A. Psychology
Online Incel Forums: Exploring Sexism and Masculinity Themes
Faculty Mentor: Dr. Heidi Riggio

Within the last few years, there has been a rise in misogyny on social media websites and online forums. A group of men that identify as "involuntarily celibate" – or "incels" – bond over their shared distrust of women, anti-feminist and misogynistic beliefs, and frustration toward society's hierarchical views of manhood (Daly & Reed, 2021). Studies focused on this group have ranged from analysis of the emotions that motivate "incels" (Cottee, 2020), the correlation between masculinity threat and their violent fantasies (Scaptura & Boyle, 2019), and analysis of the demographic and cognitive traits of "incels" who have attempted or successfully committed homicide (Williams et al., 2021). The goal of this qualitative study is to further increase our understanding of the "incel" population and the themes that commonly appear in the online forums and websites they frequent or create using types of sexism identified within social psychology: hypermasculinity (Hickey, 2016), hostile and benevolent sexism (Hammond et al., 2018), modern sexism (Lewis, 2017), and precarious manhood (Bosson et al, 2009). One hundred, one social media posts from nine different sources, including achived posts and active forums, are analyzed.

Selena Morentin
M.A. Sociology
The Impact of IPV on the Academic Success of First Generation College Going Women
Faculty Mentor: Dr. Shweta Adur

It takes self-agency, confidence, and efficacy to carry oneself through a collegiate experience, but how does a poor intimate relational environment affect one's academic success in college or their confidence reinforcement to perceive collegiate success? Further, in what ways does this affect one's collegiate experience in regards to their higher educational journey? There have been many studies in accordance with the collegiate experience, however, there is dearth in regards to the phenomenon of how college students' academic success and self-esteem are affected while having gone through, or currently going through, a relationship involving intimate partner violence (IPV). This is a qualitative research project that focuses on the question: How does intimate partner violence affect college student's drive towards academic success and their self worth? Data was collected through semi-structured interviews. This research project analyzes the specific demographic of first generation college going women as this particular population is statistically affected from this social phenomenon.

Janielle Monroy
M.A. Sociology
Children of Undocumented Parents
Faculty Mentor: Dr. Katie Dingeman

This study examined the ways children with undocumented parents are affected in everyday life in the United States. Using a family systems approach, the research explored the obstacles these individuals face as they navigate daily life, with a strong emphasis on mental health as a direct outcome and a mediating factor for a variety of other life course events, including education, employment, social services, and relationships. I used convenience and snowball sampling design to conduct 15 interviews with children of undocumented parents that consisted of open-ended questions. The interviews were analyzed with thematic coding to focus on main ideas from all interviewees. The research is anticipated to show that children of undocumented students face different obstacles within the United States to succeed. Although the children are citizens of the United States, their parents' legal status brings hardships for them and their families.

Francesca Masi
M.S. Social Work
The Mental Health Impact of True Crime Media
Faculty Mentors: Dr. Anh-Luu Huynh-Hohnbaum and Dr. Seth Kurzban

True crime media, including nonfiction books, podcasts, documentary film and television, dramatized film and television of real crimes, YouTube videos, TikToks, and Reddit threads are more popular than ever before in our modern era. To date, there is little research on the impact of true crime media consumption on anxiety and depression. Research on the effects of horror films, violent video games, and the viewing of violent mass media like the *Challenger* explosion and coverage of

9/11 indicate generally that the more violent media consumed, the worse the mental health impact, but results are still mixed across these different fields of study. This study asks the questions: how does true crime media impact anxiety and depression? Are females more likely than males to consume true crime media? Are females who consume true crime media more likely to experience anxiety and depression than males? I collected survey data from participants (n=155) on the frequency of their true crime consumption (times per day, week, year) and utilized the GAD-7 to measure anxiety symptoms, and the Beck Depression Inventory. Findings and implications to be discussed.

Ayse Durak

M.S. Social Work
How Gender and Sexuality Influence Body Satisfaction
Faculty Mentors: Dr. Anh-Luu Huynh-Hohnbaum and Dr. Seth Kurzban

Body dissatisfaction significantly impacts mental and physical health, correlating with depression, body dysmorphia, and disordered eating behaviors. Research has consistently shown higher levels of body dissatisfaction among sexual minority men compared to heterosexual men, often attributed to societal objectification and minority stress theories. However, disparities between sexual minority women and heterosexual women remain inconclusive. Overall, heterosexual men tend to exhibit the least dissatisfaction, while women, regardless of sexual orientation, experience the most. This study investigates two key research questions: 1) How does minority status impact body dissatisfaction levels?
2) Which combination of minority status identities is the strongest predictor of body dissatisfaction? Incorporating three variables – gender, sexuality, and androphilia – the study explores their intersection with body dissatisfaction. Given that sexual minority women who are also attracted to men are considered minorities across all of these variables, it is hypothesized that they will demonstrate the highest levels of dissatisfaction. Data for this study was collected through an online survey. Data analysis is expected to unveil predictors of dissatisfaction and protective factors, essential for targeted interventions. Addressing research gaps, particularly in women, this study seeks to advance understanding of body image concerns and inform strategies to mitigate the impacts of body dissatisfaction.

Cristina Zetino

M.A. Psychology
Social Dominance Orientation as a Mediator between Religiosity and Racism toward African Americans
Faculty Mentor: Dr. Heidi Riggio

This study examines relations between religiosity, social dominance orientation, and new racism toward African Americans and Latinx Americans. Adults (*N* = 398, *M* age = 36, 264 men) recruited via Amazon Mechanical Turk completed an anonymous online survey for one dollar. Measures included new racism (e.g., "*Latinx Americans are more likely to make progress by not pushing so hard for change* ," Jacobson, 1985) (a = .79) toward African and Latinx Americans; one item to indicate religiosity (" / *consider myself to be a religious person*"); and a 15-item measure of Social Dominance Orientation (SDO) (e.g., " */nferior groups should stay in their place*," Pratto et al., 1994). Regression analyses indicate that while both SDO and religiosity are linked to racism toward both groups, SDO mediates the link between religiosity and racism toward African Americans but not for racism toward Latinx Americans. These results suggest that racism toward African Americans is predicted by orientation toward social hierarchy but not by religiosity. Both religiosity and SDO however are independently linked with racism toward Latinx Americans, likely because of the association between Latinx culture and Catholocism. Results are discussed using social identity theory (Tajfel & Turner, 1979).

Jessica Eick

M.A. Economics
The Effects of Economic Uncertainty on Higher Education Enrollments and Attainments
Faculty Mentor: Dr. Niraj Koirala

Our study aimed to assess the impact of economic uncertainty on undergraduate enrollments and attainment across all 50 US states. We utilized the University of Michigan survey of consumers and the Economic Policy Uncertainty index, with robustness checks. The model incorporated panel data from 1956 Title IV institutions (baccalaureate or above degree-granting universities) in the US from 2004-2021. Our model included uncertainty measures, enrollment levels as a percentage of each state's population, state GDP, state-level expenditures per capita on higher education, and the percentage of the population under 18. Community college data were analyzed separately. To address endogeneity, we employed a Generalized Method of Moments (GMM) with an instrumental variable (IV). Results indicated that as uncertainty increased, enrollments also increased, but the findings were ultimately insignificant. However, further analysis revealed significant heterogeneity among states in

terms of uncertainty impacts on higher education.

Neille John Apostol

M.A. Public Health

Gender moderates social media use's effect on psychological distress in California young adults

Faculty Mentor: Dr. Ndifreke Etim

Because of the observed link between social media use and mental health in young adults, a deeper understanding of the mechanisms that underlie this association is needed to inform public health interventions. In this cross-sectional study, we used the data from the 2019 California Health Interview Survey to conduct weighted multivariable logistical regression analyses. Our models looked at frequency of social media use as the exposure and psychological distress measured using the Kessler-6 distress scale as the outcome. Demographic variables, socioeconomic status, and self-reported health status were included as covariates. While we found a correlation between social media and psychological distress, this association was similarly significant when we factored gender into social media use frequency. This suggests that gender plays a moderating role. For females, frequent social media use was more associated with psychological distress. In contrast, the data showed the opposite for males with frequent social media use as less associated with psychological distress. These epidemiological findings demonstrate how gender differentially impacts the effect of social media use on psychological distress. Future research should further examine how different uses of social media and other sociocultural factors may influence the moderating effect of gender.

Vivien Romo

M.A. Economics

Effects of Uncertainty on Labor Migration: Evidence from the Philippines

Faculty Mentor: Dr. Niraj Koirala

This paper analyzes and investigates various macroeconomic and socioeconomic determinants related to labor migration. In particular, there is focus on the effects of uncertainty and corruption on labor migration. The study focuses on the possible reasons why Filipinos are inclined to leave the Philippines and pursue to live in other countries to work. This despite the possible repercussions of leaving their households. Labor migrants are typically those belonging to the more educated class. The country has seen a massive migration of teachers and healthcare workers abroad over time. The Philippines is thus left with a shortage of talent, hence possibly sacrificing the level of education and health care in the country (Quimbo, et.al., 2008). This study also looks into related literature regarding migration, employment and perceived income. Preliminary results show that higher overall uncertainty increases labor migration from the Philippines to other countries. Wages in-country also trend downward as a result. Labor migration and brain drain is exacerbated by various political issues such as corruption and polarization.

Theresa Marie Bernal

B.S. Kinesiology

Knowledge, Opinions, and Perceived Barriers toward Research among CSULA Undergraduate students

Faculty Mentor: Dr. Leila Rahnama

Background: Research can present undergraduates with valuable tools and knowledge that can be used in future settings. Methods: This cross-sectional study was conducted among the undergraduate students of CSULA. The required information was obtained through a self-designed questionnaire in Qualtrics. Participants were asked to answer 15 multiple-choice and 2 matrix-style questions on their demographics, knowledge, opinions, and perceived research barriers. Results: A sample of 49 students voluntarily participated in this study. 79.6% of participants were first generation university students coming from their immediate families. We observed that 57.1% (n=28) of participants have not participated in a research study and 77.6% (n=38) of participants were unaware of the campus research opportunities. General knowledge of research among students varied. Students exhibited positive attitudes towards research, with 73.5% (n=36) agreeing that research is beneficial for their future and 87.8% (n=43) understand the value of research. Lack of encouragement 78.3% (n=36) and lack of time 69.75% (n=32) 44.9% were among the top commonly perceived barriers. Conclusion: Our sample of undergraduates showed positive attitudes towards research, although feelings of nervousness to start research and finding research stressful where barriers students faced with research. Therefore, students' positive attitudes towards research can be developed into better training systems.

Noemi de Jesus

M.A. Public Health

Exploring Institutional Preferences for Healthcare Resources among Southeast Asian American Individuals: Insights from the SEA US, HEAR US Study

Faculty Mentor: Dr. Melanie Sabado-Liwag

Community organizations play a pivotal role in empowering individuals by providing access to essential resources such as healthcare, education, and social services. This study aims to understand the degree of

engagement with community organizations among Southeast Asian American (SEA) individuals, focusing on their propensity to seek support from these organizations compared to other institutions. As part of the SEA US, HEAR US Study designed to assess the impacts of COVID-19 on SEA communities, qualitative data was collected to examine institutional preferences for healthcare-related resources. A total of 935 SEA individuals were recruited across the greater Los Angeles area and administered the baseline survey. Our hypothesis posits that SEA individuals prioritize community organizations as their preferred access point for healthcare-related resources. While research findings are undergoing analysis, preliminary insights suggest a significant inclination towards community organizations within the SEA community for accessing healthcare resources and support. Understanding these preferences is paramount for tailoring outreach efforts and enhancing the effectiveness of services targeting the SEA demographic.

Group 3 ▪ Biological Sciences
▪ University-Student Union – Los Angeles A Room 308A

Michael Zitser
B.S. Biochemistry, Minor in Art
Sphingopyxis alaskensis*: a Bacterial Isolate Relevant as a Partner in Manganese Lithotrophy*
Faculty Mentor: Dr. Gustavo Ramírez

The oxidation of manganese has been theorized to fuel the growth of chemolithoautotrophic microorganisms. An enrichment culture was refined and found to rely on Mn(II) oxidation for growth. Unpublished observations show that Sphingopyxis alaskensis can substitute for Ramlibacter lithotrophicus in the co-culture. This study characterizes and determines optimal conditions for growth for S. alaskensis and investigates its candidacy for genetic manipulation. This aids in the ultimate goal of exploring the partnership with the main oxidizer in the co-culture. Cell and colony morphology were characterized, and growth kinetics were measured in different media. Although the type strain was isolated from Alaskan saltwater, our strain was isolated from Pasadena tap freshwater. Examining the strain's growth and viability across varying salinity levels revealed an optimal salinity level of 13.13 ppt for growth and no discernible trend in cell viability. Bacterial electroporation and conjugation methods were tested to establish a molecular genetics protocol. Electroporation with electrocompetent S. alaskensis cells yielded transformed colonies resistant to antibiotic concentrations, to which the wild-type strain was sensitive. This work contributes to the understanding and use of S. alaskensis as a model organism to probe into biotic manganese oxidation.

James Araiza
M.S. Biology
The Effects of Body Weight Supported Treadmill and Overground Training on the BDNF, TrkB, and CREB expression in Severe Spinal Contused Rodents
Faculty Mentor: Dr. Michael Joseph

Spinal cord injury (SCI) is a debilitating neurological disorder that restricts movement in addition to secondary complications. Exercise rehabilitation is used to improve locomotor recovery and other complications in SCI patients, with body weight-supported treadmill training (BWSTT) being the most commonly used method. Rodent studies have provided a detailed understanding about SCI pathophysiology and spinal plasticity, which are key to understand how exercise impacts functional recovery. Yet, a majority of the rodent research utilizes treadmill training as a main method of rehabilitation, excluding the importance, and the potential benefits, of overground training. Therefore, our lab has developed a novel, overground rodent training device that enables volitional quadrupedal locomotion, which will be combined with treadmill training to improve locomotor recovery in severely contused rodents. To assess the molecular impact of this novel training paradigm, expression levels of plasticity markers BDNF, TrkB, and CREB were examined at the injury site and various segments of the lumbar. The main finding was the injury site was most receptive to the combined treadmill and overground training with respect to CREB expression. Overall, the data will be integrated with kinematic analysis to understand the impact of these differentially expressed genes on functional recovery.

Irene Ngo
M.S. Biology
Investigating the role for Rbp2 in regulating the circadian clock in the cyanobacterium Synechococcus elongatus
Faculty Mentor: Dr. Susan Cohen

Circadian rhythms enhance fitness for cells growing in environmental cycles. Cyanobacteria are the only prokaryotes known to display circadian rhythmicity, where *Synechococcus elongatus* is the model organism for studying the circadian clock. The circadian clock in cyanobacteria is composed of KaiA, KaiB, and KaiC oscillator proteins, which regulate several activities over the course of the day including global rhythms of gene expression. Previous work from our lab has shown that RNA-binding protein 2 (Rbp2) is an important factor for normal clock function. Rbp2 is a eukaryotic-like RNA-binding protein that contains a single RNA recognition motif. It was found that Rbp2 interacts with KaiC and deletion of Rbp2 results in long-period rhythms. The expression of RNA binding deficient mutants results in long-period rhythms revealing that the RNA binding activity of Rbp2 is involved in the regulation of the circadian clock. We are currently focused on investigating Rbp2 interactions with RNA. We have co-purified RNA bound to Rbp2, where our preliminary results suggest that Rbp2 shows rhythmic associations with RNA throughout the day. RNA binding mutants show reduced RNA binding. Based on these results, we determined time points that will be sent for sequencing

to determine significant RNA(s) that associate with Rbp2.

Krisha Algoso

M.S. Biology
Investigating the Antibacterial Potential of Native Chumash Medicinal Plants
Faculty Mentors: Dr. Kirsten Fisher and Dr. Caryl Ann Becerra

This study investigates the antibacterial potential of 18 native medicinal plants traditionally used by the Chumash, an indigenous tribe from the central and southern coast of California and the Channel Islands, by exploring the effectiveness of various plant extracts on *Escherichia coli*, *Bacillus subtilis*, and *Pseudomonas fluorescens*. 1:10 and 1:5 concentrations of plants in water, ethanol, acetone, and hexane were tested using the Kirby-Bauer disk diffusion method. The 1:5 concentrations of plant extracts in ethanol were more effective on *B. subtilis* and *P. fluorescens*. Lemonade berry + white sage and lemonade berry + coastal sage displayed a synergistic effect, displaying larger zones of inhibition compared to individual plant extracts tested on *B. subtilis*. Yarrow + manzanita and yarrow + rue produced a significantly greater (p- value ≤ 0.03) antibacterial effect on *E. coli* and *P. fluorescens*. In general, the plant extracts had a bacteriostatic effect, not bacteriocidal. Future work includes identifying the minimum inhibitory concentration of the most effective plant extracts, characterizing the phytochemicals responsible for the antibacterial properties, and testing them on other bacteria. The results highlight potential avenues for developing medicinal herbal remedies to address the growing concern of antibiotic resistance.

Tammy Pham

B.S. Biology, General Option
Investigation of nanoplastics neurotoxicity on SH-SY5Y human neuroblastoma cells
Faculty Mentor: Dr. Yixian Wang

Increased plastic production and waste mismanagement since 1950 has resulted in severe environmental pollution. Plastic bags, bottles, fragments, and scrap tires accumulate in various ecosystems, breaking down into microplastics (<5 mm) and nanoplastics (<1000 nm), which can cause possible harmful effects to the human body. In this work, we use SH-SY5Y human neuroblastoma cell line (ATCC CRL-2266) as an in vitro model for investigating the neurotoxicity of various types of nanoplastics such as commercial polystyrene (PS) and in-house fabricated polyethylene terephthalate (PET) nanoplastics. The methoxynitrosulfophenyl-tetrazolium carboxanilide (XTT) and lactate dehydrogenase (LDH) assays were used to assess cell viability and membrane damage upon treatment of nanoplastics. The morphological changes of the cell membranes were monitored using scanning ion conductance microscopy (SICM), a high-resolution imaging technique which employs a nanopipette as a tip. The assays and SICM results have indicated increasing cytotoxicity with rising concentration of nanoplastics treatment and observed particle binding on cells. LDH assay results show increasing LDH release with higher concentrations of nanoplastics. Future work will involve studying nanoplastics from different sources and using surface plasmon resonance microscopy (SPRM) for real-time membrane-nanoplastic interaction kinetic studies. This work has been (partially) supported by NIH R15 (Grant 1R15NS120157- 01) and NSF HRD-2112554.

Aaron Cruz

M.S. Biology
Blue Light as a Potential Antimicrobial Therapeutic Agent
Faculty Mentor: Dr. Hyunsook Park

Candida albicans, a fungus inhabiting human mucosal surfaces, is a primary cause of vulvovaginal candidiasis (VVC), affecting 75% of women at least once in their lives. Traditional antifungal treatments with oral or topical medications can be ineffective or cause adverse effects. Antimicrobial blue light (ABL) has emerged as an alternative therapy for microbial infections, leveraging its microbicidal properties through oxidative stress and DNA damage. While ABL has shown promise against various microbial pathogens in vitro and in vivo, limited research has explored its efficacy against fungal infections. ABL operates at wavelengths between 400-470 nm, inducing intracellular reactive oxygen species production to impede microbial growth. This study aims to assess ABL's effectiveness in inhibiting *C. albicans* growth and determine optimal parameters for VVC treatment, including wavelengths, energy levels, irradiance times, and photosensitizers. We also compared the viability of blue light-treated *C. albicans* with *Gardnerella vaginalis*, a common bacterial pathogen linked to bacterial vaginosis, and *Lactobacillus crispatus,* a vital bacterium for vaginal homeostasis. This study highlights the potential of blue light treatment as a safe and effective approach for treating vaginal infection without disturbing normal commensal flora.

Jocelyn Alfaro

M.S. Biology

Locomotor exercise on inflammatory and plasticity markers in severely contused spinal cord injured rodents

Faculty Mentor: Dr. Michael Joseph

With 17,500 new cases of Spinal Cord Injury (SCI) occurring each year in the United States, understanding the plasticity mechanism after injury is critical. This study focuses on understanding the role inflammation and neuroplasticity have in a *severe* SCI in rats. We hypothesize in rats that undergo locomotor intervention known as Body-Weight Supported Treadmill Training (BWSTT) and/or circular Bodyweight-Supported Ambulatory Rodent Training (cBART) will lower inflammation and facilitate neuroplasticity in the spinal cord. In SCI contused rats, we imposed 8-weeks of locomotor training and measured the levels of TNF-alpha, major histocompatibility complex 1 (MHC1), and IL-10 in the thoracic, at the injury site, and lumbar segments of the spinal cord. The results show, the MHC-1, a neuroplasticity marker, was significantly greater in the lumbar segment of cBART trained and not in the contused group without training. Training did not modulate TNF-α levels in the lumbar region. No IL10 expression was detectable. This study shows exercise facilitated plasticity but did not reduce inflammation. Additional work will be required to consider the training intensity and varying severity of SCI contusion. Understanding of these mechanisms may be useful in developing better locomotor training methods and drug targets for facilitation of recovery following SCI.

Janette Dzul

M.S. Biology

High-quality RNA Extraction from the Acid-fast Bacterium Mycolicibacterium smegmatis, a model organism for Mycobacterium tuberculosis

Faculty Mentor: Dr. Edith Porter

Tuberculosis (TB), caused by *Mycobacterium tuberculosis (Mtb),* remains a major global health threat worldwide. Multidrug-resistant and extreme drug-resistant strains necessitate novel treatments for TB, including immune-based approaches. Preliminary data from our lab suggested that the antimicrobial peptide Human Beta Defensin 2 (HBD2), a natural protein-based innate immune effector molecule, inhibits the metabolic activity of *Mycolicibacterium smegmatis* (*Ms*), a model organism for *Mtb*. We hypothesize that HBD2 induces dormancy, a temporary state of inactivity, in *Ms*. To test this hypothesis, we wish to assess the expression of dormancy-regulated genes in *Ms* in the presence and absence of HBD2. However, this requires the extraction of high-quality RNA from *Ms*, like *Mtb,* a notoriously hard-to- lyse bacterium. The objective of this study was to establish a protocol to extract high-quality RNA from *Ms*. We found that chemically stabilizing the RNA, mechanically lysing the cells through tip sonication, followed by a column-based RNA extraction combined with DNAse treatment and final RNA purification and concentration yielded high purity and quality RNA. This protocol will be employed to obtain RNA for quantifying the expression of dormancy-regulated genes in *Ms* response to HBD2. This research may lead to novel approaches to treating TB targeting dormancy induction in *Mtb*.

Kam Hang Chan and Nancy Diaz

M.S. Chemistry, Physical and Analytical Chemistry;
B.S. Biology

Method application of using surface plasmon resonance microscopy to monitor activity on S Epi.

Faculty Mentors: Dr. Yixian Wang and Dr. Edith Porter

Healthcare-associated infections (HAis) are increasingly problematic due to the emergence of multidrug- resistant bacteria like Staphylococcus epidermidis (SE). This necessitates the development of new prophylactic and therapeutic strategies. Notably, approximately four out of every five implant infections are typically attributed to Staphylococci bacteria. Addressing this critical issue involves exploring innovative drugs, such as liposomal formulations containing antimicrobial lipids and peptides, to target SE effectively. To assess the effectiveness of these formulations against live SE, we are adopting Surface Plasmon Resonance Microscopy (SPRm), a label-free, real-time biomolecular interaction monitoring technique. SPRm allows us to monitor bacterial interactions with liposomes on the metal dielectric surface. However, before SPRm can deploy, it is imperative to establish SE viability in the presence of these formulations. We have devised a novel method inspired by the commonly used Trypsin Soy Agar plate for growing bacteria. This method incorporates Tetrazolium dye into agar to monitor SE viability. Our results showed that SE shows signs of survival after one hour on SPRm with at least 3 injections of buffer containing PBS and BSA. This gives us confidence to move on injection on antibacterial peptide on SPR, against SE.

Group 4 ▪ Humanities and Letters I
▪ University-Student Union – Montebello Room 309

Calvin Canfield
M.A. Philosophy
Autism and Gender: What's the Connection?
Faculty Mentor: Dr. Katie Howard

This project explores the relationship between gender and autism. This topic is currently on the rise for multiple reasons, including a recent meta-study finding that trans people are four to six times more likely to be autistic than their cis counterparts. Theories attempting to explain this overlap in population have not examined thoroughly and critically our ideas about what makes someone autistic and trans. I begin with the history of autism. I focus specifically on three points in this history: The Feminine Boy Project, the wrong-body account/extreme-male brain theory, and the role of the internet and other technology in the politicization of autistic and trans communities. It is vital to look closely at this history because if we are to propose new theories, it is crucial to understand how these many misguided theories went wrong. After this history, I move into the current rhetoric and laws, examining the ways that autism is used in our current anti-trans legislation to characterize trans people as incompetent and unable to identify themselves correctly. After this, I close with some theories that I will argue account for the overlap in population without further pathologizing trans and autistic people.

Lilian Salas
B.A. English
Re-examining the Southwest's Literary Landscape: Gothic Literature and Tomas Rivera's .Y no se lo tragó la tierra/… And the Earth Did Not Devour Him
Faculty Mentor: Dr. Matthew Gonzales

Much of U.S. Latine Literature focuses on transnational identities and duality within Latinidad. Because of this, Latine novels are often pigeonholed as texts solely about "identity," ignoring overlaps with other literary genres, like Modern Gothic Literature. Gothic literature is known for criticizing the culture of capitalism and is subdivided geo-socially with Southern Gothic in the U.S. and Tropical Gothic in the Global South. Yet elements of both subgenres exist in the Southwest, specifically in U.S. Latine Literature. The duality of "U.S. Latines" demonstrates how the Southwest, a space historically inhabited by Latines, disrupts artificial literary borders by fusing the thematic conventions of "southern" and "tropical" gothic literature. This fusion can be seen in Tomas Riveras' novel *.Y No Se Lo Tragó La Tierra/…And The Earth Did Not Devour Him.* By blending elements associated with both-such as isolation, marginalization, and the grotesque-Rivera humanizes Mexican migrant farmworkers and their children, demonstrating how they follow a long capitalist tradition of exploitation and unprotected labor. Ultimately, I argue that much like geo-social spaces associated with both Southern and Tropical Gothic literature, the Southwest, too, is haunted by the ghost of colonialism and labor exploitation.

Marineh Mousalu
B.A. Anthropology
Dental Wear Indicative of Spinning Found in the Midnight Terror Cave Assemblage
Faculty Mentor: Dr. Michele Bleuze

This study explores unique dental wear patterns resulting from the extra-masticatory use of teeth, particularly associated with the habitual utilization of anterior teeth for crafting yarn or thread. Examining isolated permanent teeth from a Late Classic (AD 600−900) dental collection at Midnight Terror Cave, Belize, we focused on the incisal surfaces of right and left maxillary and mandibular central incisors. Macroscopic and microscopic analyses were conducted, recording groove morphology, frequency, location, and tooth attrition stage. Out of 43 examined teeth, 16 (37%) displayed extra-masticatory grooves, with left upper (3/6) and right lower (5/10) teeth being the most affected. V- and U-shaped grooves exhibited comparable frequencies. Most teeth (12/16) had a single centrally located groove, and all grooved teeth displayed low attrition. Drawing on ethnographic, ethnohistoric, and archaeological evidence, our findings suggest the likely presence of spinners in this assemblage, shedding light on the sociocultural significance of ancient and modern Maya textile industries. By juxtaposing multiple lines of evidence, this study cautiously interprets extra-masticatory dental wear to glean insights into individual habitual behaviors.

Cristina Cortés

M.A. Latin American Studies

Mujeres Indígenas: Resistiendo Las Violencias y Protegiendo Sus Territorios

Faculty Mentor: Dr. Sandra Gutierrez de Jesus

All across Latin America, the territories of Indigenous women are being violated by the resource extractivism that is taking place and threatening their very survival. It is known that “between 2015 and 2017, 437 activists were murdered; 75 percent of these cases occurred in Latin America and all of them were connected to extractive activities” (Altamiro-Jiménez, 2021.) Amnesty International confirms that those who are most affected by these violences are Indigenous women. From the violation of the right to self-determination to *feminicidio*, the violences Indigenous women experience are “systemic, historical, and structural; and their principal causes include racism, patriarchy, colonialism, and an economic model based on exploitation” (CHIRAPAQ, 2022). My presentation will explore the multiple forms of violence Indigenous women continue to endure when protecting their *cuerpo-tierra territorios* (body-earth territory) (Cabnal, 2010) as my research focuses on *Las Defensoras de Agua y Tierra*, Indigenous women from Zacualpan, Colima and their struggle to protect their territories from resource extractivism.

Marjorie Hunt

M.A. History

Flora, Fauna, Terra Firma: Landscapes of Portuguese America in Early Modern European Travelogues

Faculty Mentors: Dr. Kittiya Lee

This project investigates the cultural geography of early Portuguese America. Reviewing a selection of sixteenth- and seventeenth-century travel narratives, I examine how European explorers, crown agents, and missionaries represented plants and physical features of the landscape (hills, rivers, bays) in their writings about the territories encompassed by Portugal’s Estado do Brasil and Estado do Maranhão e Grão-Pará. While early Brazilian travelogues are well-known for their controversial portrayals of indigenous cannibalism, I shift the focus to how these works describe the natural landscape of South America and portray indigenous interactions with that landscape. My guiding questions are twofold. First, how did Europeans interpret the new landscape they encountered in South America, beginning to shape the idea of Brazil as a place? Second, what do these early writings reveal about how indigenous people used plants and the natural landscape during the period of early contact with Europeans? I pay special attention to how indigenous people informed European understandings of Brazilian geography. I suggest that although Europeans often described the Portuguese American landscape as wild, untouched, and uncultivated land—creating a strong contrast to their ideals of sedentary agricultural civilization—their writings in fact reveal that they encountered a cultivated and semi-domesticated landscape.

Katherine Haniel Lainez

M.A. Latin American Studies

Dolorosamente Agradecidos: The Impacts of Parental Out-Migration on Left-Behind Children in Honduras in the 1970s

Faculty Mentor: Dr. Enrique Ochoa

Migration has been hailed as a "tool of development" for "underdeveloped" regions. Consequently, parents are often forced out of their homeland in search of livable wages which often comes at high costs to families that are left behind. Parental out-migration leaves children vulnerable to various types of violence and other hardships- especially when the migrant is a single parent. Building on emerging academic work focused on the experiences of left-behind children, I situate the personal account of my mother who was left behind by her mother. Despite the studies conducted throughout Asia and Central America, Honduras is largely forgotten in examining the impacts of parental out-migration on left-behind children. Research has shown that the social-emotional connections that are disrupted and damaged during childhood are not mitigated by reunifications. Left-behind children often find themselves displaced in their own country and are then similarly forced to migrate. These separations create intergenerational consequences within familial relationships that contribute to further loss. Utilizing scholarly articles, books, and my family's oral histories, my research concludes that parental out-migration comes at a cost to left- behind children. These costs are the afflictions that they are forced to bear in silence out of gratitude for their parent's sacrifice.

Group 5 ▪ Humanities and Letters II
▪ University-Student Union – Pasadena Room 307

Carlos Somoza
M.A. Latin American Studies
Rhizomes of Resistance: Hip Hop Dreams of Liberation from the Bronx to Puerto Rico and Central America
Faculty Mentor: Dr. Erika Verba

Since its birth in the United States, hip hop has spread to all parts of the globe in an uncontrolled and organic way. For some countries such as Puerto Rico, the influence of hip hop has had time to mature and develop. In other countries like El Salvador and Guatemala, hip hop is an underground movement that is just beginning. My paper explores the factors behind this musical advancement in Puerto Rico and the seeds that have created the movements in Guatemala and El Salvador. I also examine the ways these countries have blended traditional music to create unique regional sounds that are then used as vehicles for social and political expression. I critically analyze how Hip Hop arrived in Guatemala and El Salvador, both countries marred by civil wars. On a broader level, my paper contributes to the discussion around the erasure of black bodies in the Americas and how Hip Hop culture, in contrast, has allowed them to be seen and heard on their terms. I will discuss why this is an inherently political act in itself; the act of just existing and expressing yourself.

Alex Derbyshire
M.S. Kinesiology
Weight Inclusivity In The Running Industry: A Professional Development Training Program
Faculty Mentors: Dr. Saemi Lee, Dr. Sierra Cordova and Dr. George Crocker

Running is a popular outlet for recreational exercise and competition, a foundational element of many sports, games, and activities, and a hub for community gatherings. Despite this emphasis on community and an outward appearance of accessibility, the presence of weight stigma in exercise and running spaces is well documented. Due to the prevalence of weight stigma, individuals with larger bodies are often subjected to false assumptions of their health and poor treatment in running spaces. This treatment of larger runners, whether intentional or not, creates a more exclusive environment that can serve to perpetuate harmful myths regarding the relationship between weight and health. Existing research shows that training and education regarding the relationship between weight and health reduces weight stigma and promotes more inclusive environments. The purpose of this project is to provide an online course to aid in the professional development and education of employees in the running industry. The course will address the topics of weight stigma, weight science, and running-specific misconceptions about weight. This course is significant because it will reduce weight stigma and make running more accessible and inclusive for all bodies, allowing more individuals to find community and enjoyment through the sport of running.

Alyssa Herrera
Post Baccalaureate Women's Gender & Sexuality Studies
Liberation in a Wounded Chicana Body
Faculty Mentors: Dr. Dionne Espinoza and Dr. Alejandra Marchevsky

My Chicana body carries intergenerational and personal wounds; a split between the mind and body that blocks the path towards spiritual healing and moving freely. I was fed to believe that the more desirable our minds and bodies are, the more rewarded we will be; an unspoken transaction between the patriarchal order and women. Our bodies are subject to abuse and unequal power dynamics, unveiling the realities of the unspoken transaction we were expected to uphold. Left to live with the consequences of abuse and power from the transactions we don't even remember agreeing to, our minds grow detached from our bodies. Employing autohistoria teorfa, I analyze the life of my mother and my own relationship to heteronormative desirability to reveal paralyzing chains of colonial, patriarchal modes of existence. Disillusioned with promises of power and liberty through embodying heteronormative feminine desirability, I seek methods of radical empowerment that pull my body back together like Coyolxhauhqui. Gloria Anzaldua's concepts in *Borderlands* such as Coatlicue State, and concepts in *Luz en Lo Oscuro* such as imagination and the Coyolxauhqui Imperative guide me back to my body. I walk along the path of imagination, mysticism, and movement to be one with serpents.

Frank Sposato

M.S. Social Work

The Impact of Education on Rural Ugandan Girls and Their Communities

Faculty Mentor: Dr. Jieru Bai

Abstract: In rural Uganda, where gender disparities and socioeconomic challenges persist, examining the influence of education and potential risk factors on local communities is crucial, especially within small, tightly-knit societies. The lack of acceptance or negative responses from family, friends, and neighbors can impede students' educational progress and mental well-being. Educated girls in Uganda, viewed as valuable assets, are often expected to return to their villages post-graduation despite the lack of opportunities for professional growth. The impact of education on rural Ugandan girls and their communities has been severely under-researched. Objective: This study aims to assess the long-term outcomes and impacts on both the community and individuals who have received education compared to those who have not. Methods: Eleven girls utilized photo-voice technology to interview family members, community leaders, and peers, aiming to understand the effects of education on individuals and the community. Four professionals who received education in rural Ugandan villages will also complete questionnaires detailing their post-school experiences. Preliminary Findings: Numerous traditional cultural values directly contradict modern educational beliefs, highlighting the importance of cultivating community support, respect, and trust to advance gender equity in education effectively.

Robert Coronado Jr.

M.A. History

Purepecha Polyptychs: Renaissance Triptychs and Episodic Fragmentation in the Relacion de Michoacan

Faculty Mentor: Dr. Manuel Aguilar-Moreno

The illustrations in the indigenous manuscripts, or codices, of sixteenth-century New Spain on which indigenous peoples and Spanish friars collaborated, have been analyzed in the context of the Global Renaissance in recent decades by scholars such as art historians Elizabeth Hill Boone and Barbara E. Mundy, as well as by historians Serge Gruzinski and Jorge Canizares-Esguerra. The particularities of their analyses have varied. Some have argued for thematic connections and others for more structural connections. What I aim to contribute to this body of literature is to merge the two approaches and argue that some of the illustrations in the *Relacion de Michoacan*, a codex often neglected by scholars of colonial Mexico, do not only show the influence of Renaissance iconography in their application of perspective and naturalism, but also in the particular type of episodic segmentation depicted in several of the *Relacion*'s illustrations. This type of episodic segmentation, corresponding with text, I argue, can be seen in Renaissance triptychs found in altarpieces and illuminated manuscripts, works that Spanish friars of the Franciscan order, the order of friars that collaborated with the Purepecha on the *Relacion de Michoacan*, had not only commissioned in Europe, but also had deep familiarity with.

W. James Carter II

B.A. Anthropology I, B.A. Music

A Discourse on Settler Colonialism

Faculty Mentor: Dr. Rafael Gomez

Settler colonialism is a continual process that uproots an Indigenous people through extreme violence and replaces them with a people the colonists approve of. For the Settler, is not enough to simply take their possessions: land, water, food, but the colonists must also exterminate the aboriginal population. When a project of extermination is not possible (or practical), the colonist will ghettoize, which is to say marginalize, the Indigenous peoples and ensure that they do not have political or national rights. While this exogenous form of domination has been imposed all over the world it is most useful to examine the particular polities of the United States, the Greater German Reich, and the State of Israel (the Zionist State as I will refer to it in this work) as they best exemplify how a settler colony functions. Manifest Desteny, Lebensraum, and Zionism all sought (and seek in the case of Zionism and Manifest Destiny) to uproot and completely destroy a people such that they replace the Indigenous peoples – while often taking elements of their cultural practices. This work will be a comparative analysis between the aforementioned polities so that we can draw out common themes in the settler colonial process.

Edward Romero

M.A. Chicano and Latino Studies

South Los Angeles and USC: Conflict of Shared Space in an Urban Environment

Faculty Mentor: Dr. Anita Revilla

This research explores the relationship between the University of Southern California, or USC, and the surrounding South Central Los Angeles community. This urban portion of Los Angeles has experienced much change, and USC is a major contributing factor. The institution both directly and indirectly buys out land, which has led to issues of displacement, gentrification, and a change in the mindset of students and community members. I will use digital mediums as a reference for my research and convey my message through an oral presentation. Specifically, I will utilize

maps to display my research and showcase how many natives have been bought and kicked out. I will use quantitative data to analyze the socioeconomic and spiritual changes that South Central LA experiences as USC expands. Property value, Property changes, community displacement, social media factors, and more will be analyzed. I choose to look at property and social media to display visual and mental changes and stereotypes within the area. Social media will show students, activists, and community members' thought processes. Various community landmarks will also be referenced, and their changes as a result of the institution will be highlighted, as well as the negative impact on the community.

Group 6 ▪ Engineering and Computer Sciences I
▪ University-Student Union – Los Angeles C Room 308C

Elizabeth Nunez
M.S. Civil Engineering
Laboratory Investigations into the Effects of Heating on Clay's Mechanical and Hydraulic Changes Using Geophysical Methods
Faculty Mentor: Dr. Wing Shun Kwan

This research explores the responses of reconstituted Kaolin clay samples under controlled heating to simulate wildfires in the laboratory using heat guns. Wildfires can alter soil's mechanical and hydraulic properties, and it is essential to study those changes in soils, so geotechnical engineers can better predict the consequences: debris flow from strength reduction and water scarcity from infiltration repellency. We used two geophysical methods: bender element and electrical resistivity, to detect the changes in soil's mechanical and hydraulic properties in real-time while the soil specimens are being heated in the laboratory. The same geophysical methods were applied to samples that were not exposed to any heat. Results show that heating has a negative effect on soil strength and hydraulic conductivity in comparison to non-heated samples.

Brandon de Jesus
B.S. Civil Engineering
Comparison of Advanced Hydraulic Properties between Microplastic and Fines in Sands
Faculty Mentors: Dr. Wing Shun Kwan and Dr. Gustavo Menezes

Advanced hydraulic characteristics of sands mixed with microplastic and fines are studied and compared using a Steady-State Centrifugation (SSC) Unsaturated Flow Apparatus (UFA). Some evidence suggests that low-level microplastic concentrations in natural environments are not harmful to aquatic organisms. However, concentration levels are rapidly increasing in urban areas, and wildfires in urban-forest interface areas can increase the generation and distribution of microplastics, amplifying the environmental contamination and potential health hazards associated with these persistent pollutants. Currently, there is limited literature focused on studying the impact of microplastics on the hydrological impedance of soils, which could trigger landslides and retard aquifer recharges. This study utilizes California State University Los Angeles centrifuge facilities for the development of Soil Water Retention Curves (SWRC) for Microplastic-Sand (MpS) mixtures to characterize the unsaturated hydraulic properties of the MpS mixtures and compare responses from clay particles. We considered sands with five and ten percent microplastic and sands with the same proportions of Kaolin fines. The generated SWRC curves with various percentages of microplastic will be useful for future numerical studies on the effects of microplastics on rainwater infiltration and on urban resilience from natural hazards like wildfires.

Geethanath Duggiralla
M.S. Materials Science and Engineering
Polythiophene Solar Cell - P-N Junction Solar Cell
Faculty Mentor: Dr. Dianlu Jiang

This study presents an in-depth exploration of Polythiophene-based solar cells with a specific focus on P- N junctions, aiming to contribute significantly to the field of renewable energy harnessing. Polythiophene, a conjugated polymer, has garnered attention due to its unique electronic properties, environmental stability, and ease of fabrication, making it a promising candidate for photovoltaic applications. The research primarily revolves around the creation and characterization of P-N junctions within polythiophene matrices, which are pivotal for the conversion of solar energy into electricity. Techniques such as cyclic voltammetry and amperometric I-t curves were employed to dope polythiophene films, creating P-type and N-type regions. These doped regions were then combined to form P-N junctions, an essential component for charge separation and the generation of photovoltaic effect. The study also delves into optimizing the doping process, ensuring efficient charge carrier generation and minimizing recombination losses. Furthermore, the impact of various parameters like doping levels, junction interfaces, and light absorption efficiencies on the overall performance of the solar cells were meticulously analyzed. The findings of this research are expected to provide valuable insights into the development of cost-effective and efficient polythiophene solar cells, thereby contributing to the advancement of organic semiconductor-based solar technology and its potential in sustainable energy solutions.

Albert Bernal and Marcello Canova

M.S. Mechanical Engineering
Validation of an Externally Heated Diverging Channel for Flame Speed Measurement
Faculty Mentor: Dr. Jeffrey Santner

The burning velocity of fuels is an important factor in any combustion process because it can be used to determine flame stability and can validate models which can then be used to design combustion devices and simulate pollutants from anything that burns. The burning velocity can be shown from the reactions of the fuel and oxidizer by chemical kinetic models and validated by the laminar burning velocity. In this research, a flame is produced inside of a narrow diverging channel at different temperatures and at different equivalent ratios, then analyzed once sufficient data is gathered to compare with known values. The analysis is performed on pictures of the flame inside the channel through MATLAB. The test fuel used is propane, a well-studied fuel to give the research something to compare with to determine if the system is accurate. The goal of this research is to validate the setup to ensure accuracy with propane so that further experiments and analysis can be performed with different fuels, such as ethylene, at near-limit conditions where no other studies are available.

Amirhesam Shakibizadeh

M.S. Materials Science and Engineering
Process-Induced Texture Formation in 316L Stainless Steel Samples Processed by Wire-Laser Directed Energy Deposition
Faculty Mentor: Dr. Mohsen Eshraghi

Directed Energy Deposition (DED) is a type of Additive Manufacturing that uses wire, powder, or a combination of both as the feedstock. DED offers advantages such as high deposition rate, lower cost, and capability of manufacturing large-scale functional parts which making it valuable to many industries. The purpose of this study is to use Wire-Laser DED to manufacture location specific structure therefore it is essential to understand the process parameters and investigate their effect on microstructure, defect, and texture formation. Meltio M450, a coaxial DED system equipped with 6 laser beams, was used in this study. The process parameters including laser power, printing speed, wire feed rate, hatch spacing and scanning strategy were varied to produce 316L stainless steel samples. The samples were studied by SEM and EBSD to reveal the effects of parameters on microstructure and texture formation during Laser Wire DED process.

Matthew Engquist

M.S. Materials Science
Scan-Strategies in Additive Manufacturing: Can We Control Microstructure?
Faculty Mentor: Dr. Mohsen Eshraghi

Metal Additive Manufacturing seeks to open new design possibilities by producing components in a layer- by-layer fashion. It shows much promise in fields such as aerospace or medical devices, but its primary hurdle in adoption lies in obtaining consistent results to ensure performance during a part's service life. One reason for this variation from machine-to-machine is the wide range of input control variables ranging from laser power to print speed. Thus it is important to understand how these variables affect the resultant microstructure. In this study, a Meltio M450 Laser Wire – Directed Energy Deposition printer is used to evaluate the effects of one such input variable called scan strategy. The as-printed microstructure is evaluated using Optical Microscopy and a technique called Electron Backscattered Diffraction.

Anayely Saguilan

M.S. Mechanical Engineering
Analysis of Fuzzy Control Robustness in a Multi-room Building Testbed
Faculty Mentor: Dr. Arturo Pacheco-Vega

In this work, we extend our efforts in testing and enhancing the robustness of a fuzzy logic-based controller designed for the purpose of temperature control within a multi-room sub-scaled building testbed. To this end, we test the controller by changing each of the setpoint temperatures in the eight rooms of the building within the same experiment, the objective being to maintain the temperatures in each of the rooms at their specified setpoints. The fuzzy controller is built using time-dependent temperature data in the form of the difference between setpoint and actual temperatures in each room, the derivative of these differences, and their integrals. These values are described via triangular membership functions and expert defined if-then rules. The Mamdani inference method is used to defuzzify the outputs, providing crisp values to the actuators. The control variables are the average temperatures inside the rooms, while the airflow rates of the cold air that is let into the rooms through the dampers are the variables being operated. Results demonstrate that the fuzzy logic controller can effectively keep the temperatures in each of the eight rooms of the building testbed at their respective temperature setpoints.

Cesar Leal
M.S. Civil Engineering
Sand Post-Liquefaction Monotonic Responses with Various Loading Directions and Angularity
Faculty Mentor: Dr. Wing Shun Kwan

Loose sandy soil deposits in areas with high seismic activity, like California, are at high risk of liquefaction in the event of an earthquake. Liquefied sands act like liquid with no strength and are dangerous for structures resting on top. This study focuses on determining the effects of loading angles and sand particle roundness on the post-liquefaction sand response by strain-control cyclic loading and post-liquefaction monotonic loading up to a shear strain of 37% in a uni-directional and bi-directional simple shear testing setup. A better understanding of the post-liquefaction behavior of sandy soils can improve the engineering assessment of geohazards, such as seismic-induced displacements and settlements, helping in the design of more earthquake-resilient structures, potentially preventing the negative financial impact from rebuilds needed after liquefaction and, most importantly, saving lives. The test results show that the loading angles between the pre-liquefaction cyclic and post-liquefaction monotonic loadings have limited effects on the post-liquefaction stress-strain responses. However, sand angularity and density provide more impact. The data generated from this study is valuable for calibrations and validations of constitutive models and numerical analyses.

Group 7 ▪ Engineering and Computer Science II
▪ UAS Executive Boardroom

Arpit Vaishya
M.S. Computer Science
Web Based 3D Remote Interaction Tool
Faculty Mentor: Dr. Navid Amini and Dr. Jung Soo Lim

Imagine working together in a virtual space, enhancing collaboration regardless of physical locations. This project aims to revolutionize remote teamwork using a web-based virtual environment. Utilizing advanced technologies like WebRTC, WebXR, and VR, we create a 3D Immersive and Collaborative platform. This cutting-edge platform transcends physical boundaries, enabling users to seamlessly interact in a shared 3D environment. Collaborators engage in dynamic meetings, sharing 3D models, annotating concepts, and participating in a new dimension of virtual teamwork. Key functionalities encompass sharing 3D models, infinite size screen sharing, snapshot capabilities, and real-time communication facilitated by the robust sockets. The system captures real-time user movements by representing them as avatars, providing an immersive experience of the authentic physical environment. The vision is to redefine collaboration, liberating teams from geographical constraints and offering a transformative experience beyond conventional 2D video calls. Step into a virtual room, effortlessly manipulate 3D objects, and exchange ideas in a truly immersive space. This project not only streamlines remote work but elevates it into an engaging experience, marking a significant leap in the evolution of collaborative ventures. It represents the convergence of spatial computing and real-time communication, shaping the future of remote teamwork.

Dikshant Sagar
M.S. Computer Science
Deep Generative Models for New Ligand Discovery
Faculty Mentor: Dr. Negin Forouzesh

In the pursuit of structure-based drug discovery, the goal is to find small molecules capable of binding to a particular target protein and altering its behavior. In recent times, deep learning has emerged as a highly promising approach for crafting drug-like molecules. It excels in creating compounds possessing precise biochemical attributes while being influenced by structural characteristics. Yet, their typical shortfall lies in the neglect of a critical element: the intrinsic physics that governs the formation and binding of molecules within real-world contexts. In this study, we introduce deep generative models informed by physics principles for drug discovery. These models are designed to consider not just the binding site but the interaction mechanism between a receptor and a ligand. We test the proposed models by generating corresponding drug molecule candidates for a large variety of protein complexes from the PDBBind dataset. Additionally, the drug-like attributes of the generated molecules are assessed in accordance with the Lipinski rules. Furthermore, to extend the analysis, their synthesizability is evaluated using a tool called ASKCOS from MIT, elevating the evaluation to a more comprehensive level.

John Triantafyllos
M.S. Civil Engineering
Seismic Design and Performance Testing of Steel Structures with Special Concentrically Braced Frames Using the Cal State LA Shake Table
Faculty Mentor: Dr. Maryam Nazari

Throughout history, earthquakes have consistently posed a threat to structures, particularly in regions with high seismic activity such as California. For designing seismic-resistant structures, steel stands out as an optimal material due to its inherent properties of high strength, ductility, and flexibility. Often employed in conjunction with steel structures are braced frames, strategically utilized in buildings to resist the impact of earthquake forces. This research, funded by the American Institute of Steel Construction (AISC), focuses on examining the seismic performance of a widely used type of braced frames, known as steel special concentrically braced frames (SCBFs). The project involves the design of a case study prototype building located in San Francisco, CA, along the San Andreas fault, adhering to all seismic provisions. For testing purposes, the prototype building's core system, containing the SCBFs, was scaled down by a factor of 1/5 and fabricated by a certified AISC fabricator. With a combined weight of 3700-lb, this 4'x4'x6' test unit was placed on the Cal State LA shake table to assess its seismic performance against a series of historical earthquakes, encompassing multiple intensity levels from frequent to maximum considered events. The observations from these tests will be presented in the forthcoming presentation.

Stellina Ao
B.S. Computer Science, Minors in Biomedical Engineering and Mathematics
A Beta Regression Model Using Fractal Dimensionality to Predict Imagined Grip Force from EEG for Applications in Brain-Computer Interfaces
Faculty Mentors: Dr. Deborah Won and Dr. Jie Zhong

Brain-computer interfaces (BCIs) are neurotechnologies that can restore motor functionality

to those with impairments by decoding intent from neural activity and commanding prosthetics to perform the decoded action. While BCIs may fundamentally change the prognoses of many diseases, their clinical applicability is limited by the low resolution of discretized decoders and non-scalability of graded decoders. Thus, a paradigm for efficient graded intent decoding is critical. Beta regression is a computationally-inexpensive model that can capitalize on the relationship between imagined grip force and EEG's fractal dimensionality (FD) to potentially achieve high decoding accuracy. To verify this hypothesis, EEG from F7, C3, C4, and F8 (10-20 system) was collected and processed through artifact subtraction and bandpass and Butterworth filters. Delta through high gamma bands were extracted and features with 0.1+ correlation were used in training. Beta regression with FD outperformed the highest-performing model in literature with an RMSE of 0.105 and a FVAF of 0.772. Since the relationship between motor property intensity and EEG complexity is relatively general, this paradigm should generalize to other properties. These results have meaningful implications for comprehensive BCIs using beta regression units to restore the entire range of dexterity to individuals with motor impairments.

Luis Jimenez Diaz and Isuru Rajapakshe

M.S. Electrical and Computer Engineering

Spectral analysis of changes in brain activity after repetitive transcranial magnetic stimulation to treat major depressive disorder

Faculty Mentor: Dr. Deborah Won

According to the 2021 National Survey on Drug Use and Health, an estimated 8.3% of adults, or 21 million adults, in the U.S. experience major depressive episodes. The purpose of this study is to explore the relationship between spectral changes measured through electroencephalography (EEG) and clinical outcomes in patients with major depressive disorder (MDD) who have received repetitive transcranial magnetic stimulation (rTMS) therapy. We computed spectral band power and the alpha:beta band power ratio in six MDD patients who received a full course of rTMS therapy over the dorsolateral prefrontal cortex. Generalized Anxiety Disorder 7 (GAD-7) and Montgomery-Asberg Depression Rating Scale (MADRS) assessments were conducted pre- and post-treatment. We found positive correlations between alpha and beta power with MADRS and GAD-7 scores. Significantly, in brain regions ipsilateral to stimulation, the alpha:beta ratio showed a high positive correlation (>0.9), suggesting that it could be used as a quantitative marker for diagnostics and evaluating treatment response. Positive correlations were also found for increased coherence between pre-frontal and frontal regions, which may indicate a possible mechanism underlying rTMS's therapeutic benefits. Our results support the hypothesis that rTMS improves prefrontal-frontal connections, as demonstrated by increases in coherence, thereby improving MDD symptoms.

Oscar Rodezno, Johan Rodriguez, Osvaldo Mendoza-Alvarez, and Junior Yah Torres

B.S. Civil Engineering; M.S. Civil Engineering

Advancements in Sustainable Concrete: Experimental Testing of Modified Tire-Derived Aggregate for Seismic Resilience

Faculty Mentor: Dr. Maryam Nazari

Traditional concrete, a fundamental material in global civil infrastructure, annually releases a substantial amount of carbon dioxide (CO2). Widely employed in the construction of bridges, dams, roads, and buildings, it relies on fine and coarse aggregates, predominantly comprising sand, natural gravel, and crushed stone. Recognizing the environmental challenges of traditional concrete has fueled interest in sustainable approaches to enhance its properties, including ductility and energy absorption. Recent literature explores alternative aggregates, such as rubber, leading to the creation of tire-derived aggregate concrete (TDAC). However, studies indicate that adding rubber to concrete mixes may decrease mechanical properties, including compressive strength. This research project aims to experimentally investigate and improve TDAC's mechanical properties through relevant techniques, focusing on compression and bending. The study aims to formulate a TDAC mixture with minimal reduction in compressive strength compared to a baseline (i.e., traditional concrete) by testing various mix additions, e.g., aggregate surface treatment, supplementary cementitious materials, water reducers, and fibers. Subsequently, a performance indicator, based on beam testing results, will identify the mixture with the highest energy absorption capacity. This optimal mix is intended for fabricating a seismic-resilient foundation system, though specific details of the fabrication process are beyond the scope of this presentation.

Group 8 ▪ Physical Sciences
▪ University-Student Union – Los Angeles B Room 308B

Samuel Groysman
B.S. Biochemistry
Developing Non-Contact Plasmonic Electrochemical Microscopy for High-Resolution Bioanalytical Measurements
Faculty Mentor: Dr. Yixian Wang

Plasmonic electrochemical microscopy (PEM) is an optical imaging technique that utilizes surface plasmon resonance to map electrochemical reactions near a sensing surface. Unlike other analytical techniques that primarily perform bulk measurements, PEM has the potential to visualize single vesicle release due to its high spatial resolution. However, the biological applications of the PEM setup are limited because cells in contact with the sensing surface generate significant noise and are damaged by the potentials applied during experiments. To that end, this study develops the technique of non-contact plasmonic electrochemical microscopy (NC-PEM), in which the sensing surface of the PEM setup is coated with a mesoporous silica film to prevent direct contact with cells. A model redox species, 1,1'- ferrocenedimethanol, was used to investigate the performance of the NC-PEM system in the absence of cells. Surprisingly, NC-PEM enhanced signals by two orders of magnitude, allowing semi-quantitative detection of concentrations as low as 10 μM, while the PEM setup without modification could not detect concentrations as high as 1 mM. Signal enhancement is hypothesized to arise from the attraction of oxidized cations to the negatively charged pore walls, observed as a relatively greater reduction current and a correspondingly greater concentration change.

Jordan O'Kelley
B.S. Physics, General Option
Simulating Organic Molecules in the Protostellar Disk to Understand the Origins of Life
Faculty Mentor: Dr. Susan Terebey

Protostars possess remarkably complex chemistry throughout the various regions of a forming star. The chemistry of the protostellar disk is of particular importance, as this is where planets are widely thought to form. Understanding the chemical abundances, particularly those of organic molecules, in this region is therefore of crucial importance to understanding the origin of life. RadChemT is a novel code which simulates physical parameters and astrochemistry for protostars in star forming regions. Its initial primary use was to simulate the relative densities of CO species throughout a protostellar region. The model proved to be accurate compared with observations of the protostar L1527. However, recent ALMA observations of L1527 indicate gas-phase presence of simple organic molecules, which are not predicted by RadChemT. Thus, new physical methods for desorption of these molecules from the dust grains are being explored, with the goal of accurately simulating these observations. Initial results indicate that the code can efficiently simulate abundances for all regions other than the outflow cavity. We present results showing the effect of the new desorption mechanism on the chemistry model.

Tony Tran
M.S. Chemistry
Microplastic Pollution in Huntington Beach: Characterization and Implications for Coastal Waste Management
Faculty Mentor: Dr. Yixian Wang

The exponential increase in plastic production, driven by consumer demand, has led to a significant rise in plastic waste, adversely impacting ecosystems and public health. This issue is particularly evident in Huntington Beach, California, a tourist destination with 11 million annual visitors. Urban runoff, carrying pollutants including plastics, contributes to the pollution of its beaches and harbors. A major concern is the transformation of this waste into microplastics (particles smaller than 5 mm), which possess unique chemical and physical properties that exacerbate environmental pollution through leaching. Understanding the nature of these microplastics is critical in Huntington Beach for devising effective coastal waste management strategies. In this study, beach sediments were collected and analyzed using a modified protocol from the National Oceanic and Atmospheric Administration, with Fourier-transform infrared spectrometry employed for particle analysis. Among the findings, polypropylene, commonly used in bottle caps and synthetic textiles, was identified, highlighting the urgent need for targeted waste reduction measures.

Alex Nikolian
B.S. General Physics
The Correlation Between Low and High Mass Star Formation: Comparing the Envelope Mass Infall Rate of Low and Intermediate Mass Protostars
Faculty Mentor: Dr. Susan Terebey

Protostars are the precursor to all stars in the night sky including the sun, however, they range in size. A low-

mass protostar will eventually become a star roughly the size of the sun, while a high-mass protostar is 10 to 30 times more massive and much rarer. Yet, they produce most of the elements in the periodic table. Protostars gain mass as their core takes in gasses and particles from the surrounding environment called an envelope in a process called mass infall. The current theory for low-mass protostar formation is well studied. We are testing whether high-mass protostar theory is simply scaled up from low- mass theory. It is theorized that the envelope mass infall rate for high-mass protostars should be 100 to 1000 times that of a low-mass source. The project will test this hypothesis by comparing the envelope mass infall rate for low-mass and intermediate-mass protostars in the Orion star-forming region. The Orion nebula has 22 protostars that are in the intermediate-mass range; the envelope mass infall rate will be calculated and then compared to the remaining low-mass protostars in the region. The comparison results will be presented to see if the theory correlates with the sources in the region.

Larry Rodriguez

M.S. Chemistry

Advancing Materials Discovery Via the Prediction of the Electronic Density of States Using a Euclidean Neural Network

Faculty Mentor: Dr. Olaseni Sode

The electronic density of states (eDOS) quantifies the distribution of energy levels that can be occupied by electrons in a material and is a central component of modern electronic structure theory. Moreover, the eDOS underpins key insights for material discovery of photoptics and photoelectronics by providing an understanding of a materials electronic structure, namely the electronic band structure via band gaps, band energy, and the optical absorption spectrum. Conventionally, the eDOS is calculated using computationally intensive methods such as density functional theory (DFT) which become prohibitively expensive for high-throughput materials discovery workflows. In this study, we predict the eDOS of inorganic crystals using a Euclidian neural network (e3nn), which naturally accounts for and operates on a material's crystallographic 3D geometric information, thus providing an efficient surrogate for high- throughput materials discovery. Structural and DOS data were gathered from the Materials Project for 1488 inorganic crystalline solids. Each material's eDOS was evenly spaced (49, 100, 501 points) and smoothed using a Savitzky-Golay filter. The crystallographic structural data for each material was constructed into periodic graphs and processed through e3nn's network applying iterative "convolution and gated block" layers to give a predicted result of the eDOS for a given material. To test e3nn's data efficiency, we varied the number of data points for each material trained. To test model performance, we varied the number of layers and maximum allowed spherical harmonics. Our results show a fairly accurate prediction of the eDOS for a given material. Future work includes additional hyperparameter tuning of this model for increased prediction fidelity.

Sailaja Muduganti

M.S. Physics

Efficiency of Dye-sensitized solar cells using Titanium porphyrin Metal-organic frameworks.

Faculty Mentors: Dr. Oscar Bernal and Dr. Yangyang Liu

Researchers have extensively studied dye-sensitized solar cells (DSSCs) incorporating metal-organic frameworks (MOFs) for over twenty years. These cells have gained popularity due to their low cost, easy manufacturing process, and low toxicity. Moreover, the titanium (Ti) MOF, with its porphyrin ligand and semiconductive properties, can potentially enhance solar cells' photovoltaic efficiency. Despite optimizing material and structural properties, the current efficiency of DSSCs still needs to catch up to that of first- and second-generation solar cells. DSSCs can achieve an efficiency of up to 12% with Ru (II) dyes. However, the photovoltaic activity of solar cells is expected to improve in the next decade. In 2018, ultra- thin films with nanocrystalline Ti MOFs achieved an efficiency of 18.94%. This project provides depth in review of DSSC construction, Operating principles, efficiency calculations, and characterization of sample Powder using X-ray diffraction (PXRD) measurement, UV visible spectrum, lifetime scan of electron and scanning electron microscopy images of cells with different layers. In this work, the most common layers fabricated in the solar cell are the compact layer, the MOF layer, the hole transporting (HTM) layer, and the gold layer. Six different methods were tried to acquire a uniform Ti MOF layer. The solar cell thus created with the Ti MOF, DGIST-1, in this project gave the highest efficiency of 0.12144*10-2%.

Genesis Barzallo

M.S. Chemistry

GCxGC-FID Quantification of Olefins in Alternative Fuels Produced from Plastic Waste Conversion

Faculty Mentor: Dr. Petr Vozka

With the increase in the use of single-use plastic, plastic waste has been accumulating at an alarming rate. This poses a significant environmental challenge, and conventional disposal methods such as incineration and mechanical recycling are not sufficient to handle the amount of waste being produced.

However, common conversion techniques such as hydrothermal processing and pyrolysis can transform plastic waste into potential alternative fuels with varying olefin concentrations (up to 50 wt.%). There are currently no methods for the detailed quantitation of olefins at such high concentrations. In this study, a novel approach was developed to characterize and quantify aliphatic olefins in plastic waste-derived fuels. The method involved comprehensive two-dimensional gas chromatography with a flame ionization detector (GCxGC-FID), a derivatization process using dimethyl disulfide, and the use of olefin standards ranging from C_5 to C_{25}. The results closely aligned with established ASTM-approved methods, including D1159 (Bromine number), D5554 (Iodine value), and D1319 (FIA method). This study presents a robust and dependable technique for the accurate quantification of olefins in fuels derived from plastic waste conversion.

Raul Reyes

M.S. Physics
Increasing LIGO sensitivity by Syphoning Heat
Faculty Mentor: Dr. Marina Mondin

An exciting field of Astronomy has emerged from Albert Einstein's theory of General Relativity. Astronomers now have an additional method of detecting black holes and neutron stars by using gravitational wave detectors. LIGO (laser interferometer gravitational observatory) needs their detectors to sustain high sensitivities throughout the observation. Any noise, vibrations, and distortions will greatly impact the sensitivities of the detectors. As a result, heat transferred from the laser to the mirrors of the detector will produce an adverse effect called Thermal Lensing. We are proposing a Radiative Cooling method to decrease the effects of thermal lensing and increase the detectors sensitivity.

Kenneth Stebbing

M.S. Physics
Shock Fronts at the Envelope Interface in the Class OiI Protostar L1527
Faculty Mentor: Dr. Susan Terebey

A protostar is a young star in its earliest phase of stellar evolution. When a dense region collapses under its own gravity within a molecular cloud, it forms a star-like object – our protostar. During this phase, the protostar continues to accrete dust and gas from the surrounding molecular cloud. The protostar phase ends once the infalling material has depleted. This study will focus on the protostar L1527, and specifically on chemical production when infalling material goes through a shock when it impacts the disk. A shock front is the boundary in which the surrounding environment experiences sudden changes because of a shock wave. These shocks may be powerful enough to liberate precursor organic molecules from dust grains. Earlier research on L1527 using the HOCHUNK3D radiative equilibrium code has been conducted without considering shock physics, but a first step has been taken toward accounting for it by modifying the shape of the disk-envelope boundary as defined in the code. We account for shocks in this research so that we can use the change in the temperature and density profiles to predict chemical abundances in L1527. This could lead to a better understanding of how organic molecules are distributed in planetary formation.

Abstracts of Poster Presentations

Behavioral and Social Sciences

1. Jarenni Ambriz

B.A. Asian and Asian American Studies, Option in Asian Studies; Minor Anthropology
Metal in the Underground: Industry from Below
Faculty Mentor: Wei Lun Jason Chiu

Musicians are no longer just artists but instead have acquired a nuanced role as business owners. The accessibility of music production technology, distribution platforms, along with social media as marketing tools have enabled musicians to no longer require record labels or recording studios in order to break into the music business. As a result, a metal scene has fostered locally amongst the outskirts of the larger music industry. This project explores how local metal artists from Southern California navigate the music industry as business owners within a local, often perceived as informal business. The objective of this project is to explore the unique amount of freedom local artists possess that result from the large distance they embody in relation to the larger music industry. In this particular case study, an analysis was conducted on the Instagram accounts of local metal bands' from Los Angeles County, specifically analyzing their event flyers. It was found that there is an inherent flexibility within their social media accounts which might allude to a flexibility within their music and business that could possibly enable for more creative freedom in comparison to more popular artists.

2. Nyah Bermea

M.A. Sociology
Food Insecurity and the Health and Socioeconomic Well-being of Low-Income Communities of Color
Faculty Mentor: Dr. Analena Hope Hassberg

Studies have shown that living in food deserts significantly affects people of color in low-income communities (Cooksey Stowers K, Jiang Q, Atoloye A, Lucan S, Gans K, 2020). People of color, particularly those living in low-income and rural areas are disproportionately affected by food deserts- areas where it is difficult to buy affordable food and fresh produce. According to the Centers for Disease Control and Prevention (CDC), limited access to nutritious food can cause an increased risk of health issues such as obesity, diabetes, and cardiovascular diseases. When addressing nutritional food disparities it is essential to address both systemic barriers and social determinants of health, such as housing, education, and employment. I use a quantitative approach to analyze the disparities in access to healthy food options, nutritional choices, and their subsequent impact on the health and economic status of residents, by utilizing data from government agencies, and academic sources. I demonstrate that improving access to healthier foods for people of color living in low-income communities can promote health equity and reduce inequality by implementing affordable, organic foods in low-income communities.

3. Haley Castello

B.A. History, Minor in Chicanx & Latinx Studies
Urban L.A. to the Outskirts of the S.G.V.: The Travelling Stories & Tea of Housing Displacement
Faculty Mentor: D r . Valenzuela, Dr. Mark Wild

This project delves into the historical displacement of working-class and BIPOC communities, aiming to unravel the complexities of contemporary gentrification on the fringes of urban Los Angeles. The focus is on comprehending the firsthand experiences and resistance strategies employed by those who have been uprooted from their homes. The research is currently honing in on the San Gabriel Valley, with a special emphasis on Baldwin Park, spanning from the late 19th century to the present day. Central to this study is the exploration of community formations amidst the recurring cycles of housing displacement throughout history. The methodology involves examinations of archival sources, including photographs, written material, housing contracts, drawings, maps, and items with sentimental value. In addition to using literary tools, the project adopts post-colonial and post-structural approaches, reading against established narratives to challenge the perspectives propagated by elites and bring forth the untold stories of residents. The ultimate aim is to amplify local attitudes and responses, shedding light on their intricate connections to processes such as modernization, land privatization, and housing dynamics.

4. Katie Gekler

B.S. Nursing
Power to Ignite the Heart
Faculty Mentor: Dr. Stefanie Varela

The purpose of the following research is to answer the following question: In individuals who experience cardiac arrest outside of the hospital setting, how does bystander intervention with CPR (cardiopulmonary resuscitation), when compared to lack of intervention without CPR, affect patient survival rate between time of return of spontaneous circulation (ROSC) and discharge? Bystander intervention refers to the act of someone who witnesses the cardiac arrest performing lifesaving intervention at the scene. The following findings are an examination of five studies that discuss the effectiveness and rate of bystander intervention in patients who experience out of hospital cardiac arrest (OHCA). The synthesis of information in this analysis includes information from one systematic review meta-analysis, two retrospective studies, one cross sectional study all conducted between 2018-2020. The synthesis of the following research revealed that bystander CPR significantly increases the rate of survival in patients who experience OHCA to discharge. Yet, the rate of bystander CPR is significantly lower in communities of low socioeconomic status, thus decreasing the rate of survival in these patients. The findings of this research are revolutionary, and shine light on the racial and socioeconomic disparities and barriers communities face to receive high quality resuscitation and emergency care. It is essential that nurses create interventions and solutions to save the lives of patients within these communities.

5. Karina Gutierrez

B.A. History, Minor Chicana/o and Latina/o Studies
The Right to Suburb: Student Activism on Immigrant Rights in the Inland Empire, 1990-2010
Faculty Mentor: Dr. Joy Sales and Dr. Wild

In the 1990s, California's Inland Empire region experienced a rapid increase in the number of Latinx immigrants, who hoped to find economic security in suburban communities like Riverside and San Bernardino, rather than urban Los Angeles. Many of these immigrants participated in an informal economy that met burgeoning demand for domestic labor and construction. But while these immigrants were integral to the growth of the suburbs, they were also frequently in conflict with white residents. Cities like Pomona, Ontario, and Rancho Cucamonga passed ordinance laws that targeted day laborers, and created a regime of security checkpoints to police suburban space. Although scholars have started to turn their attention to these policies in the Inland Empire in the hopes of crafting a more textured picture of Southern California life, they have typically overlooked students' organizing in the struggle for immigrant rights. My research focuses on a group of students in and around the city of Pomona, who worked alongside community members and college professors to advocate for day laborers, and whose activism led to the creation of the Pomona Economic Opportunity Center. My methodologies include oral history interviews, analysis of local newspapers, student theses, and documents available at local archival collections.

6. Giovanna Calderon

B.A. Chicano/a and Latino/a Studies
Latinx Business: El Mercadito
Faculty mentor: Dr. Beth Baker

My research looks at Latinx small businesses in East Los Angeles from the 1990s to present. In particular, I focus on El Mercadito, which is a shopping center that provides different religious relics, ethnic products and food to its customers. This work aims to understand if El Mercadito serves as social, cultural and or economic anchors. I will primarily use oral histories to conduct this project. I plan to interview long term business owners, the landowners, and customers. I will ask a series of questions while investigate the role of El Mercadito and its history. These questions consist of asking: What is ethnic about ethnic businesses? How do consumers create a sense of place? What is the significance of small owed Latinx business to the broader Los Angeles community? What does entrepreneurship look like at different levels of operation? My findings will contribute to an understanding of Latinx entrepreneurship, community building, and quieter forms of resistance.

7. Shelby Detweiler and Darlene Ramirez

M.A. Psychology
Attitudes toward Women: Links with Social Dominance Orientation, Right Wing Authoritarianism, and Narcissism
Faculty Mentor: Dr. Heidi Riggio

Values associated with power and dominance, including individual differences in social dominance orientation (preference for inequality between groups) and right-wing authoritarianism (extreme traditionality with emphasis on power and punishment), are linked with ambivalent attitudes toward women when controlling for gender (Feather & McKee, 2012). While some research links narcissism, a grandiose sense of self-importance, with greater right-wing authoritarianism and social dominance orientation (de Zavala et al., 2017), other findings are mixed (Cichocka et al., 2017), and scant research has examined links between narcissism and attitudes toward women (Kushari et al., 2017). We examine

links between narcissism, social dominance orientation, right-wing authoritarianism, and attitudes toward women. Participants are 245 undergraduate students (194 women, *M* age = 24 years) who received 1% extra credit for completing an anonymous online survey including the *Narcissistic Personality Inventory* (Raskin & Terry, 1988), Right-wing Authoritarianism Scale (Altemeyer, 1981), the Social Dominance Orientation Scale (Pratto et al., 1994), the *Attitudes Toward Women Scale* (Spence et al., 1978), and a measure of Social Desirability (Reynolds, 1982). Partial correlations indicate that narcissism, social dominance orientation, and right-wing authoritarianism are predictive of more negative attitudes toward women, both while controlling for gender and for both women and men.

8. Mei Ku, Jordy Ocampo, and Lauren Perez

Ph.D. Psychology, M.A. Psychology, B.A. Psychology
Examining the Construct Validity of Two Rumination Measures in a Predominantly Hispanic/Latino Sample
Faculty Mentor: Dr. Yvette Szabo

Rumination is characterized by repetitive and prolonged negative thinking. This study explores psychometric properties of the Ruminative-Response Scale (RRS-10) and Stress-Reactive Rumination Scale (SRRS) in a predominantly Hispanic/Latino sample. The study examines these measures' utility as a correlate of mental health as most previous research relies on predominantly white samples. Participants (N=210; 71% women and 85% Hispanic/Latino) completed an online survey consisting of rumination (RRS-10, SRRS) and depression (Patient Health Questionnaire-2) questionnaires; some also completed measures two weeks later (N=85). Subscales of the RRS-10 (Brooding, Reflection) and the SRRS (Hopelessness, Negative Inferential Style, Problem-Solving) demonstrated acceptable levels of consistency across the items of the scale (a =0.73-0.86), as well as over a two-week period (ICC range=0.78-0.80), suggesting these are reliable trait measures. Higher levels of Brooding, Hopelessness, and Negative Inferential Style were associated with depressive symptoms (R2=.20-.25, p<.001), though Reflection was less so (R2=.16, p<.001), and Problem-Solving was negatively associated with depression (R 2=.05, p<.001). Consistent with prior research, the SRRS and RRS-10 are reliable and correlate highly with depression. This suggests these are valid measures in a primarily bilingual and Hispanic/Latino sample; future longitudinal research will examine rumination as a vulnerability factor for depression.

9. Humberto Hernandez Mendez

B.A. Sociology, Women's Gender Sexuality Studies
Queerness & Abolition: Examining The Impacts of The ICE Deportation Machine on Gender Variant, People of Color And The Need to Abolish ICE Now.
Faculty Mentor: Dr. Heidi Riggio

This project looks at the impact of ICE detention on undocumented gender Variant folks. My research examines how these folks' gender expression is impacted within a violent system as these community members access resources, avoid deportation, and obtain liberation. It focuses primarily on California, Texas, Georgia, and New York subjects. The previous states showcase the violence and differential treatment gender variant folk are subjected to under different state policies and legislatures, such as Title 42. I will be conducting interviews with undocumented gender variant folks and activists in non-profit support organizations that provide support. The research will explore how gender identity is shaped and expressed as individuals try to access resources for release and transition into their communities- opening a more extensive discourse on the abolition of such oppressive systems of punitive punishment. As the number of people in detention has escalated to more than 40 percent since 2021.

10. Natalie Rustrian

Master of Social Work
Mental Illness and Substance Abuse in LGBTQ+ Racial/Ethnic Minorities
Faculty Mentor: Dr. Jieru Bai

Racial/ethnic and sexual minorities are at increased risk of developing mental health or substance use issues due to various factors including stigma, discrimination, and lack of social support. In addition, minority stress and systemic discrimination further aggravate the issue as racial/ethnic and sexual minorities face barriers in receiving quality care, thus impacting their decision to receive the treatment they need. This study aims to examine the factors that contribute to the risk of developing mental disorders and substance abuse issues in LGBTQ+ racial/ethnic minorities in comparison to those who identify as White LGBTQ+. An online survey was designed for the inquiry. The survey will consist of 13 questions covering 6 areas, including demographics, comfort in disclosing their sexual orientation, social support, minority stress, mental health, and substance usage. The data collection is ongoing. To this date we have 10 participants. I will use multiple regression to identify the significant predictors of mental health and substance usage. I will also use the T test to compare the mental health and substance usage between LGBTQ+ ethnic minorities and those of the majority population.

11. Ya Hsuan Ting

Master of Social Work

The Impact of COVID-19-Related Anti-Asian Hatred on School-Age Children and Youth

Faculty Mentor: Dr. Jieru Bai

The current research studies the impact of Anti-Asian hatred on school-aged children and youth from both the parents' and children/youth's perspectives. The study has three parts: interviews with parents of Asian children in K-12, an online survey with parents, and interviews/focus groups with Asian youth. To date, 10 parents have completed interviews, and 99 parents have taken the online survey. The preliminary data indicated that most participants' children did not experience anti-Asian hatred. However, they reported high levels of anticipated discrimination, which resulted in distress. In addition, parents also expressed concerns about their children's safety at schools, neighborhoods, public areas, and their general health. Many Asian parents did not send their children back to school when school reopened due to the lack of proper response to hate incidents in school and concerns about their safety. Interviews/focus groups with Asian youth will take place in February. Conclusions: The amount of anti-Asian hate incidents also appeared to be tied to location. There were significant differences between individuals living in California and those living outside of California, where the Asian population was smaller than in California.

Biological Sciences

12. Leilani Corleto

B.S. Biology, Minor in History
Utilizing molecular methods to identify a cryptic species in the rockfish genus Sebastes
Faculty Mentor: Dr. Andres Aguilar

The rockfish genus Sebastes contains high species diversity, and the center of its diversity is in the northeast Pacific. Cryptic species, groups of individuals within a species that are only distinguishable through genetic data, are important to study from a conservation and evolutionary perspective. This project aims to understand the genetic differences between cryptic lineages of the stripetail rockfish S. saxicola, as little is known about the geographic distribution of these lineages. We sequenced the cytochrome b gene of 130 S. saxicola individuals from 14 locations across the geographic distribution of the species to characterize these lineages. We then compared the resulting sequences to published Sebastes cytochrome b data. The proportion of differences found between compared sequences from the two S. saxicola lineages, the pairwise distances, were more significant than p-distances observed from other Sebastes sister species. Additionally, the haplotype network generated based on the sequences distinguished the S. saxicola lineages and gave a visual indication of how many differences were found between them. This data provides support for the cryptic S. saxicola lineages as distinct species.

13. Isabel Garcia

M.S. Chemistry
Evaluating the Cytotoxic Impact of Polystyrene Nanoplastics on SH-SY5Y Cells
Faculty Mentor: Dr. Yixian Wang

Plastics can degrade into microplastics (less than 5mm) and nanoplastics (less than 100nm), posing environmental and health challenges. Recent research highlights the peril these minuscule particles pose to human health, particularly at the cellular level, where they can disrupt cellular membranes, impair cellular interactions, and potentially induce cell death. In this project, we studied the impact of polystyrene nanoplastics, specifically 0.03µm in size, on the viability of SH-SY5Y cells by introducing varying concentrations of these nanoplastics to the SH-SY5Y cells and utilizing cell viability assays, such as XTT and LOH. The results from the XTT assay demonstrated a concentration-dependent decrease in cell viability, while the LOH assay indicated a corresponding increase in cytotoxicity. This research underscores the need for a deeper understanding of nanoplastics' impact on cellular health and highlights the potential risks associated with their accumulation in the environment.

14. Karli Miller

M.S. Biology
Assessing heat tolerance and leaf anatomical traits of fifteen desert succulent plant species
Faculty Mentor: Dr. Christine Scoffoni

Heat waves with record-breaking high temperatures brought on by climate change are becoming a regular occurrence across the globe. Southern California is not immune, and even desert succulent plants adapted to arid conditions are being negatively affected by the increase in temperatures. There are numerous studies on how temperature impacts plant physiology, but not many focus on the capacity of plants to recover from extreme heat events (i.e. above 50 degrees Celcius), also known as thermal tolerance. In this study, we quantify thermal tolerance of desert succulent plant species and characterize various leaf anatomy traits of each species to better understand how they respond to heat. We ask questions such as, do plants with a higher degree of succulence (i.e. leaf thickness, air space vs. water space, etc.) tend to recover better after a high heat event? Do species that are evolved to photosynthesize particularly efficiently (CAM plants) tolerate heat better than plants without this evolutionary adaptation (C3 plants)? By including plants from a variety of families, we hope to see how these high temperatures affects desert succulents across taxa and across different geographic distributions. Understanding how this stressor affects specific plant physiological traits may inform future studies on plant resilience in the face of climate change.

15. Tiffany Smith

B.S. Biology, Option in Microbiology
Impact of Sulfate-Modified Polystyrene Nanoplastics on Neuronal Cell Viability and Membrane Integrity: A Nanoscale Analysis
Faculty Mentor: Dr. Yixian Wang

Nanoplastics (NPs), synthetic polymers ranging in size from 1 nanometer to 1 micrometer, are pervasive in the environment due to widespread plastic pollution. The urgent need for research into the effects of NPs on human health stems from their ability to breach the blood-brain barrier, posing potential health risks. This poster focuses on the impact of sulfate-modified polystyrene nanoplastics on the viability and membrane integrity of SH-SY5Y neurons. Scanning Ion Conductance Microscopy (SICM), a method that yields

high-resolution topographical imagery at the nanoscale, and Lactate Oehydrogenase (LOH) assays were utilized to evaluate membrane damage in the presence of NPs. XTT assays were used to analyze the impact of NPs exposure on cell viability. Our study treated SH-SY5Y neurons with three varying concentrations of these nanoplastics over a 24-hour period, followed by assessments through SICM, XTT, and LOH analyses. The findings revealed that higher concentrations of NPs lead to increased cell mortality, as evidenced by XTT and LOH assays, although the SICM with individual cells didn't reveal membrane damage. Future investigations will expand to include other nanoplastic types, such as polyethylene, to broaden our understanding of their biological impacts.

16. Aurora Trejo

M.S. Biology
High gene flow in widow rockfish populations from California and Oregon
Faculty Mentor: Dr. Andres Aguilar

Widow rockfish (Sebastes entomelas) is a major fisheries species on the West Coast of the United States. The species abundance declined in the 1980s due to overfishing and subsequently rebounded following harvest restrictions. To assess population structure for widow rockfish, we performed low-coverage whole genome resequencing on 174 widow rockfish individuals from 16 locations in California and Oregon. A principal component analysis (PCA) of single nucleotide polymorphism data showed evidence of subtle population structure. An admixture analysis also supports this finding of weak structure with potential differentiation between populations from Oregon/Northern California and Central/Southern California. An analysis of genome-wide FST found low differentiation throughout the study area (range: 0.009 - 0.019) and no evidence for isolation by distance. These findings suggest little population structure for widow rockfish from Oregon to California, in agreement with the predicted potential for high gene flow due to long pelagic larval durations for this species.

17. India Wesley, Robert Juarez, Elijah Ortiz, and Lisya Tanujaya

M.S. Biology, B.S. Biology, B. S. Biochemistry
Effects of elevated environmental carbon dioxide (CO2} on epaulette shark gills
Faculty Mentor: Dr. Jinae Roa

As human-produced carbon dioxide (CO2} emissions continue to increase, the world's oceans are experiencing a corresponding increase in the concentration of hydrogen (H+} ions. This phenomenon, better known as ocean acidification, is significant because exposure to excess H+ ions can affect important physiological functions like metabolism, damage individual cells, and lead to overall poor health outcomes. Fortunately, animals have developed complex mechanisms for managing blood H+ ion concentration, also known as blood pH; and recent studies have shown that vertebrate animals like sharks are especially tolerant against the negative effects of ocean acidification. To better understand how sharks achieve this tolerance, we aim to study the gills of epaulette sharks (Hemiscyllium ocellatm}. Specifically, our analysis will focus on the two types of gill cells responsible for blood pH regulation: acid(H+}-secreting cells enriched for Na+/K+-ATPase (NKA} and base (HCO -}-secreting cells enriched for the vacuolar-H+-ATPase (VHA}. Using immunohistochemistry and antibodies against NKA and VHA, we will measure the difference in abundance and location of these pH regulatory cells in sharks exposed to normal and elevated environmental CO2 conditions. Since the mechanisms sharks use to regulate blood pH are evolutionarily conserved in many marine animals, tracking these changes can provide some insight into how all marine animals might manage the increased pH stress associated with ocean acidification.

18. Jason Chen

B.S. Biology, Option in Microbiology
Analyzing the potential effect of heat shock proteins on cyanobacterial circadian rhythms
Faculty Mentor: Dr. Susan Cohen

Cyanobacteria are the only prokaryotes known to have a circadian clock and are thus a model organism for the study of circadian biology. Recently, the ClpXP protease was identified as a modulator of the cyanobacterial circadian clock. Because of its ability to fold or unfold proteins, ClpX is considered a molecular chaperone. While the impact of the ClpXP protease on cyanobacterial circadian rhythms has been studied, whether other molecular chaperones influence circadian rhythmicity is unclear. Molecular chaperones are often classified as heat shock proteins (HSPs) because of their function in refolding or degrading damaged proteins after exposure to high temperature. I hypothesized that HSPs, which often work together and are capable of regulating their own expression, may interact with other known circadian regulators, such as ClpX and the core KaiA-C oscillator, to influence the circadian clock. To test this hypothesis, I performed a literature review to identify proteins involved in the cyanobacterial heat shock response. Then, I leveraged an existing transposon mutagenesis library to obtain HSP mutant strains.
Finally, I conducted a preliminary circadian rhythm analysis using a bioluminescent luciferase reporter system to determine the circadian phenotype of the selected mutant strains.

19. Alfredo Gonzalez

M.S. Chemistry, Option: Biochemistry
The Effects of a Hyperactive Antifreeze Protein on Cryopreservation of SKBR3 Breast Cancer Cells
Faculty Mentor: Dr. Xin Wen

Cryopreservation is an essential aspect of cell line maintenance and the developing field of cellular therapeutics. Standard cryopreservation of cells involves the use of cryoprotective agents, such as DMSO, that exhibit significant toxicity and offer limited efficacy for maintaining cell viability. Antifreeze proteins (AFPs), evolved by many cold-adapted organisms, can effectively promote the survival of organisms at sub-zero temperatures, and thus have been considered as potential cryoprotectants. A hyperactive AFP, DAFP-1, originally from Dendroides canadensis, is being considered as a protective agent for cell preservation. Previous work has shown that DAFP-1 promotes cell survival of INS-1 cells, a
�-cell model, during hypothermic preservation at 4C. To develop low-toxicity cryopreservation solutions, we explore the toxicity profile and protective effects of DAFP-1 on SKBR3 breast cancer cells, a cancer cell model. We prepared DAFP-1 recombinantly and exposed SKBR3 cells to DAFP-1 from between 0 and 1000µg/ml. The cytotoxicity of DAFP-1 is evaluated using cell viability assays. Cell survival following cryopreservation in the presence of DAFP-1 at -80C with reduced quantities of DMSO is also assessed. This research contributes to new solutions for cell cryopreservation and biomedical applications.

20. Yahan Lin

B.S. Biochemistry
Investigating the pathway by which the circadian clock controls cell division in cyanobacteria
Faculty Mentor: Dr. Susan Cohen

Circadian rhythms, driven by a circadian clock, are rhythms in biological activities that occur once per day. Although found ubiquitously throughout nature, cyanobacteria are the only prokaryotes known to possess them. In Synechococcus elongatus, the model system in which bacterial clocks are studied, cell division is inhibited for ~6 hours during dusk in a process known as circadian gating. While the circadian clock, comprised of KaiA, B, and C proteins, determines when cell division is inhibited, ClpX, a chaperone protein, is required to allow cell division to resume. As a result, strains lacking clpX display elongated morphologies where circadian gating continues beyond 6 hours. We have identified potential secondary site suppressor mutations, from a population-based screen, that allow clpX mutant strains to grow better. We have chosen three potential suppressors to investigate at the molecular level: tlyA, Synpcc7942_0319, fur, Synpcc7942_0817, and psbX, Synpcc7942_2016. Suppressors will be investigated by looking at double mutants, deleted for both clpX and the suppressor gene; where confirmed suppressors should showcase restored cell growth patterns. Our preliminary data suggest that fur and tlyA are indeed suppressors. By identifying secondary site suppressors, we can elucidate the pathway by which the clock controls cell division in cyanobacteria.

21. Mariana Prado Martinez

M.S. Biology
Roles for ClpX in Circadian Clock and Cell Division
Faculty Mentor: Dr. Susan Cohen

Circadian rhythms allow cells to adapt to environmental changes. Cyanobacteria are the only prokaryotes known to have a robustly tested circadian clock, where Synechococcus elongatus is the model system used. The KaiABC proteins make up the oscillator that drives ~24-h rhythms. Cell division mostly occurs independent of the circadian clock; however, there are about 6-hrs during the day when the clock inhibits cells from dividing. This is known as circadian gating of cell division and the details of inhibition are not understood in any model system. In S. elongatus, ClpX is a chaperone that folds/unfolds proteins. Strains where clpX is deleted display elongated cell morphology and altered circadian rhythms of gene expression. Current models suggests that circadian machinery inhibits cell division and ClpX chaperone activity is important for the resumption of cell division. Previous work identified potential secondary site suppressor mutations, which allow the t-clpX mutant strain to grow to a more optimal biomass, suggesting they may play a role in ClpX-mediated regulation of cell division. Currently, I am creating single and double mutant strains of these potential suppressor genes in both a Wild Type and t-clpX background to confirm their roles in circadian control of cell division.

22. Puron Rahman

M.S. Chemistry
Can a Beetle Urine Antifreeze Protein Treat Human Kidney Stones?
Faculty Mentor: Dr. Xin Wen

Antifreeze proteins (AFPs) have been found in many organisms, and are known to lower the freezing temperature of the body fluids of the organisms and inhibit ice growth. Dendroides canadensis is a beetle consisting of 30 AFPs (DAFPs), but only four in hemolymphs: DAFP-1, DAFP-2, DAFP-4, and DAFP-6. We showed that DAFP-1 effectively inhibits the crystallization of a hemolymph sugar, trehalose. DAFP-6 is the only hemolymph DAFP found in the beetle's urine. Kidney stones are a common disorder in the human

urinary tract. About 80% of all kidney stones are calcium oxalate (CaOx) stones; calcium oxalate monohydrate (COM) is the main constituent. The urine components of human and the beetle are similar, however, no stones have been found in the beetle. We hypothesize that DAFP-6 can inhibit the formation of COM. We prepared COM in three different shapes: hexagonal lozenge aggregate (HLA), thin hexagonal lozenge (TL), and thin hexagonal lozenge aggregate (TLA) and investigate the effects of DAFP-6 on the formation of COM. DAFP-1 and bovine serum albumin (BSA) are used as controls. The shapes and the amounts of COM are analyzed using microscopic and gravimetric methods. The results will impact the treatments for kidney stones.

23. Rachelle Soriano

B.S. Biochemistry

Development of an Unbiased Cell Enumeration Protocol Using ImageJ to Assess Effect of Cytokines on Cell Proliferation

Faculty mentor: Dr. Edith Porter

Tuberculosis (TB) is among the world's most deadly diseases. It is most often caused by Mycobacterium tuberculosis (Mtb) which primarily targets the lungs, where it encounters epithelial cells first before it is confronted by specialized immune cells. The current TB vaccine has limited efficacy. Our lab conceptualizes that an improved vaccine could lead to the release of cytokines, a type of messenger proteins, that stimulate epithelial cells to secrete antimycobacterial factors. However, cytokines can also affect cell viability and cell proliferation. Therefore, we aimed to quantify the number of cells in response to cytokine stimulation by enumerating the cell nuclei from microscopy images taken of control and cytokine treated cells. An unbiased ImageJ protocol was developed to auto-enumerate nuclei. The cell counts as a percent of the controls were statistically analyzed. There was no statistically significant difference in the number of nuclei between the various treatment groups. This suggests that the cytokines used in the experiments did not statistically significantly affect cell viability and proliferation, encouraging further study of cytokine mediated stimulation of epithelial cells in future TB vaccine design.

24. Samantha Rose Teves

B.S. Biochemistry

Investigating the interactions between circadian clock proteins KaiC and Rbp2 in Synechococcus elongatus

Faculty Mentor: Dr. Susan Cohen

Circadian rhythms are ~24-hour cycles that drive various biological processes over the course of the day. Circadian rhythms are found in nearly all organisms, the simplest being cyanobacteria. There are three core oscillator proteins, KaiA, KaiB, and KaiC that drive circadian rhythms in S. elongatus, the model organism for studying cyanobacterial circadian rhythms. In S. elongatus, the clock controls the timing of gene expression and cell division. We had previously discovered that oscillator protein KaiC associates with the RNA binding protein known as Rbp2 through a screen aimed at identifying novel interaction partners. To investigate this interaction in more detail, we tagged Rbp2 with a strep tag and monitored its association with KaiC via co-immunoprecipitation throughout the day. My data suggests that these proteins interact, notably peaking at dusk. Amino acids R11, R36, and R70 of Rbp2 were identified as potentially being required for association with KaiC. We mutated each of these residues to Alanine in single, double, and triple mutation combinations. My data suggests that the R11 residue of Rbp2 plays a significant role in regulating the circadian clock. My future directions aim to determine if this is due to disruption of the interaction between Rbp2 and KaiC.

Education

25. Jeanette Calderon

B.A.: History, Minor Asian and Asian American Studies *Bilingual Education in Los Angeles 1970s-1990s*
Faculty Mentor: Dr. Enrique Ochoa

Bilingual Education was demanded to be established in California by Chicano activists for desegregation and cultural preservation/ presentation of Spanish-speaking people. Many Chicano activists argued that Spanish-speaking children not being able to exercise their native language and culture was discrimination. The activists began to pressure that the federal government had a duty to combat these discriminatory practices. In 1968, the Bilingual Education Act was passed in the United States to improve English learners' learning process. Bilingual Education was incorporated into schools in different ways to fit the students better. Programs like CLEAR at UCLA were federally funded research on how the students and faculty handled bilingual education and the methods they utilized. The research on bilingualism is crucial to understand as it impacted how Americans viewed bilingual education and formed the argument to advocate for it. This project will contribute to understanding how bilingual education served the Latinx community. To investigate bilingual education, I want to examine the changing laws, programs, research, and schools. I want to look at archives of the programs that researched bilingual education, such as CLEAR, done by UCLA. In addition, I want to look at newspapers to understand the sentiment of bilingual education in Los Angeles. What developments in the 1970s impacted the educational curriculum in the state of CA? How did bilingual education serve the community? How did the CLEAR program investigate bilingual education? What did their findings contribute? In my project, I am looking at archives and continuing to read. My research aims to highlight what bilingual programs/education did for the community and the cultural wealth it added.

26. Sean Erkin

B. A. Politics Science, Option in Global Politics
Workplace and Political Democracy
Faculty Mentor: Dr. Jared, Abbott

This study analyzes the correlation between the strength and quantity of institutions of workplace democracy and trust and participation with institutions of political democracy. To answer this question, I utilized quantitative regression modeling, comparing institutions of workplace democracy such as unionization and average wages with institutions of political democracy such as electoral turnout and government trust across all 38 Organisation for Economic Co-operation and Development (OECD) countries. My results showed that there was a direct positive correlation between the abundance and strength of institutions of workplace democracy and the strengthening of institutions of political democracy, even when compared with various confounders such as corruption and inequality.

27. Arnold Herrera, Matthew Alvarado, Michael Zhao, and Jeremy Tadeo

B.A. Nursing
AI's Social Impact: The Rise of Parasocial Relationships
Faculty Mentor: Dr. Stefanie Varela

The rapid and exponential growth of technology has evolved to the increased utilization and incorporation of artificial intelligence into our society, which has led to the emergence of unhealthy parasocial relationships. Studies have found that people encounter altered perceptions related to parasocial interactions and that virtual influencers can engage in consumers just as effectively as humans. This paper takes an approach that examines the parasocial relations amongst real people and artificially intelligent generated people, the clinical issues presented, and applications to nursing practice. In addition, we aim to provide psychoeducation consequences of parasocial relationships and benefits to real-life relationships. Our findings indicate that parasocial relationships through artificial intelligence or online influencers disrupt the ability for individuals to have real relationships and may induce mental health problems such as anxiety and depression in the long run.

28. Shira Levin

M.S. Nutritional Science
The Search for Health: A Qualitative Analysis of Where People with Chronic Conditions Turn for Trusted Health Information
Faculty Mentor: Dr. Kathryn Hillstrom

Over half of United States adults live with at least one chronic health condition. It is common for people with health conditions to seek out health information from medical professionals, family/friends, government organizations, and online. Individuals have varying levels of trust in the numerous health information sources available. One's trust may be influenced by various sociodemographic factors such as education levels, gender, age, and race. This qualitative study aims to understand where people with chronic conditions turn for trusted health information and the

factors that may impact their trust. Interviews were conducted with 38 diverse adults living in Los Angeles County who had or were caretakers of people with diabetes, hypertension, and/or hypercholesterolemia. Interviews were recorded, transcribed, and translated. NVivo software was utilized for coding recurring themes. A major theme included an overarching trust in medical professionals, including registered dietitians and people who have experienced the same health condition. Additional themes included reliable evidence-based resources/advice, a distrust of social media, and mixed attitudes toward WebMD and Google. The emerging themes provide insight into why people gravitate toward specific health information sources. Understanding the public's trust in sources is critical for practitioners and researchers to utilize as they communicate health messages.

29. Chelsea Leyva and Sarina Jade Velsa

B.A. in Psychology, Minor in Child Development; B.A. in Child Development

Assessing the Values of Pre-Service and In-Service Teachers and Their Perceptions on the PK-3 Credential

Faculty Mentors: Dr. Yafen Lo, Dr. Su Jeong Wee

Despite the increase in children enrolled in early childhood education (ECE) programs, many early childhood educators are leaving the field. In the United States, there is an estimated 15 to 30% annual attrition rate among ECE teachers, a turnout rate that is four times higher than their counterparts in elementary education (Schaack et al., 2022). Given the escalating number of children entering ECE and an increase of teachers quitting, it is crucial to understand how teachers perceive themselves and their profession to foster longevity. With the introduction of the PK-3 Early Childhood Education Specialist Credential, it is imperative to know what current and aspiring teachers' perceptions of it and whether it will address the career's challenges. The credential plans to meet the demand for diverse and qualified ECE teachers and increase job stability and flexibility for those already in the field (Commission on Teacher Credentialing, 2024). We aim to compare pre-service and in-service early childhood educators' personal and social values as well as their perceptions of the forthcoming PK-3 Credential. Using one-way ANOVA and correlational analysis, the preliminary analyses reveal no significant difference in personal or social value as teachers or the perception towards the PK-3 Credential between groups.

30. Sijia Zhou

B.A. Child Development

The Career Journey of Chinese American Male ECE Professionals

Faculty Mentor: Dr. Yafen Lo

Despite the numerous advantages associated with male preschool teachers, including facilitating children's gender identity development (Solomon, 2016), introducing new experiences (Wohlgemuth, 2016), challenging traditional gender roles (Cole et al., 2019), and encouraging fathers' involvement in their children's lives (Rohrmann, 2019), the representation of males in this profession remains significantly low. The objective of this study is to gain an understanding of the experiences and obstacles encountered by Chinese American male educators in the field of early childhood education (ECE). By analyzing personal narratives gathered through interviews, the study explores how participants' educational philosophies may clash with the prevailing ECE philosophy, and how their ethnic and gender identities influence their professional identities. The study interviewed three male Chinese immigrants employed in ECE, representing different age groups (20s, 40s, and 60s). Each participant underwent an individual online semi-structured interview, providing them with a platform to openly and honestly share their lived experiences. The thematic analysis demonstrates that male educators often face biases, particularly concerning their gender, which undermines their masculinity and raises doubts about their job competence. These findings partially support previous research and shed light on the detrimental impact on the career progression of male educators.

31. Stephanie Ardiano-Longo

B.A. Psychology

Family structure in YouTube videos for 3- to 5-year-olds

Faculty Mentor: Dr. Corinne Bower

Media targeted towards children may have recurring themes of the types of families that are represented, such as the traditional family with a mother, father, and two offspring rather than showing diverse structures, such as single parents. It is important to examine what children are being exposed to and how this may influence their development. This study examines videos labeled as educational to investigate the diversity in family structures. An online survey was distributed to parents across the U.S. (N=232) asking them to provide the three most recent YouTube videos their children watched. Sixty-eight videos in ranges of 5-15 minutes were preliminarily coded. Through a comprehensive analysis of the content within these videos, results suggest that the most common structure shown is of two parents and two children:

78% of the families portrayed had a mother and father, while 38% had only two offspring. Family dynamics such as single-parent, LGBTQ+, adoptive, or foster households are underrepresented in media. Educational content creators need to incorporate more family structure diversity in their videos to reflect the diversity in family structures of their viewers.

32. Ani Avakian

B.A. Psychology

Prevalence of math language in YouTube videos watched by 3-to-5-year-olds: Are there differences by child gender and parent education?

Faculty Mentor: Dr. Corinne Bower

Language, especially math language (e.g., many, few), is an integral part of the acquisition of early math skills. The amount of daily screen time varies by age but can start anywhere from 45 minutes or more. However, are the videos educational and if so, how much educational language is there? Although children are exposed to these videos every day, parents are not always monitoring what they hear and see. We examine the quality of math language in videos watched by 3- to 5-year-olds. An online survey was distributed to parents across the U.S. asking them to list their 3- to 5-year old children's (55.33% boys) top three recently watched YouTube videos (N=450 videos). Math language was then coded for in these videos. Given the prevalence of gender and parent education differences in children's math language, we hypothesized that videos watched by boys and highly educated parents would have more math language. Overall, we found that 2% of the language in educational videos was math-related (SD=4%). Contrary to our hypothesis, we found no significant differences in prevalence of math language by child gender (p=.945) nor parent education (p=.425). Thus, educational content creators should consider incorporating more math language in their videos.

33. Marie Lassaigne

M.A. Child Development

Toddler Media Consumption and its Implications

Faculty Mentor: Dr. Corinne Bower

The escalating screentime among preschoolers, with a quarter of US children devoting 4+ hours daily to media, poses concerns about the potential opportunity cost. This trend diverts time away from crucial interactions and independent play, vital for teaching adaptive skills-conceptual, social, and practical-that shape competence in daily life (American Association on Intellectual and Developmental Disabilities, 2023). Research links children's media consumption to adverse outcomes such as obesity, violence, risky behavior, and language impairments (Yilmaz et al., 2015). Nevertheless, the potential positive impact of YouTube videos on children's information absorption warrants exploration. Analyzing content in these videos is crucial for understanding developmental implications. This study delves into the portrayal of adaptive skills in YouTube videos for 3-5-year-olds, assessing both active and passive displays. Findings reveal that 81% of the videos demonstrate conceptual skills (28% actively), 86% display social adaptive skills (24% actively), and 93% feature practical adaptive skills (35% actively taught). The results highlight the prevalence of adaptive skills in children's media consumption, with conceptual skills being frequently addressed, room for improvement in actively teaching social skills, and a promising emphasis on practical adaptive skills. These insights contribute to understanding how digital content may influence preschoolers' adaptive skills development.

34. Elizabeth Plascencia

B.A. Psychology

Problem-solving and Social Learning Skills through Sing-along YouTube videos

Faculty Mentor: Dr. Corinne Bower

Bandura's Social Learning theory says children acquire skills and behaviors by watching and modeling others. YouTube has increased children's access to videos creating new ways for children to learn via social learning. But what skills do songs encourage? Prior research is conflicting on how effective sing-alongs are in teaching children's skills. Songs may not be as effective for language acquisition due to lack of conversational-turns, while they may encourage social interaction. This study explored social interactions, and problem-solving skills in sing-along videos. We hypothesized that sing-along videos encourage social interactions but not problem-solving skills. Parents (N=232, Mage = 4.43 years) were surveyed, and they provided the three most recent YouTube videos their children watched. We coded 60 videos in a range of 5-15 minutes. Out of the 60 videos, 52% were sing-alongs, and of these 69% had social interaction, and 54% had problem-solving. These findings suggest sing-along videos are recommended for parents aiming to encourage social interaction and problem-solving skills with their children. This study is important because it helps parents make informed decisions about content their children watch, ensuring it contributes positively to their children's development.

35. Ahyeon Shin

M.A. Early Childhood Education
Gender-Stereotyped Conformity in YouTube Videos Viewed by 3- to 5-Year-Olds
Faculty Mentor: Dr. Corinne Bower

According to technology development in education, the usage rate of social media, including YouTube, has tremendously increased. In 2020, children in the United States aged 4 to 14 will now dedicate 86 minutes daily to viewing YouTube content (Hale, 2020). Therefore, it is essential to understand if these videos include diverse characters or incorporate biased and stereotypical depictions of race, gender, and ethnicity. This research examines the general frequencies of gender presentation and gender-stereotyped conformity in videos viewed by 3 to 5-year-old children. Results of an online survey of parents across the U.S. suggest that 92% of the characters in the videos were of a traditional, stereotypical binary gender. Of these videos, a surprising 41% did not conform to their gender stereotype (e.g., females engaged in non- feminine roles) whereas 59% did conform to their gender stereotype. Additional analyses will investigate if these rates of gender diversity and stereotype conformity vary by parents' gender identity and other demographic variables (e.g., education). Implications of these results will inform discussions on the role of media in shaping children's perspectives and to offer considerations for content creators and educators aiming to foster inclusive and equitable representation in media for young audiences will be discussed.

36. Anthony Von Schonfeldt

M.A. Psychology
Spatial language in YouTube videos watched by 3-to-5-year-olds
Faculty Mentor: Dr. Corinne Bower

Spatial language describes how a scene or object relates to its location in space (e.g., the large triangle is on top of the smaller square) and is correlated with spatial skill development, which in turn is associated with later STEM achievement. Given that many children access online video content, we ask here whether educational YouTube videos watched by young children include a high prevalence of spatial language and if so, are they watched by children with more-highly educated parents? Participants were children (N=450, Mage=4.27, SD=1.80, 55.33% Boys) whose parents completed a questionnaire over the COVID-19 lockdown in 2020 that had them submit the links of the 3 most recent youtube videos their child watched. This work analyzed 57 of the submitted videos that were categorized as educational content and assessed the prevalence of spatial language within the first 15 minutes of each video. We found that only 5% of the language in these educational videos was spatial. Moreover, primary caregiver’s education was correlated with the proportion of spatial language present in the child’s videos (r=.28, p=.035). These results indicate that children from advantaged backgrounds gain more opportunities to experience spatial language early in development.

Engineering and Computer Science

37. Alannys Argandona and Sophia Sherzai

B.S. Electrical and Computer Engineering, Minor in Biomedical Engineering

Discrimination of Reach Direction Using Surface EEG Event Related Potentials

Faculty mentor: Dr. Deborah Won

Surface electroencephalography (sEEG) is a non-invasive alternative to intracortical EEG for brain-computer interfaces (BCI) that drive motor prostheses. Despite the appeal of the safer, more convenient, and lower cost sEEG option, noise in sEEG hinders its ability to be used for more than binary discrimination tasks. The objective of this study is to determine what features, if any, of event related potentials (ERPs) encode the direction of upper limb reach. sEEG was acquired from nine subjects performing a center-out reaching task with the MP-160 amplifier system (Biopac, Goleta, CA) at 500 samples/s with 5000x gain, and 2-pole bandpass filtering from 0.5 to 35 Hz at frontal and central electrodes on each hemisphere. Event-related potentials were computed using custom-written software in MATLAB (Mathworks, Inc. Natick, MA). Comparisons between ERPs for each of the 8 directions revealed differences in polarity of the main peaks, along with peak time and amplitude, across the eight reach directions, but there is significant variability across trials. The results of this study demonstrate the promise of using ERP features to discriminate upper limb reach in 8 different directions, enabling the development of non-invasive BCIs with greater motor functionality than the current state of the art.

38. Kim Kha

M.S. Mathematics

Applying Deep Reinforcement Learning for Predicting COVID-19 Infections and Stock Prices

Faculty Mentor: Dr. Jie Zhong

This project explores the adaptability and predictive abilities of deep reinforcement learning (DRL) algorithms in healthcare and economics, drawing inspiration from notable successes like AlphaGo and precise market predictions. The study focuses on applying DRL methods for predictive tasks, comparing deep Q-learning, Advantage Actor-critic (A2C), and Proximal Policy Optimization (PPO) algorithms in predicting stock prices and forecasting COVID-19 cases. Highlighting DRL's multifaceted predictive potential, this research showcases its capacity to reshape diverse domains through experiential learning-driven solutions, building on its proven versatility in addressing intricate problems.

39. Gabriel Linecker

B.S. Computer Science

Financial Sentiment Analysis Using Open-Licensed, Fine-Tuned Large Language Models

Faculty Mentor: Dr. Jie Zhon

The stock market is complex and temperamental, with news and earnings constantly changing the landscape. With the rise of revolutionary Large Language Models, we are seeing new and exciting applications that leverage natural language processing to improve workflows and accelerate businesses. We explored the effectiveness of Large Language models in performing one-shot stock analysis when fine-tuned for financial analysis. Specifically, we focused on quick outlooks on weekly financial news run on consumer-grade devices.

40. Frank Moreno and Sophia Sherzai

M.S. Electrical and Computer Engineering, B.S. Electrical and Computer Engineering, Minor in Biomedical Engineering

Development of a thermal energy monitoring and simulation system for optimization of a model HVAC controller

Faculty Mentors: Dr. Deborah Won and Dr. Arturo Pacheco-Vega

Heating, ventilation, and air conditioning (HVAC) is the largest (48%) single source of energy consumption in buildings. We present the design and development of a thermal energy monitoring and simulation system to evaluate the efficiency of a sub-scale model building HVAC system under varying external conditions as well as for different HVAC controller parameters. The sub-scale building model will be outfitted with an array of 64 thermocouples; a power meter will be added to continuously measure power consumption; a flow sensor will also monitor the air flow generated by the HVAC system. The thermocouples are wired directly to the MCC TC-32 (Digilent, Pullman, WA) which interfaces with our custom virtual instrument developed in LabView (National Instruments, Austin, TX). External conditions such as sunlight and wind will be simulated. We will monitor temperature across the 64-channel array, inside and outside the building, while different parameters are

adjusted in the fuzzy logic controller previously developed for this sub-scale building model. We will apply machine learning algorithms to detect patterns in thermal energy dynamics and identify HVAC controller schemes that minimize energy consumption while achieving desired temperatures. The ability to optimize energy consumption in HVAC systems will greatly improve urban sustainability.

41. Ali Risheh

MSc Computer Science
Physics-guided neural networks in protein-ligand binding
Faculty mentor: Negin Forouzesh

Calculation of binding affinity of biomolecules is an essential part of drug discovery processes and Machine Learning (ML) algorithms have demonstrated promising result in predicting binding affinity. Molecules are constructed by an arbitrary number of atoms and using their structure as input data for ML models is not reasonable. There have been efforts to generate a fingerprint out of structures that has fixed size and can be used in different ML models. Therefore, designing a method to represent a large amount of data in the form of one fixed-size vector is very challenging. Based on current deep learning solutions to predict the parameters of molecules, the widely used model is graph convolutional networks (GCN). In this study we designed a new deep learning architecture which has been integrated with physics based models. It incorporates a unique neural network layer specifically designed to featurize molecules, with a focus on retaining crucial information for predicting binding affinity. The proposed model will be tested on standard datasets, including small host-guest systems and large protein-ligand complexes.

42. Kaelyn Taing

B.S. Computer Science
Investigating Natural Language Processing Through Word-Based Games
Faculty Mentor: Dr. Jie Zhong

Board games have often been studied through artificial intelligence (Al) and machine learning (ML), but not often explored are word games. lnvestigating word games from the perspective of Al and ML elicits a more open kind of decision-making, relying on a combination of strategy and linguistic expertise. This project will focus on the latter and delve into natural language processing (NLP) techniques, specifically on the implementation of Word2Vec's approach, which utilizes vector knowledge to be able to visualize words as embeddings. Future NLP techniques and reinforcement learning can be applied to produce a better understanding of word relationships and decision-making results.

43. Marlen Trigueros and Arpit Vaishya

B.S Civil Engineering; M.S. Computer Science
Integrating Science Pedagogy into Computational Materials Research: Burning Energetic Materials
Faculty Mentors: Drs. Jeffrey Santner and Lexi Hwang

As part of a project funded by the National Science Foundation, four student scholars majoring in engineering from two CSU campuses underwent training in reactive molecular dynamic simulations (RMD) during Fall 2023. RMD is a powerful tool for modeling material properties, offering dynamic representations of molecules and the manipulation of unobservable phenomena at the atomic level. The students received hands-on training through various practical exercises under the supervision of faculty mentors. This study aims to present preliminary findings from the trained student scholars who utilized RMD to address real-world engineering problems through computational modeling, specifically focusing on the combustion of metal nanoparticles-an essential topic in aerospace engineering. The student scholars applied their training to explore inquiries arising from their own experiences, leading to authentic questions and opportunities to investigate and understand material processes, such as the oxidation of energetic metal nanoparticles. Their findings indicated that the oxidation rate of metal nanoparticles depends on the chemical reactivity of metal-oxygen elements, potentially resulting in varying energy releases during the oxidation processes. We believe that our efforts will significantly contribute to diversifying the field of engineering education research. Acknowledgement: Priyanshu Luhar, Karen Estrella, and Dr. Sungwook Hong from CSU Bakersfield.

44. Henry Amador and Suthawit Udomnopwitthayakul

B.S. Electrical Engineering, M.S. Materials Science
Materials and Systems for Aqueous pH Neutral Redox Flow Batteries
Faculty Advisor: Dr. John C. Bachman

With the growing demand for energy and the need for sustainable grid-scale renewable energy, aqueous redox flow batteries (ARFBs) are a promising energy storage technology. ARFBs offer several potential advantages over traditional lithium-ion batteries and vanadium redox

flow batteries, including more abundant raw materials, design flexibility, and environmental friendliness. However, ARFBs still face some challenges before this technology can be widely deployed, such as lower energy densities and shorter operating life. This research addresses these challenges by systematically exploring the crossover and degradation of active species and membrane in a promising ARFB. Two promising active species, 9,10-anthraquinone-2,7-disulfonic diammonium salt (AQDS Na2) and an equal amounts of NaFc(CN)6 (II) decahydrate and KFc(CN)6 (II) trihydrate, were synthesized and characterized for their electrochemical performance, reversibility, and lifetime. Testing methods included electrochemical impedance spectroscopy, cyclic voltammetry, and charge and discharge tests while performing high performance liquid chromatography and UV-vis spectrophotometry. Shelf life, half-cell, full-cell, and other experiments were conducted to quantify performance and cyclability of the active materials and membranes. Rates of chemical degradation, electrochemical degradation and ion-crossover are identified and reported and ways to mitigate them are provided.

45. Julia Chavez

M.S Civil Engineering

Evaluation of Mg-Silicate Hydrothermal Chimneys Effectiveness for CO2 Sequestration and Organic Adsorption

Faculty Mentor: Dr. Arezoo Khodayari

Organic compounds are found in a variety of sources, these can contaminate valuable water resources. Carbon dioxide is a disruptive greenhouse gas that poses serious risks to air quality, global warming, and resulting sea level rise. Mitigation techniques are essential to combat the effect of these in the environment. Strytan Hydrothermal Field (SHF), a warm (79 °C) alkaline (pH 10) shallow vent, is a saponite rich hydrothermal field off the northern coast of Iceland. Using solutions similar in composition to those found at the field site, the hydrothermal fluid was injected via syringe pump into a custom glass apparatus to simulate formation of hydrothermal chimneys. Low concentrations of different organics were added to the hydrothermal fluid prior to injection. Upon completion, the resulting precipitate and the ocean simulant are extracted and analyzed via SEM and ^{1}H NMR. The purpose of this project is to assess the degree to which these chimneys can play a possible role in conversion of CO_2 through mineralization and/or adsorb organics that can pose a risk to the environment when in high concentrations.

46. Boris Lagutin

B.S. Electrical Engineering

Impulse difference engine

Faculty Mentor: Dr. Charles Liu

The impulse difference engine is a device to create a thrust in any chosen direction of motion. The engine is powered by electricity only (no need for fuel or gas). The engine exploits conservation of momentums of and inertia of rotating masses (sources of magnetic field). The first tests of the engine simplified prototypes happened to be successful. Some of the tests were implemented in the Department of Electrical and Computer Engineering. The engine can work in various environments: space (vacuum), air (gas), water (liquid), on the ground. The engine is best for aerospace. The engine could solve a growing problem of space garbage orbiting the Earth and make space exploration much cheaper and more efficient.

47. Isabel Lopez

M.S. Materials Science and Engineering

Gecko-Inspired Dry Adhesive Micropillar Arrays: Impact of Geometry and Contact Shape on Performance

Faculty Mentor: Dr. Travis Hu

Gecko toepads have been extensively studied as a biological model to create advanced artificial dry adhesives, outperforming traditional pressure-sensitive adhesives and medical tapes. These adhesives possess strong adhesion, easy detachment, and self-cleaning. The primary objective of this project is to investigate how the shape and geometry of wedge-shaped micro-pillars affect the adhesive performance. These pillars are designed to resemble the anisotropic adhesive units of gecko setae. Several designs of wedge-shaped pillars with different contact shapes were created using a nanoscale 3D printer by Nanoscribe. The designs included rectangular, inverted, triangular, inverted half-elliptical, and half-elliptical shapes. The design features vertically aligned pillars of three different sizes. Subsequently, the adhesive properties were tested using an atomic force microscope (Bruker Corporation). Individual micropillars and micropillar arrays were examined to determine how contact shape, spacing, and patterning/distribution affect adhesion across different levels. Each design's adhesive performance and mechanical properties were assessed, and the force curves were obtained for each design. Three special AFM probes were implemented on six different micropillar array designs, which ensure that both individual and pillar array level performances can be investigated via force curve measurement.

48. Fergus Place

B.S Electrical Engineering
High throughout characterization of mutations
Faculty Mentor: Dr. Negin Forouzesh

Computational methods discovery can significantly reduce the time it takes to discover new drugs. Through molecular dynamic simulations we can create models that in turn calculate the binding free energy of a ligand and a receptor, how likely they are to bind, or interact. In computational methods the time complexity of the model is a significant factor in determining its utility. In this research we aim to develop a pipeline for high throughout characterization of mutations, specifically between the ACE2 receptor and the SARS-Cov-2 ligand. The objective is to systematically determine model parameters that will yield results that align with wet lab research while minimizing computational time.

49. Nathan Stoetzel

M.S. Mechanical Engineering
Numerical Modeling of Laser-Wire Directed Energy Deposition Process
Faculty Mentor: Dr. Mohsen Eshraghi

Laser-Wire Directed Energy Deposition (DED) is an Additive Manufacturing (AM) method that opens new possibilities for metal additive manufacturing. As research is being conducted on the physical material properties of samples produced by this method, there are physical limitations to the number of samples that can be produced at a time, as well as great material and energy cost for each sample produced. Numerical simulations can be used to predict the effects of various process parameters, reducing the burden on experimental testing. Single bead samples are first simulated and verified with experimental results. Once a model has been developed with a reasonable level of accuracy, the model can be used to predict effects of process parameters on more complex part geometry.

50. Cathy Trejo

B.S. Civil Engineering
Investigating polycyclic aromatic hydrocarbon transport in natural systems: A perspective towards wastewater treatment
Faculty Mentor: Dr. Arezoo Khodayari

Polycyclic aromatic hydrocarbons (PAHs) are a group of organic compounds that are ubiquitous contaminants in terrestrial and aquatic environments. PAHs are formed through incomplete combustion of organic matter and are known to be toxic. PAHs modes of transport allow them to easily travel in sediments and waterways, resulting in water pollution (Abdel-Shaffey and Mansour, 2016). PAHs can be transported in hydrothermal fluids and even trapped within the porous walls of a hydrothermal vent (Baumgartner et al., 2023). We investigate geochemical conditions that affect the mobility of anthracene and phenanthrene using a continuous-flow reactor that simulates a hydrothermal setting. Martian Global Simulant (MGS-1) regolith was used since it simulates both Mars and Earth's general basaltic composition and would provide insight into PAH transport on two planetary systems (Cannon et al., 2019). We used Nuclear Magnetic Resonance (NMR) spectroscopy and ion chromatography (IC) to analyze the liquid samples and Visible-Near Infrared Spectroscopy (VNIR) to analyze the regolith samples. Our results demonstrate some of the geochemical conditions that would allow or prohibit PAH transport and show that mineral structure plays a role in the decomposition of these compounds. These findings can help identify effective conditions for the removal of PAHs from contaminated waterways.

Health, Nutrition, and Clinical Sciences

51. Cristelyn Joyce Chua, Arielle Jonna Guinto, and Xena Cameron Albania

B.S. Nursing

Does Color/Theme on Isolation Gowns Affect Anxiety Levels Among Hospitalized Pediatric Patients?

Faculty Mentor: Dr. Stacey A. Warner

Hospitalization is a traumatic event that can leave negative impacts among children In a study on a pediatric surgical unit, 91.7% of the children experience moderate anxiety while 8.3% suffer from severe anxiety. The unfamiliarity of the environment, presence of medical equipment, and fear associated with procedures can increase stress levels among children. Studies show that high-stress experiences such as hospitalization can impede growth and development. Pediatric nurses can improve patient outcomes by providing atraumatic care. Research shows that nursing attire is a factor hospitalized children consider in nurse-child relationships as non-verbal means of communication. The use of non-conventional nursing uniforms can create a child-friendly environment that decreases anxiety levels. The COVID-19 pandemic has significantly increased the prevalence of PPE use. Researchers suggest that children have become familiar with PPE use. Upon literature search, it has been found that there are no existing studies on the effects of non-conventional isolation gowns on anxiety levels among hospitalized pediatric patients. This study aims to bridge this literature gap in nursing by proposing a research design that will determine the correlation between colored/themed isolation gowns and anxiety levels of hospitalized pediatric patients.

52. Ivan Cobian, Kenobi Donart, and Lauren Perez

B.A. Psychology

Examining the Construct Validity of the Difficulties in Emotion Regulation Scale (DERS) 36 and 18-item Short-form among a Predominantly Hispanic/Latino Population

Faculty Mentor: Dr. Yvette Szabo

The 36-item Difficulties in Emotion Regulation Scale (DERS-36) is widely used to measure emotion dysregulation and is a valid tool in studies with predominantly white samples. An 18-item short-form (DERS-18) was validated within a 97% white sample. Different races/ethnicities uniquely experience emotion, which calls for assessing if these scales are to the long forms and can be used to reduce participant burden. Future research to assess associations with key outcomes over time is needed.

53. Charlize De Guzman, Audrey Caringal, Kenneth Manansala, and Taylor Woo

B.S. Nursing

The Effects of Social Media on Adolescents' Well Being

Faculty Mentor: Dr. Stefanie Varela

Studies have shown that adolescents are becoming addicted to social media, so it is important to identify the effects social media has on adolescents' physical and mental well-being. Prolonged social media use has been linked to detrimental effects on socio-emotional well-being, lower self-esteem, and negative body image. The adolescent years consist of identity formation, so social media use makes adolescents susceptible to being influenced by the opinions they receive on social media, which in turn leads adolescents to constantly compare themselves to "perfect" influencers they see online. This research utilizes the Maslow's Hierarchy of Needs framework, which states that adolescents cannot fulfill their full potential if self-esteem issues are present. The studies used for this research consist of a randomized controlled trial, a descriptive study, and a cohort study. Reducing social media use increases appearance and weight esteem levels.There is a negative relationship between self-esteem and social media addiction levels with a positive relationship between self-esteem and body image levels. Self-esteem issues that are not resolved in adolescence can lead to depressive symptoms in adulthood. Interventions that can be implemented to help adolescents include parental guidance and support, finding hobbies to boost self-esteem, and limiting social media use.

54. Kevin Diego-Perez

M.S. Chemistry

Optimizing Methods to Monitor the Degradation of individual Polyethylene Terephthalate Microplastics

Faculty Mentor: Dr. Yixian Wang

Plastics are essential in our daily lives but have become harmful environmental pollutants due to their overproduction and inadequate disposal. Despite their inherent durability, environmental factors like mechanical forces, temperature changes, and exposure to light can degrade plastics. This results in the formation of microplastics—particles smaller than 5 mm—which pose ingestion risks to wildlife, marine life, and ultimately, humans. Microplastics can further degrade changing their specific properties. Our study concentrates on tracking the degradation of individual polyethylene terephthalate (PET) microplastics subjected to thermal or UV exposure. To achieve this, we fine-tuned methods involving scanning electron microscopy (SEM) and atomic force microscopy (AFM).

The optimization of SEM was crucial due to microplastics' minute size and non-conductive properties, which can lead to image distortions. By employing low vacuum SEM, we bypassed the need for metallic coatings, eliminating potential artifacts caused by surface charging. Using Pinpoint AFM, we assessed individual PET microplastics at the nanoscale, yielding both topographical and mechanical insights, including data on the Young's modulus. Additionally, we explored the chemical changes of PET microplastics using attenuated total reflectance- Fourier Transform infrared (ATR-FTIR) spectroscopy. Through these combined techniques, we discerned the physical, mechanical, and chemical alterations induced by various degradation processes.

55. Tania Galvez

B.A. Anthropology

Bone Health Among Ancient Maya Females from the Midnight Terror Cave, Belize

Faculty Mentor: Drs. Michele M. Bleuze & James E. Brady

Osteoporosis is a condition characterized by the weakening of bones and increasing risk of fractures caused by a reduction in bone density. This study investigates bone health in Late Classic (AD 600-900) females (N= 7) and males (N= 4) from the Midnight Terror Cave, Belize. Since the assemblage is commingled, bone density was assessed in the pelvis because both sex and age-at-death can be estimated in this element. Bones were radiographed in standard anatomical position, images were imported into Fiji (lmageJ), and regions of interest (ROls) (100 x 100 pixels) were selected at the anterior superior iliac spine, anterior inferior iliac spine, acetabular fossa, and greater sciatic notch. Fractional bone area (bone area [BA]/total area [TA]) and mean of trabecular thickness (Tb.Th), which assess bone quantity and quality, respectively, were measured on binarized ROls. Given the limited sample size, general patterns were explored between the sexes and across ROls within individuals. Females show greater BA/TA and Tb.Th than males at all four ROls. Within individuals, BA/TA tends to be similar across ROls while Tb.Th is variable. Female bone health in this sample is relatively better than male bone health.

56. Sherena Tan, Sydney La, Elysse Yee, Zeta Marquez, and Lauren La

B.S. Nursing

Targeting Mental Health for Individuals Aged 15-65 During COVID-19

Faculty Mentor: Dr. Stefanie Varela

There has been a rise of mental health issues ever since the start of the COVID-19 pandemic. Among them, the most prevalent have been anxiety and depression. According to the World Health Organization, there has been a 25% increase in the global prevalence for anxiety and depression (WHO, 2022). Over 5.4 million people also took a mental health screen in 2021, with a 500% increase from the number of people who completed a health screen in 2019 and a 103% increase in 2020 (Mental Health America, n.d.). Younger individuals, with 45% of them being ages 11-17, have taken the mental health screening tests (Mental Health America, n.d.). A common stress factor was found to be social isolation, with other related factors such as fear of loneliness, fear of infection, suffering and death, and financial worries. This poses a concern, as there was a 22% increase in the use of mental health services during the pandemic (Rand Corporation, 2023). Nurses play a critical role in getting the assistance patients need to manage their mental health disorders. We evaluated 5 articles related to remote therapy to determine its effectiveness in treating COVID-induced mental health disorders.

57. Eddy Boror and Wesam Aref

B.S. Information Systems

AI-Driven Data Model: Predictive Analysis for Chronic Disease Management

Faculty Mentor: Dr. Shilpa Balan

Artificial intelligence (AI) is now used in healthcare due to the increasing number of chronic medical diseases. The revolutionary effects of AI are benefiting patients and doctors. AI brings automated tools for problem-solving, which lightens the doctor’s workloads and improves diagnostic accuracy. AI plays a critical role in preventing chronic diseases, particularly diabetes and heart diseases by utilizing risk prediction models to identify high-risk patients. This gives doctors the chance to intervene early, slowing down the progression of the diseases. With early warning indications, AI enables expedited treatment and significantly lowers costs. In this research, an AI model is created for chronic disease management. This research highlights how AI and machine learning with high accuracy rates can be used to predict and manage chronic diseases.

58. Andre Chan

B.S. Food Science and Technology
Comparison of selected household washing and drying methods in reducing Listeria innocua in iceberg lettuce
Faculty Mentor: Dr. Sunil Mangalassary

Iceberg lettuce is a common vegetable consumed in salads and is associated with many cases of foodborne illnesses. In this study, three different washing methods of tap water, 2% acetic acid, and commercial wash, and two drying methods through spin-dryer and paper towels were used to assess the reduction of the inoculated *Listeria innocua* population on iceberg lettuce, as well as the pH and color after washing. The samples were inoculated with *Listeria innocua* suspension, and one set of all treatment samples was placed under immediate refrigeration for 24 h and another set was kept at room temperature for two hours and refrigerated for 22 h. After storage, all samples were immersed in washing solutions for 15 minutes except the control. One set was given a final rinse in tap water before enumeration. Another set was subjected to both drying methods. The results showed that 2% acetic acid had consistent inhibition (~ 2 log CFU/g) of the bacterial population compared to other methods. Additional rinsing did not remove bacterial cells completely and the drying methods did not significantly reduce the *Listeria innocua* population. Three washing methods did not have any significant effect on color, which is crucial to sensory quality.

59. Matthew Christmann

B.S. Nursing
Public Awareness of Lead Toxicity
Faculty Mentor: Dr. Stacey A. Warner

Environmental lead contamination is common in the home arising from lead-based paints, dust, and lead plumbing. Exposure can cause serious health issues, especially in developing children. Lead has been reported to pass from mother to infant in utero and through breastmilk, increasing the risk to young children. Public understanding of lead toxicity's effects on growth and neurodevelopmental processes in pediatrics is necessary to protect community health. Researchers have reported the public has general knowledge deficits and poor compliance with methods to avert lead exposure. The educational resources available have not fully alleviated or addressed this issue with improving overall understanding and compliance. Increased public awareness may reduce the incidence of lead poisoning and improve long term health outcomes.

60. Veronika Katona

B.S. Nursing
Simulation-Based Operating Room Experience for Nursing Students
Faculty Mentor: Dr. Stacey A. Warner

Researchers have investigated opportunities for education beyond clinical experience. A literature review was conducted to determine the use of alternatives to clinical experience in improving learning outcomes for nursing students in the operating room. Nursing students currently receive clinical practice contingent on hospital policies which have proven to provide inconsistent exposure. A search using the terms 'nursing students' and 'operating room' was conducted using CINAHL and PubMed under PRISMA guidelines (N = 69). Fifteen studies met inclusion criteria and identified the positive effects of technologically-assisted experiences on educational and confidence outcomes. Measurement scales were reviewed in the research articles that were identified to be utilized in the research proposal for a simulation-based program. The measurement tools of the Student Satisfaction and Self-Confidence in Learning Tool as well as the Situational Awareness Global Assessment Tool will measure the content being reviewed. Deductions from the proposed research project are aimed at highlighting the benefits of simulation-based experiences in their use to educate nursing students about the operating room. Therefore, simulation-based experience aims at alleviating reliance on hospital-based clinical hours to provide necessary experience.

61. Sabrina Jackson-Zambon, Aida Benitez, and Villiam Ralica

M.A. Psychology, B.A. Psychology
Attitudes toward Knowledge of Abortion: Links with RWA and Religiosity
Faculty Mentor: Dr. Heidi R. Riggio

The overturning of *Roe v. Wade* highlights the importance of legal abortion for women's lives. Research suggests that individuals who identify as religious are less supportive of abortion rights (Osborne, 2022). Fewer studies have focused on abortion knowledge, with studies suggesting that religious people have less factual knowledge of abortion (Esposito & Basow, 1995). This study examines strength of religious identity and right-wing authoritarianism (RWA) in relation to abortion attitudes and knowledge. Participants from Amazon Mechanical Turk (N = 237, 116 women, M age = 33.5) completed an anonymous online survey for three dollars, including abortion attitude and knowledge measures, the *Right-Wing Authoritarianism Scale* (Altemeyer, 1983), and religiosity ("*I consider myself to be a religious person*"). Regression results indicate that religiosity and RWA are independently significantly predictive of greater

endorsement of the statement, "*The United States government should enforce laws that prevent a woman from having an abortion*." While religiosity is initially predictive of accurate abortion knowledge, religiosity is not predictive of knowledge when RWA is included, a mediation effect. Results are discussed in terms of links between authoritarianism and sexism (Christopher & Mull, 2006), and social identity theory (Tajfel & Turner, 1979).

62. Reina Evette Ramos, Patrizia Abcede, May Tran, and Kristine Nava

B.S. Nursing
Breast Augmentation Effects on Breastfeeding Mothers: A Literature Review
Faculty Mentor: Dr. Stefanie Varela

This study aims to explore the effects of breast augmentation on a woman's ability to breastfeed through literature review. Breastfeeding is crucial for providing both protection to newborns. We searched four databases - CINAHL, Medline, PubMed, and PsycINFO - from 2010 to 2022. After applying the selection criteria of being a peer-reviewed article published within the last 15 years, we selected 6 out of 346 records. This review discusses the impact of breast augmentation on breastfeeding, emphasizes the significance of support and education, and highlights the role of the healthcare team in providing this teaching. Through our review, we aim to educate healthcare professionals and women on the gaps in knowledge regarding the effects of breast augmentation on breastfeeding.

63. Brisa Rodriguez and Ciara Gutierrez

B.S. Public Health
Addressing Disparities in Breast Cancer Care
Faculty Mentor: Dr. Behjat Sharif

Breast cancer is a significant health concern among women as it is the second leading cause of cancer death among women in the United States. Among ethnic monitory women, the problem is compounded by the lack resources that contribute to the development of breast cancer. These can include barriers such as no health insurance, no health promotion and education programs, and a lack of access to yearly mammograms. We have planned a scientifically based intervention to be accessible to the high-risk minority women. The goal is to provide education and skills to low-income population that can greatly benefit from the positive impact of this intervention. We have become inspired to create this prevention approach for breast cancer awareness program as it can impact ethnic minority women in Los Angeles. The program's design is guided by the comprehensive theories in public health and is based on data gathered through research of the literature. We have planned for partnership and collaboration with other community agencies to complement our practical planning of the program. The potential impact of the intervention is to effectively inform and impower the participants to regularly perform self-breast examination as it can save their lives and improve public health.

Physical and Mathematical Sciences

64. Rajkin Chakroborty and Ruth Gonzalez

B.S. Biochemistry

Ultraviolet Spectroscopy Computational Technique: Investigating Florence of Benzo[A]pyrene and Diones Derivatives

Faculty Mentor: Dr. Olaseni Sode

The main representative in the class of polyaromatic hydrocarbons (PAH), Benzo[a]pyrene (B[a]P) is studied across the natural and social sciences for its carcinogenic properties in animal models and cited as a health and environmental hazard amongst local, federal, and international regulatory agencies. The production of B[a]P 1, 2 occurs through an incomplete combustion cycle and is classified as a moderately persistent pollutant. B[a]P remains in the air, soil, surface water, and sediments. It is well documented that B[a]P is 3 reactive within the environment and biological systems however the reactive properties of molecular B[a]P remain unknown. We aim to investigate B[a]P and respective Dione derivatives in Figure 1. through theoretical chemical computational methods and produce phosphorescence spectra. We will utilize the remainder of the introduction to review phosphorescence and its connection with molecular reactivity.

65. Jesus Corona

M.S. Chemistry

Application of Ruthenium(//) Polypyridyl Metal-Organic Frameworks in Solid-State Dye-Sensitized Solar Cells

Faculty Mentor: Dr. Yangyang Liu

Metal-organic frameworks (MOFs) comprised of ruthenium(II) (Ru(II)) metal and 1,4-di([2,2':6',2''-terpyridin]-4'-yl)benzene (tpy) ligand were implemented as sensitizers in solid-state dye-sensitized solar cells (ssDSSCs). The highly ordered and rigid structure of the Ru(II)-tpy MOF was used to facilitate the generation and mobilization of charge carriers at the Ru(II)-tpy MOF/TiO_2 interface. Additionally, the effect on ssDSSC performance by varying the counterions between chloride (Cl^-) and hexafluorophosphate (PF_6^-) was also investigated.

66. Katherine Ortiz and Timothy Harris

M.S. Mathematics

Cayley Graphs, Chromatic Numbers, and How to Find Them.

Faculty Mentor: Dr. Michael Krebs

Cayley graphs are a special type of graph, having vertices from a group G and a special subset of G normally called S, which is closed under inverses. Adjacency between two vertices g,h E G is equivalent to the condition that g
- h E S. We will give a presentation on a specific class of Cayley graph,
where G = Zn / H , for some finitely generated subgroup H of Zn, and S =
{±e1,...,±en}, the "standard basis" elements of Zn / H and their inverses. The generators of this subgroup H may be arranged in a matrix, giving us a succinct representation of any Cayley graph of this form. We will discuss especially chromatic numbers and their applications, more general graph theoretic strategies for finding them, known chromatic numbers of classes of graphs we are currently studying, and classes which are soon to be determined.

67. Madison Ngo

B.S Biochemistry

Self-made Ag/AgCl Reference Electrodes

Faculty Mentor: Dr. Yixian Wang

In electrochemistry, a reference electrode is a stable, non-reactive component that maintains a constant potential against which the other electrodes in the cell can be measured. The silver/silver chloride (Ag/AgCl) reference electrode is a widely used type of reference electrode, consisting of a silver wire coated with silver chloride that is immersed in a solution containing chloride ions. It is commonly used because of its well-defined and stable potential, ease of preparation, and broad applicability across various types of electrochemical investigations. The current study delves into the fabrication of in-house Ag/AgCl reference electrodes as a cost-effective and practical alternative to commercially available ones, which can be prohibitively expensive and suffer from limited shelf-lives. We adopted a literature-reported procedure in which the electrodes are constructed in micropipette tips and sealed with agarose gel. We used cyclic voltammetry to compare the performance of both the self-made and commercial reference electrodes. In this presentation, we will report on the critical steps during

the fabrication and share the final results demonstrating the reliable performance of the as-made reference electrodes. This project has been optimized and adapted into CHEM 4530 as an experiment for upper-division undergraduate students.

68. Jyotikaben Patel and Ananya Sharma

M.S. Chemistry
Improving Derivatization Techniques and Quantitative Analysis of Olefins in Alternative Fuel Derived from Plastic Waste Using GCxGC-FID
Faculty Mentor: Dr. Petr Vozka

Plastic waste is a major environmental concern, with billions of tons accumulating in landfills yearly. Alternative fuels, generated through pyrolysis and hydrothermal processing, aim to reduce plastic waste by converting it into valuable energy sources. However, these fuels contain a significant amount of olefins, posing analytical challenges due to their structural complexity and similarity, often leading to inaccurate quantification using conventional methods. This study delves into optimizing derivatization techniques to enhance separation efficiency for precise quantitative analysis of olefins in fuels derived from plastic waste. Derivatization offers a promising solution by modifying the chemical properties of olefins, thereby improving their chromatographic separation and mass spectrometric detection. This work introduces a derivatization method and reaction condition using dibenzyl disulfide (DBDS) and diphenyl disulfides (Ph_2S_2), optimizing separation and detection in complex alternative fuel samples. Samples will be analyzed via comprehensive two-dimensional gas chromatography (GCxGC) with a flame ionization detector (FID) and time-of-flight mass spectrometry (TOFMS) for quantitative and qualitative information, respectively. This research aims to contribute valuable insights into applying derivatization techniques to advance the accurate analysis of olefins in fuels derived from plastic waste, thereby supporting the development of sustainable energy solutions.

69. Nicole Salimbangon

M.S. Chemistry, Inorganic and Organic Chemistry
Photooxidation of Arylphosphines in Metal Organic Frameworks: A Mechanistic Probe for Cage Effects
Faculty Mentor: Dr. Matthias Selke

Arylphosphines are a class of organophosphorus compounds that are widely used in applications of catalysis, polymerization, and fuel-stabilizers for jet fuels. The bulkiness of these compounds can be modified with substituents on the ortho position of the aryl group which is useful for mechanistic studies. Additionally, most arylphosphines are inert -that is- they are unreactive with triplet oxygen. In contrast, they react readily with singlet oxygen leading to phosphine oxides and/or phosphinate esters. The ratio of these products is highly sensitive to steric effects: the intramolecular formation of the phosphinate ester is preferred in a sterically demanding environment. This research studied the change of reactivity and products of phosphine oxidation chemistry inside metal organic frameworks (MOFs). This was demonstrated through photooxidation chemistry using triphenylphosphine and tris(ortho-methoxyphenyl) phosphine as the substrate and MOFs with porphyrin linkers as the catalyst. Other MOFs with varying pore sizes was examined for their cage effects. In contrast with previous assumptions in the literature, we have found that there is no insertion product formation therefore implying that singlet oxygen diffuses out of the MOF cage.

70. Olivia Spanish

B.S. Applied Mathematics; Minor in Bioinformatics
Exploring the Relationship between the Intrinsic Properties of Proteins and Protein Degradation Rates
Faculty Mentor: Dr. Jamil Momand

This study aims to determine if measurable intrinsic properties of proteins can predict protein degradation rates. Here, we explore three intrinsic properties: amino acid sequence, predicted three-dimensional structure, and subcellular location. Known degradation rates (half-lives) and sequences came from a published study of human proteins in cultured liver cells. Predicted structure data came from the AlphaFold2 database and subcellular localization data came from the UniProtKB database. We converted the AlphaFold2-predicted structures of 473 proteins to coefficient vectors with the 3D Surfer 2.0 program. We intend to use a deep neural network coded in MATLAB to detect patterns within our compiled sequence, structure, and location data that associate with each of 14 known protein half-life ranges: 0-1 hour, 20 hour intervals spanning 9-249 hours, and $\geq$250 hours. We will report our progress on patterns associated with these half-life ranges. Findings from this study could be applied to the design of protein therapeutics with desired degradation rates for short-term or long-term treatment regimens.

71. Sudheendra Gamoji and Raul Reyes

M.S. Physics
Using blackbody radiation to reduce lens distortion of the U GO Telescope
Faculty Mentor: Dr. Marina Mondin

The Laser Interferometer Gravitational-Wave Observatory (LIGO) was built to detect gravitational

waves--ripples in the fabric of spacetime generated by the acceleration of binary stars, black holes, and other massive objects. The telescope at LIGO uses a powerful laser that is split into two beams that bounce off mirrors and return to a central location where they originally split. The heat generated from the laser, over time, distorts the mirrors in a phenomenon known as "Thermal Lensing," which attenuates the already weak signals received by gravitational wave detectors. We propose a radiative cooling apparatus using black body radiation to sap the heat from the mirrors, allowing for better data collection from the instruments.

72. Rayana Ramirez and Elena Mosham

B.S Biochemistry; M.S. Criminalistics

Comprehensive Two-Dimensional Gas Chromatography and Time-of-Flight Mass Spectrometry as Method for Age Estimation of Fingerprint Deposition

Faculty Mentor: Dr. Petr Vozka

Fingerprints are widely used for personal identification in forensic casework due to their individualizing characteristics. However, more information can be obtained beyond the external features of a fingerprint. We propose developing a time frame model of the chemical degradation process based on the compounds extracted from fingerprints to estimate how long a fingerprint has been deposited on a surface. This project aims to use comprehensive two-dimensional gas chromatography combined with time-of-flight mass spectrometry (GCxGC-TOF/MS) to develop a method for estimating the time since deposition. This will provide more definitive circumstantial evidence of an individual's presence at a crime scene. Preliminary research is being conducted using LECO's Pegasus BT 4D GCxGC TOF/MS. Eccrine and sebaceous fingerprints are collected on microscope glass slides and analyzed at varying times post-collection, ranging from immediately to four months. Preliminary results indicate the presence of squalene and cholesterol in fingerprints. Continuous research is being conducted to determine how aging fingerprints affect the concentration ratio of squalene and cholesterol.

73. Brandon Ramos

B.S Mathematics

A Study on the Importance of the Time Value of Money

Faculty Mentor: Dr. Jie Zhong

In the practice of financial mathematics, the time value of money is the conjecture that a sum of money received now has more value than an identical sum that will be received at a future date. The TVM principles are used in financial professions to manage wealth and mitigate risk in investments. In this project we will cover the fundamental ideas behind the TVM. The concept of applying interest rates towards investments, calculating present value/future value of cash flows, convertible rates, force of interest, and time equations of value will be presented and explained for this study by applying the knowledge that we will learn towards real-life mathematical problems. Overall, the purpose of this study aims to develop a sense for making calculations towards our own financial assets. Furthermore, we want to introduce this material to students because financial management should be a fundamental branch in the American educational system. A poster will be used to explain the concepts in detail, and a mathematical problem involving cash flows and its value over a period of time will be presented visually and solved in real time.

74. Emily Samperio and Mayra Hernandez

M.S. Materials Science and Engineering; B.S. Chemistry

Zirconium-based Metal-Organic Frameworks for Drug Delivery

Faculty Mentor: Dr. Yangyang Liu

Metal-Organic Frameworks (MOFs) are hybrid porous nanomaterials with high surface area that have shown potential for targeted drug delivery applications due to their highly tunable structure. Novel drug delivery systems have been used in an attempt to specifically target desirable locations, such as cancerous sites in the body. In this research, Zirconium-based MOFs were selected due to their low cytotoxicity, biocompatibility, and pH responsive properties. This work utilizes three different hybrid organic-inorganic MOFs (UiO-66, MOF-808, NU-1000) incorporated with polyethylene glycol (PEG) chains to optimize drug release efficacy under pH 7.4 and generating a pH-responsive drug release at pH 5.5, emulating a healthy and cancerous cell environment subsequently. All uncoated and PEG-coated MOFs with diverse structures will be investigated to study the effects of PEGylation on drug delivery and their pH-responsive properties. The continuation of this project can lead to finding promising results and potentially finding novel drug carriers to minimize side effects on cancer therapeutics.

75. Tommy Taing

B.S. Chemistry

Utilization of Titanium Porphyrin Metal Organic Frameworks to Fabricate Photovoltaic Cells

Faculty Mentor: Dr. Yangyang Liu

Photovoltaics have seen much interest as a source of renewable energy, with recent interest in titanium (IV) based metal organic frameworks (Ti-MOF) studied.

The Ti-MOFs application in solar cells makes for a prospective alternative to current silicon-based cells. The paper synthesized the Ti-MOF DGIST-1 utilizing the porphyrin ligand TCPP (tetrakis(4-carboxyphenyl)porphyrin) and iron trichloride in a one pot reaction. The DGIST-1 was used to fabricate dye sensitized solar cells (DSSCs) that were constructed using fluorine-tin doped glass as the base with layers consisting of titanium oxide, anchor material, DGIST-1, hole transporting material, and a conductive gold layer. The fabricated solar cells had their photovoltaic activity tested to determine their power from light energy to electrical power efficiency.

76. Matthew Tang

M.S. Chemistry

Uncovering Structure-Property Relationships for Photoactive Metal-Organic Frameworks in photocatalytic oxidation of organic sulfides

Faculty Mentor: Dr. Yangyang Liu

Understanding the structure-property relationships of photoactive metal-organic frameworks (MOFs) allows for the improved design of both the materiel itself and the surrounding chemical environment to allow for optimal use. The goal of this study is to uncover these relationships for the photooxidation of 2-chloroethyl ethyl sulfide (GEES), a sulfur mustard simulant. To accomplish this, a series of porphyrin MOFs with varying metals have been used as photocatalysts for the oxidation of GEES to the nontoxic 2- chloroethyl ethyl sulfoxide (GEESO). The kinetics and selectivity of the GEES photooxidation reaction was studied using GG-MS and ^{1}H NMR. To further the understand the properties of these catalysts, the types of reactive oxygen species (ROS) generated in this process were also investigated.

77. Pavithra Wijeratne

M.S. Chemistry

Catalytic Detoxification of Organophosphorus Compounds via Hydrolysis Using Zr6-based Metal-Organic Frameworks

Faculty Mentor: Dr. Yangyang Liu

Organophosphate (OP) compounds are a class of toxic agents that are widely used as pesticides in areas such as agriculture, home, garden, and veterinary practices. However, exposure to these compounds poses a major health risk to humans, and high exposures leading to death. Degradation of OP compounds via hydrolysis has shown to be a viable route due to the mechanistic ability of the phospho- ester (P-O) linkage in OPs to be hydrolyzed into nontoxic components. Phosphotriesterase (PTE) enzyme has demonstrated successful catalytic activity in cleaving the P-O bond. Nevertheless, due to short shelf life and instability in ambient conditions, continuous PTE production is required which, however, poses various challenges. In recent years, a class of crystalline porous materials, Metal-Organic Frameworks (MOFs), have emerged as a promising material for the degradation of OPs. Owing to the structural tunability, MOFs can be designed to mimic the Zn-Oxo environment present in PTE active site. Although many Zr_6-based MOFs have been reported, only a few have been investigated for their ability to detoxify OPs. In this efforts, various 2D and 3D-interpenatrated Zr_6-based MOFs consisting of 6-connected nodes and varying organic linkers are synthesized and investigated for their efficiency in the catalytic degradation of OPs.

Last Year's Cal State LA Statewide Competition Delegates
CSU Student Research Competition,
California State University, San Diego, April 28-29, 2023

Kayci Hirakawa
B.A. Communication Disorders; Au.D. Audiology
The Neuronal Measures of Auditory Processing in Speech Differentiation between English Monolinguals and Spanish-English Bilinguals
Faculty Mentor: Dr. Miwako Hisagi

Hazel Carias-Urbina, Humanities and Letters, Undergraduate, 1st Place
B.A. History, Minor in Latin American Studies
Conspirando en Los Angeles: History of Central American Solidarity Organizing at MacArthur Park
Faculty Mentor: Dr. Camille Suarez

Elicet Cifuentes
M.S. Kinesiology, Option I: Exercise Science
Critical health education: Using a cultural lens to teach young Latina girls about body image
Faculty Mentor: Dr. Saemi Lee

Katherine Lainez, Humanities and Letters, Graduate, 1st Place
M.A. Latin American Studies
The Erosion of Family Caused by 'Land Grabbing' in Honduras: Migration, Gendered Expectations, and those left-behind in Honduras
Faculty Mentor: Dr. Enrique Ochoa

Juan Lindo
M.S. Kinesiology
"I'm Sorry You Feel That Way But That Wasn't My Intention": How to apologize with Cultural Humility
Faculty Mentors: Dr. Saemi Lee and Dr. George Crocker

Farzana Yasmin Boby
M.S. Electrical Engineering
Comparison of activity classification performance based on internal and external accelerometry for stimulation-based Parkinson's disease therapy
Faculty Mentor: Dr. Deborah Won

India Wesley-Cardwell
B.S. Biological Sciences, Option in Microbiology
Effect of TH 17 cytokines on the antimycobacterial activity of lung epithelial cell secretions
Faculty Mentor: Dr. Edith Porter

Jin Hyeok Yoon
M.S. Chemistry
Regiochemistry of the Singlet Oxygen Ene Reaction in Metal-Organic Frameworks
Faculty Mentors: Dr. Mathias Selke and Dr. Yangyang Liu

Kimia Lavasani, Behavioral, Social Sciences, and Public Administration, Undergraduate, 1st place
B.A. Psychology
Exploring Jurors' Qualitative Verdict Justifications Based on Jury Instructions
Faculty Mentor: Dr. Alma Olaguez

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University-Student Union 3rd Floor Plan

