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

February 28, 2025

Welcome all student participants, faculty mentors, judges, staff, and other guests attending the Annual Student Symposium on Research, Scholarship, and Creative Activity. This annual event allows undergraduate and graduate students to present their research and scholarly work in a public forum like 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 that the research and scholarly activities shared today present evidence of our university's high standards and academic quality.

This year's symposium features 154 oral presentations and poster exhibits. We invite you, first, to choose from among the eight groups of oral presenters at the University-Student Union (starts at 9:00 AM). Then, you may explore the poster exhibits in the Golden Eagle Ballrooms (which begin at 11:00 AM), where you can interact with the student researchers to learn about their excellent work. Finally, join us for the reception at Golden Eagle Ballrooms at 3:30 PM.

The top 10 oral presentations will represent Cal State LA at the Statewide CSU competition at Cal Poly Humboldt on April 25-26, 2025. We know our campus will excel again this year.

We wish each participant the best. We appreciate all participants for your role in the development of ushering in our next generation of creative individuals, scholars, and scientists.

Haley Ye
Associate Vice President for Research

Jason Shiotsugu
Director of Research

Symposium Schedule

ORAL PRESENTATIONS

9:00 AM - 12:15 PM University-Student Union, 3rd Floor
University Club, Golden Eagle, 1st 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
University Club, 1st Floor

Group 1 ▪ Behavioral and Social Sciences
▪ University-Student Union – Los Angeles A Room 308A

9:00 Sarena Eworonsky
9:15 Jessica Vega
9:30 Angela Valadez
9:45 Ashley Ramirez
10:00 Blanca Henriquez
10:15 Mei Ku
Break 10:30 – 10:45
10:45 Unity Cordova
11:00 Drusilla Szatko
11:15 Mira Arbonies and Kenobi Donart
11:30 Shelby Detweiler
11:45 Emi Sakai and Jordan Jeremiah
12:00 Tim Nguyen

Group 2 ▪ Humanities I: Humanities and Communities
▪ University-Student Union – Los Angeles C Room 308C

9:00 Marjorie Hunt
9:15 Renée Tabizón
9:30 Jarenni Ambriz
9:45 Jamilet Ochoa Rocha
10:00 Humberto Hernandez
10:15 Anthony Sales-Hernandez
Break 10:30 – 10:45
10:45 Isaac Collins
11:00 Eric Jones
11:15 Daniela Baffigo
11:30 Marie Lassaigne
11:45 Manifa Baghomian

Group 3 ▪ Humanities II: Anthropology and Archeology
▪ University Club, Golden Eagle, 1st Floor

9:00 Eric Gonzales
9:15 Hannah Calistri
9:30 Gina Alfaro, W. James Carter III, and Alejandro Ruiz
9:45 Robert Coronado, Jr.
Break 10:00 – 10:15
10:15 Nimrat Brar
10:30 Amanda Jokela

Group 4 ▪ Political Science
▪ University-Student Union – Montebello Room 309

9:00 Yen My Tat
9:15 Jason Chen
9:30 Giovanna Calderon
9:45 Jeannette Calderon
Break 10:00 – 10:15
10:15 Isabella Santillano
10:30 Arwa Hammad

Group 5 ▪ Biological and Health Sciences
▪ University-Student Union – Los Angeles B Room 308B

9:00 Yahan Lin
9:15 Harnawaz Boparai
9:30 India Wesley-Cardwell
9:45 Karli Miller
10:00 Dyanna Jimenez
10:15 Elvin Garcia
Break 10:30 – 10:45
10:45 Rosanne Huang
11:00 Aqueen Lenon
11:15 Matthew Christmann
11:30 Teegan Boyd

Group 6 ▪ **Computer Sciences**
▪ **University-Student Union – Pasadena Room 307**

9:00 Xuewen Tang
9:15 Rajkin Chakrobarty
9:30 Isuru Rajapakshe
9:45 Eman Badr
Break 10:00 – 10:15
10:15 Joseph Tran
10:30 Anirudha Bhaktharahalli Subramanya
10:45 Luis Martinez

Group 7 ▪ **Engineering**
▪ **University-Student Union – San Gabriel Room 313**

9:00 Zeke Blanco and Diego Flores
9:15 Christian Perez
9:30 Andy Damas
9:45 Sudheendra Gamoji and William Murillo
Break 10:00 – 10:15
10:15 Alejandro Sanchez
10:30 Henry Amador and Marwin Tepanohaya
10:45 Charlie Sanches

Group 8 ▪ **Physical Sciences**
▪ **University-Student Union – Alhambra Room 305**

9:00 Sergio Avina
9:15 Marlee Rapp
9:30 Kenneth Stebbing Cabrera
9:45 Laura Fredericks and Luis Cruz Vega
10:00 Evelyn Scott
10:15 Marlon Reyes Silva
Break 10:30 – 10:45
10:45 Samuel Groysman
11:00 Dominique Dang
11:15 Doroteo Manriquez
11:30 Steve Figueroa and Emmanuel Genfior

DR. RAYMOND GARCIA POSTER SESSION

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

Behavioral and Social Sciences

1. Arielle Jonna Guinto, Cristelyn Joyce Chua, Alyanna Alexis Amante, and Michael Loyola
2. Tara Choe
3. Enelea Balba
4. Angel Chen and Beth Santana

5. Ruth Uribe-Kirby, Fiona Baker, and Ivan Cobian
6. Noemi Alanis
7. Jordy Ocampo, Mei Ku, and Ivan Cobian
8. Vanessa Roman and Margaret Kosoyan
9. Ivan Farias-Martinez

10. Andrew Impomeni
11. Daniela Salazar
12. Gabriel Alaniz
13. Andrea Gutierrez-Gallardo
14. Kenobi Donart, Zarife Agin, and Mei Ku
15. Selvin Aguilar
16. Marilu Medrano, Yazzmine Deleon, and Erik Vargas

17. Lisette G. Bailey and Evelyn Mojarro-Pedroza
18. Evelyn Mojarro-Pedroza, Shelby Detweiler, and Lissette Bailey
19. Sara Cruz and Carmine Escamilla
20. Julie Diaz
21. Kylee Q. Robinson

Biological Sciences

22. Christian Martinez
23. Tshering Y. Bhutia
24. Robert Juarez, Elijah Ortiz, Lisya Tanujaya, and India Wesley-Cardwell
25. Lauren Hill
26. Jennifer Flores
27. Sophia Diaz
28. Richard Cipian

29. Marilyn Heidecker
30. Isabel A. Garcia
31. Karolina Bielec
32. Alfredo Gonzalez, Jaelyn Asamoah, and Aiden Reyes
33. Puron Rahman
34. Alexcia Marie Garcia and Janida Williams

35. James Che, Anay Rosas, Hannah Mohammadi, and Ashley Choi
36. Parker Saikley
37. Javier Ramirez and Heidi Silvas
38. Maximilian Mobley
39. Zander Milburn
40. Nidhi Alle and Lorraine Orgaz
41. Skellie Orantes Chun

Education

42. Qiong Wu
43. Ysabel Jumarang
44. Holly Yee
45. Elizabeth Plascencia and Marie Lassaigne
46. Valeria Valencia, Laura To, and Jocelyn Quintana
47. Arpit Vaishya and Robert Garcia
48. Daniel Yang

Engineering and Computer Science

49. Kajal Bhandare, Lakita Kapoor, Yu Wang, and Sirisha Mahesh
50. Isha Jaywant Patil, Rishab Lakhotra, and Rutik Narute
51. Matthew Xie
52. Alston Tang
53. William Pasillas, Derreck Soriano, and Isuru Rajapakshe
54. Andres Dominguez and Patricia Guzman

55. Nathan Brieu
56. Luis Salgado, Jose Hernandez-Villasenor, Hector Vazquez, Benjamin Fletes, and Edrei Pliego
57. Alex Alvarenga
58. Carlos Lopez and Apryl Sperling
59. Kaelyn Bohl

60. Christian Hernandez and Jonathan Martinez
61. Jordan Doose
62. Hector Gardea
63. Jonathan Flores
64. Jose Mario Gutierrez

Physical and Mathematical Sciences

65. Damian Salas
66. Erik Weisner
67. Jared Sweatman
68. Jose Coreas Guzman
69. Angel Morales

70. Madison Ngo
71. Tommy Taing
72. Eric Gutierrez
73. Andy Ruiz
74. Christian Maldonado
75. Kaycee Willis
76. Alexandra Fisher and Sumdra Cao
77. Naomi Samarasinghe

78. Sophia Grusnis
79. Catherine E. Price
80. Jonathan Davidson
81. Robert Alexander
82. Sasha Margolies
83. Yabo Ogunduyile
84. Mitchell Jacobs
85. Ernesto Ramirez, Jr.

Judges for Oral and Poster Presentations

Jared Abbott	Political Science
Gilberto Acosta	Kinesiology and Nutritional Science
Dylan Aguirre	Psychology
Veronica Ahmed	English
Randi Aho	Pat Brown Institute for Public Affairs
Andrew Aman	Biological Sciences
Okezie Aruoma	Chemistry and Biochemistry
Charleata Battle	Management
Tanja Baum Low	Nursing
Armando Beltran	Computer Science
Irene Benitez	Student Health Center
Michele Bleuze	Anthropology
Mathias Brieu	Mechanical Engineering
Anwesha Choudhury	Management
George Crocker	Kinesiology
Brandie Cross	Biological Sciences
Robin Dodds	Special Education and Counseling
Edward Eivers	Biological Sciences
Kendall Faulkner	University Library
Stephen Felszeghy (Emeritus)	Mechanical Engineering
Nanda Ganesan	Information Systems
Debra Garcia	Psychology
Matthew Gonzales	English
Hektor Gusha	Psychology
Hichem Hajaiej	Mathematics
Miwako Hisagi	Communication Disorders
Jamie Hsiung	Chemistry and Biochemistry
Harry Kartounian	Marketing

Manveen Kaur	Computer Science
Joshua Kelly	Geography, Geology, and Environment
Seolah Kim	Economics and Statistics
Armen Kocharian	Physics and Astronomy
Niraj Koirala	Economics and Statistics
Steve LaDochy (Emeritus)	Geosciences and Environment
Karine Le Bris	Physics
Jinging Li	Geography, Geology, and Environment
Yongjun Li	LA BioSpace
Shichun Ling	Criminalistics and Criminal Justice
Joseph Lucey	Civil Engineering
Abdullah Al Maruf	Electrical and Computer Engineering
Steve McGuire	Management
Ian Morton	Communication Disorders
Libere Ndacayisaba	LA BioSpace
Jason O'Neill	Mathematics
Carlena Orosco	Criminal Justice
Anna Osipova	Special Education and Counseling
Edith Porter	Biological Sciences
Shakila Rahman	Biological Sciences
Salvador Rojas	Mechanical Engineering
Jeffrey Santner	Mechanical Engineering
Tatev Sarkissyan	Psychology
Caitlin Scott	Chemistry and Biochemistry
J. Travis Shutz	History
Olaseni Sode	Chemistry and Biochemistry
Kabore Talato	Nursing
Keirstin Uomoto	Nursing
Valentine Villa	Social Work
Petr Vozka	Chemistry and Biochemistry

Xin Wen	Chemistry and Biochemistry
Kay Yang	Nursing
Meredith Zhang	Sociology

This list was created on 02/26/2025; we apologize if you have been omitted.

ORAL PRESENTATIONS

Group 1 ▪ Behavioral and Social Sciences
▪ University-Student Union – Los Angeles A Room 308A

9:00 **Sarena Eworonsky**
B.A. Psychology
Exploring the Role of Juror Bias on Decision-Making in a Civil Case
Faculty Mentor: Dr. Alma Olaguez

9:15 **Jessica Vega**
M.A. Psychology
Positive Classroom Experiences are Related to Later Reduced Math Anxiety and Higher Math Achievement
Faculty Mentor: Dr. Corinne Bower

9:30 **Angela Valadez**
M.A. Psychology
Parent Perceptions of Math and Spatial Language in Education YouTube videos when Co-viewed with Adults Versus Peers
Faculty Mentor: Dr. Corinne Bower

9:45 **Ashley Ramirez**
M.S. Forensic Psychology
Navigating Emotions in Civil Litigation: A Qualitative Analysis
Faculty Mentor: Dr. Alma Olaguez

10:00 **Blanca Henriquez**
M.S. Forensic Psychology
Exploring Verdict Justifications: A Qualitative Analysis of the Defendant's Violent History in a Civil Trial
Faculty Mentor: Dr. Alma P. Olaguez

10:15 **Mei Ku**
M.A. Psychology
The Contributions of Rumination, Catastrophizing, and Depression in the Associations Between Adverse Childhood Events and Gastrointestinal Symptoms in a Predominantly Hispanic/Latino Sample
Faculty Mentor: Dr. Yvette Szabo

Break 10:30 – 10:45

10:45 **Unity Cordova**
B.A. Psychology
Identity, Racial Categorization, and Belonging in Muslim American Communities
Faculty Mentor: Dr. Dana Saifan

11:00 **Drusilla Szatko**
B.A. Psychology
Examining Eyewitness Decision Making Under Real World Conditions Using the Field Simulation Paradigm.
Faculty Mentor: Dr. Mitchell Eisen

11:15 **Mira Arbonies and Kenobi Donart**
M.S. Forensic Psychology
Examining Pre-Admonition Suggestion In Eyewitness Decision-Making Under Real-World Conditions Using the Field-Simulation Paradigm
Faculty Mentor: Dr. Mitchell Eisen

11:30 **Shelby Detweiler**
M.A. Psychology
Permissive Parenting Style and Adult Personality Outcomes
Faculty Mentor: Dr. Heidi Riggio

11:45 **Emi Sakai and Jordan Jeremiah**
B.A. Psychology
Can Visualization Techniques Used In The Cognitive Interview Enhance Memory Distortion?
Faculty Mentor: Dr. Mitchell Eisen

12:00 **Tim Nguyen**
B.A. Psychology
The Addict in You: A Review of Research on Dopamine Addictions
Faculty Mentor: Dr. Gaithri Fernando

Group 2 ▪ Humanities I: Humanities and Communities
▪ University Student Union – Los Angeles C Room 308C

9:00 **Marjorie Hunt**
M.A. History
The Wild and Unfree: Geographies of Nature and Slavery in Mid-Nineteenth Century Rio de Janeiro
Faculty Mentor: Dr. Kittiya Lee

9:15 **Renée M. Tabizón**
M.A. Latin American Studies
Generational Outcomes: Mexican American and Mexican Immigrant Experiences in Twentieth Century San Gabriel Valley California
Faculty Mentor: Dr. Enrique Ochoa

9:30 **Jarenni Ambriz**
B.A. Asian and Asian American Studies, Option in Asian Studies; Minor Anthropology
Metal in the Underground: An Industry from Below
Faculty Mentor: Wei Lun Jason Chiu

9:45 **Jamilet Ochoa Rocha**
M.A. Chicana(o) Latina(o) Studies
Resisting Capture: Queer Gestures in Opposition to Hauntings of Surveillance
Faculty Mentor: Dr. David Green

10:00 **Humberto Hernandez**
B.A. Sociology, Women's Gender & Sexualities Studies
Tranifesting Community Transition: On the Binary Structures of ICE, Gender-Based Violence, and the Impacts on Undocumented Gender-Variant People of Color.
Faculty Mentor: Dr. Molly Talcott

10:30 **Anthony Sales-Hernandez**
M.A. History
The Role of Print in the Pre-Revolutionary U.S.-Mexico Borderlands
Faculty Mentors: Dr. Chris Endy and Dr. Enrique Ochoa

Break 10:30 – 10:45

10:45 **Isaac Collins**
Master of Social Work
Black Americans Attitudes and Perceptions of Mental Health Services
Faculty Mentor: Dr. Margarita Villagrana

11:00 **Eric Jones**
Master of Social Work
Environmental Mastery in Addiction Recovery: A Data-Driven Revolution
Faculty Mentor: Dr. Joanna Karczewska

11:15 **Daniela Baffigo**
B.A. Communicative Disorders
Local Early-Literacy Resources for Children with Disabilities
Faculty Mentor: Erica Ellis, Ph.D., CCC-SLP

11:30 **Marie Lassaigne**
M.A. Child Development
Cultural Adaptation and Emotional Development: Exploring Resilience and Parent-Child Relationships in Immigrant Families
Faculty Mentor: Dr. Ashley Munger

11:45 **Manifa Baghomian**
B.A. English
Rhoticity in Armenian among Armenian-English Bilingual speakers
Faculty Mentor: Dr. Aaron Sonnenschein

Group 3 ▪ Humanities II: Anthropology and Archeology
▪ University Club, Golden Eagle, 1st Floor

9:00 **Eric Gonzales**
M.A. Anthropology
Reimagining Perceptions of Sacred Space at the Cueva de Sangre, Dos Pilas
Faculty Mentors: Dr. Michele Bleuze and Dr. James Brady

9:15 **Hannah Calistri**
M.A. Anthropology
Preservation and Contamination: Identifying Pesticides on Ethnographic Woven Materials using Portable X-Ray Fluorescence
Faculty Mentor: Dr. Amira Ainis

9:30 **Gina Alfaro[1], W. James Carter III[1,2], Alejandro Ruiz[1]**
[1]B.A. Anthropology; [2]B.A. Music, Option in Jazz Studies
Analysis of Historic-era Archaeological Materials from Crystal Cove State Park
Faculty Mentor: Dr. Amira Ainis

9:45 **Robert Coronado, Jr.**
M.A. History
Purépecha Humanism: Indigenous Renaissance Elements in the Relación de Michoacán, c. 1539-1541
Faculty Mentor: Dr. Kittiya Lee

Break 10:00 – 10:15

10:15 **Nimrat Brar**
M.A. Psychology
Trauma & Mental Health Service-Seeking Among Muslim American Young Adults
Faculty Mentor: Dr. Dana Saifan

10:30 **Amanda Jokela**
M.A. Anthropology
Illuminating the Subterranean: A Bioarchaeological Analysis of the Cueva de Sangre
Faculty Mentor: Dr. Michele Bleuze

Group 4 ▪ Political Science
▪ University-Student Union – Montebello Room 309

9:00 **Yen My Tat**
B.A. Economics
Impact of Tesla's Market Share Growth on Stock Prices of Other Automakers
Faculty Mentor: Dr. Seolah Kim

9:15 **Jason Chen**
B.S. Biological Sciences, Microbiology Option; Minor in Real Estate
African American and LGBTQIA+ Unhoused Communities: Disproportionately Overrepresented Groups in the Unhoused Population
Faculty Mentor: Dr. Theodoric Manley

9:30 **Giovanna Calderon**
B.A. Chicano (a) and Latino (a) Studies
Latinx Businesses in Boyle Heights
Faculty Mentor: Dr. Mark Wild

9:45 **Jeanette Calderon**
B.A. History
Dual Immersion After Prop 227
Faculty Mentor: Dr. Enrique C. Ochoa

Break 10:00 – 10:15

10:15 **Isabella Santillano**
B.A. Business Administration, option in Entrepreneurship
Thrive Ai
Faculty Mentor: Edan Epstein

10:30 **Arwa Hammad**
B.A. Philosophy, Option in Pre-Law, B.S. Political Science, Option in Pre-Law
Stretching Democracy: Third Parties and the Necessity of Democratic Elasticity
Faculty Mentor: Dr. Michael McLendon

Group 5 ▪ Biological and Health Sciences
▪ University-Student Union – Los Angeles B Room 308B

9:00 **Yahan Lin**
B.S. Biochemistry
Investigating the roles of TlyA and FtsZ in circadian control of cell division in cyanobacteria
Faculty Mentor: Dr. Susan Cohen

9:15 **Harnawaz Boparai**
M.S. Biological Sciences
Short-term Avian Response to Native Oak Restoration on the CSU LA Campus
Faculty Mentor: Dr. Eric Wood

9:30 **India Wesley-Cardwell**
M.S. Biological Sciences
Title: *Effects of elevated environmental carbon dioxide (CO_2) on the acid-base regulatory capacity of epaulette shark (Hemiscyllium ocellatum) gills*
Faculty Mentor: Dr. Jinae Roa

9:45 **Karli Miller**
M.S. Biological Sciences
The combined effect of light and heat on C3 and C4 grass function
Faculty Mentor: Dr. Christine Scoffoni

10:00 **Dyanna Jimenez**
B.S. Biological Sciences, Option in Microbiology
Gaging the Impact of Proximity to Los Angeles on Sedimentary Microbial Life in the San Pedro Channel
Faculty Mentor: Dr. Gustavo Ramirez

10:15 **Elvin Garcia**
B.S. Biochemistry
Elucidating the Mechanism of U-to-C RNA Editing in Synthetic DYW-KP Proteins: A Pathway Toward A New Programmable Base Editor
Faculty Mentor: Dr. Michael L. Hayes

Break 10:30 – 10:45

10:45 **Rosanne Huang**
B.S. Nutritional Science, Option in Dietetics
The Relationship between Food Pantry Visit Frequency and Diet Quality of Food Pantry Clients in Los Angeles County and Antelope Valley
Faculty Mentor: Dr. Michele Nicolo

11:00 **Aqueen Lenon**
M.S Kinesiology, Exercise Science
Understanding the effects of resistance training on brain and muscle oxygenation during exercise-induced muscle fatigue.
Faculty Mentor: Dr. Stefan Keslacy

11:15 **Matthew Christmann**
B.S. Nursing
Student Knowledge of Lead Toxicity
Faculty Mentor: Dr. Stacey A. Warner

11:30 **Teegan Boyd**
M.S. Kinesiology
Neck Muscle Functional Characteristics in Individuals with Forward Head Posture
Faculty Mentor: Dr. Leila Rahnama

Group 6 ▪ Computer Sciences
▪ University-Student Union – Pasadena Room 307

9:00 **Xuewen Tang**
M.S. Information Systems
Establishing an AIGC Shared Service Center within Global IT Architecture
Faculty Mentor: Dr. Song Xing

9:15 **Rajkin Chakrobarty**
B.S. Biochemistry
Post transcriptional modifications: thermodynamic insights on the enzymatic amination reaction of Uracil to Cytosine.
Faculty Mentor: Dr. Olaseni Sode

9:30 **Isuru Rajapakshe**
M.S. Electrical Engineering
Spectral Changes in sEEG as a Biomarker for rTMS Efficacy in Major Depressive Disorder
Faculty Mentor: Dr. Deborah S. Won

9:45 **Eman Badr**
M.S. Electrical and Computer Engineering
Scalable Design of Cyber-Resilient Architectures for Critical Systems.
Faculty Mentor: Dr. Abdullah Al Maruf

Break 10:00 – 10:15

10:15 **Joseph Tran**
M.S. Electrical Engineering
Observability-Blocking Controls for Double-Integrator and Higher Order Integrator Networks
Faculty Mentor: Dr. Abdullah Al Maruf

10:30 **Anirudha Bhaktharahalli Subramanya**
M.S. Computer Science
Adversarial Resilience in Large Language Models
Faculty Mentor: Dr. Mohammad Pourhomayoun

10:45 **Luis Martinez**
M.S. Electrical Engineering
Parkinsons Tremor Detection via Apple Watch Accelerometry Data
Faculty Mentor: Dr. Deborah Won

Group 7 ▪ Engineering
▪ University-Student Union – San Gabriel Room 313

9:00 **Zeke Blanco and Diego Flores**
B.S. Mechanical Engineering
Methane Flame Stability
Faculty Mentor: Dr. Jeffrey Santner

9:15 **Christian Perez**
B.S. Mechanical Engineering
Modeling of Hydrogen Station Upgrade
Faculty Mentor: Dr. David Blekhman

9:30 **Andy Damas**
M.S. Mechanical Engineering
Circulation Patterns in Horizontal Rectangular Enclosures due to Humidity in Air
Faculty Mentor: Dr. Arturo Pacheco-Vega

9:45 **Sudheendra Gamoji and William Murillo**
M.S. Physics
Combating Thermal Lensing in Gravitational Wave Detectors Through Radiative Cooling
Faculty Mentor: Dr. Marina Mondin

Break 10:00 – 10:15

10:15 **Alejandro Sanchez**
B.S Mechanical Engineering
Improving the performance of lithium-ion batteries at high temperatures for space applications
Faculty Mentor: Dr. Chris Bachman

10:30 **Henry Amador and Marwin Tepanohaya**
B.S. Electrical Engineering; M.S. Mechanical Engineering
Investigating the Impact of Oxygen on AQDS-Based Aqueous Redox Flow Batteries
Faculty Mentor: Dr. Chis Bachman

10:45 **Charlie Sanches**
B.S. Mechanical Engineering
Humidity-Induced Natural Convection Currents
Faculty Mentor: Dr. Mario Medina

Group 8 ▪ Physical Sciences
▪ University-Student Union – Alhambra Room 305

9:00 **Sergio Avina**
M.S. Physics
Airglow: Understanding the Upper Atmosphere of Venus through Infrared Observations of O_2
Faculty Mentor: Dr. Emilie Royer

9:15 **Marlee Rapp**
M.S. Physics
Spatially Resolved Star Formation History of IC 1613
Faculty Mentor: Dr. Margaret Lazzarini

9:30 **Kenneth Stebbing Cabrera**
M.S. Physics
Shocks and Astrochemistry in the Outer Disk of the Protostar L1527
Faculty Mentor: Dr. Susan Terebey

9:45 **Laura Fredericks and Luis Cruz Vega**
B.S. Physics; M.S. Physics
Tracing Potential Building Blocks of Life in the Disks of Two Nearby Young Stars using ALMA data
Faculty Mentor: Dr. Susan Terebey

10:00 **Evelyn Scott**
M.S. Physics
Protostar Disk Dynamics of Oph IRS 63
Faculty Mentor: Dr Susan Terebey

10:15 **Marlon Reyes Silva**
M.S. Physics
Characterizing High Mass X-ray Binary Populations in Low Metallicity, Low Mass Dwarf Galaxies Using Chandra and Hubble Data
Faculty Mentor: Dr. Margaret Lazzarini

Break 10:30 – 10:45

10:45 **Samuel Groysman**
B.S. Biochemistry
Sensitive Imaging of Electroactive Species in Plasmonic Electrochemical Microscopy Enabled by Electrostatic Nanoconfinement
Faculty Mentor: Dr. Yixian Wang

11:00 **Dominique Dang**
M.S. Chemistry
Single Nanoparticle Electrochemical Analysis Using Critical Angle Reflection Microscopy
Faculty Mentor: Dr. Yixian Wang

11:15 **Doroteo Manriquez**
M.S. Materials Science and Engineering
Metalloporphyrinic Metal–Organic Frameworks for Enhanced Photocatalytic Degradation of a Mustard Gas Simulant
Faculty Mentor: Dr. Yangyang Liu

11:30 **Steve Figueroa and Emmanuel Genifor**
M.S. Physics
Magnetic Properties of Nanoparticles in Different Carbon-based Matrices
Faculty Mentor: Dr. Armen Kocharian

Abstracts of Oral Presentations

Group 1 ▪ Behavioral and Social Sciences
▪ University-Student Union – Los Angeles A Room 308A

Sarena Eworonsky
B.A. Psychology
Exploring the Role of Juror Bias on Decision-Making in a Civil Case
Faculty Mentor: Dr. Alma Olaguez

Research examining emotional biases has revealed that jurors tend to make decisions based on emotions rather than objective evidence, especially in criminal cases involving violent actions. The current study seeks to explore whether these same emotional biases are observable in a civil case where the defendant has a history of committing violent actions. Participants were assigned to one of three conditions in which they were presented with an audio/video trial simulation with testimony that was manipulated to include character evidence of the defendant's history of either Domestic Violence or Animal Abuse and a control condition with no history of abuse. Participants reported their emotions and moral outrage before rendering a liability verdict and compensatory award recommendations. The history of Animal Abuse condition was expected to elicit the highest emotional reactivity, greater liability verdicts, and award amounts. Contrary to expectations, the history of Domestic Violence condition elicited the greatest liability verdicts. No significant difference in emotional reactivity or award amounts between conditions was observed, potentially because of ceiling effects (i.e., high conviction rates across all conditions). Future directions will address these limitations by using character evidence on the plaintiff's side to weaken case evidence.

Jessica Vega
M.A. Psychology
Positive Classroom Experiences are Related to Later Reduced Math Anxiety and Higher Math Achievement
Faculty Mentor: Dr. Corinne Bower

Early adversity is negatively associated with later physical health, mental health, and cognition in adulthood (Felitti, 2002). Cognitive function is a less-studied, though equally important outcome of such experiences and consists of an array of mental processes, several of which are used in mathematics (vanMarle & Wynn, 2017). Positive childhood experiences shield against early adversity (Wang et al., 2021). Here, we focus on how positive childhood experiences affect cognition in the context of math achievement. Math achievement is related to greater career and life outcomes, so finding ways to promote greater math outcomes is essential in fostering equity. This preliminary work (N=41) analyzed the associations between adults' retrospective positive early math experiences across home and school contexts, and current math anxiety and math outcomes. Results suggest that positive math experiences at school—not at home—relate to later math anxiety, but not math outcomes. Given that our sample is majority first-generation students, our results may reflect the challenges faced by this demographic whose parents cannot assist with their math homework. Further analyses of the associations between these variables may reveal potential mechanisms for these contextual differences and thus may inform the development of interventions tailored specifically to each context.

Angela Valadez
M.A. Psychology
Parent Perceptions of Math and Spatial Language in Education YouTube videos when Co-viewed with Adults Versus Peers
Faculty Mentor: Dr. Corinne Bower

With the rise of technology, YouTube has become an important resource for education. Research suggests that parental co-viewing of media enhances children's word production and retention (Sims & Colunga, 2013). The current study examined whether there would be higher proportions of educational language in educational videos when co-watched with a parent compared to co-watched with a peer. Parents (49% high-SES) of children aged 3-5 years (*Mage* = 4.27 years; *SDage* = 1.80) completed an online questionnaire. They submitted links of the most recently watched YouTube videos by their child and indicated whether the videos were watched independently or co-viewed with an adult or peer (friends or siblings). Preliminary results (n=54) indicate no significant correlations between the proportion of math and spatial language used in videos when co-viewing with adults (p=.440*;* p=.060) compared to peers (p=.900*;* p=.210). However, a trend suggests that adults were more likely to co-view educational videos with their children when the videos had a higher proportion of math and spatial language. This could imply that videos watched with adults may be more "educational" compared to co-viewing with a peer. These findings indicate the potential educational YouTube videos have as a supplemental tool for cognitive and language development.

Ashley Ramirez
M.S. Forensic Psychology
Navigating Emotions in Civil Litigation: A Qualitative Analysis
Faculty Mentor: Dr. Alma Olaguez

Jury decision-making processes may be affected by emotions, influencing evaluations of culpability. The current study examines the effect of emotion regulation instructions in civil cases to reduce jurors' emotional decision making. To analyze the influence of instructions on emotions, the amount of emotional details in the plaintiff's testimony was manipulated. Participants completed the study in a controlled lab setting where they were randomly assigned to instruction conditions (Instructions v. No Instructions) and one of two case vignettes (Emotional v. Factual). Participants' open response verdict justifications were analyzed using a qualitative coding scheme emphasizing liability (e.g., full/partial/none), compensation types (e.g., economic/non-economic), and evidence (e.g., focus/neglect). In the Emotional Case, participants are expected to prioritize non-economic damages such as the plaintiff's pain and suffering, often concluding that the defendant is entirely at fault. Conversely, participants in the Factual Case are expected to place higher importance on evidence, frequently attributing partial or no blame to the defendant. Finally, instructions will mitigate the influence of emotional factors, producing similar verdict outcomes to the Factual Case condition. If hypotheses are supported, and instructions minimize emotional decision-making, future implications will include increasing evidence-based verdicts despite the emotional nature of the case.

Blanca Henriquez
M.S. Forensic Psychology
Exploring Verdict Justifications: A Qualitative Analysis of the Defendant's Violent History in a Civil Trial
Faculty Mentor: Dr. Alma P. Olaguez

Past research has shown that emotions can influence decision-making. This study examines the impact of a defendant's violent history (domestic violence vs. animal abuse) on juror decision-making and verdict justifications in a civil case. Participants were presented with a case involving a dog attack, where the dog's owner was sued for damages. After reviewing trial materials, jurors provided verdicts and open-ended justifications. We developed a coding scheme to qualitatively code jurors' justifications into one of six categories (eyewitness and evidence, owner responsibility and competency, history of the dog's aggression, liability and financial impact, assumptions and generalizations, and the defendant's past violent history). Initial findings indicate jurors were more likely to reference the defendant's past violence when presented with the animal abuse condition compared to the domestic violence condition. The study highlights how emotional biases from character information has the potential to influence legal outcomes, suggesting the need for safeguards in the courtroom.

Mei Ku
M.A. Psychology
The Contributions of Rumination, Catastrophizing, and Depression in the Associations Between Adverse Childhood Events and Gastrointestinal Symptoms in a Predominantly Hispanic/Latino Sample
Faculty Mentor: Dr. Yvette Szabo

Adverse Childhood Experiences (ACEs) have been linked to gastrointestinal (GI) symptoms. While one identified pathway is depression, other research suggests that maladaptive emotion regulation (ER) strategies (i.e. rumination and catastrophizing) also contribute to GI symptoms. This study furthers understanding of the pathways through which ACEs relate to GI symptoms at an age when GI symptoms begin to develop. Participants were 196 students from a minority-serving institution (mean age = 19.92, 71% female, 86% Hispanic/Latino). They completed measures of stressful life events, depression, GI symptoms, and ER. More ACEs was correlated with more GI symptoms ($r = 0.21$, $p < 0.05$). However, rumination and catastrophizing did not account for this relationship. Catastrophizing ($\beta = 0.10$, $p < 0.01$) but not rumination ($\beta = 0.07$, $p = 0.07$) was associated with GI symptoms. The direct effect of ACE and GI symptoms became nonsignificant when including depression as a covariate. These findings conflict with previous literature as rumination and catastrophizing were nonsignificant contributors, potentially due to the recruitment of an ethnic minority sample. Ultimately, the results suggest that depression is the primary pathway in which ACEs lead to GI symptoms. Interventions addressing catastrophizing and depression may improve GI symptoms among Hispanic/Latino adults.

Unity Cordova
B.A. Psychology
Identity, Racial Categorization, and Belonging in Muslim American Communities
Faculty Mentor: Dr. Dana Saifan

Research has shown that individuals who do not fit stereotypical racial or cultural expectations often face unique challenges in achieving a sense of belonging, particularly within religious or cultural groups (Nadrich, 2024). This study investigated how external racial perceptions and self-identification with the Muslim community and individual ethnic communities impact feelings of acceptance and belonging among Muslim Americans. Utilizing survey data from 277 young adults Arab and South Asian Muslim Americans between the ages of 18 and 25, this research addresses two questions:

(1) How are racial categorization and external perception linked to belonging in the Muslim community? and (2) How does in-group identification relate to belonging in the Muslim community? Preliminary findings, based on hierarchical regression analyses, suggest that individuals who self-reported that they were perceived as more racially aligned with stereotypical Muslim identities report higher levels of belonging in the Muslin community . This research contributes to understanding identity and community cohesion within racially and culturally diverse religious groups, with implications for promoting inclusivity and mental well-being in minority communities.

Drusilla Szatko

B.A. Psychology
Examining Eyewitness Decision Making Under Real World Conditions Using the Field Simulation Paradigm.
Faculty Mentor: Dr. Mitchell Eisen

Reflector variables are observable elements of witness decision-making that reveal how strongly the suspect matches the witness's memory for the culprit. Previous lab research shows that reflector variables like witness confidence and decision-time can predict accuracy effectively. Recently, the generalizability of these lab findings were examined in a field experiment to examine whether reflectors like confidence and decision-time predicted accuracy in actual cases. Although data from this field-experiment generally supported the effectiveness of the use of reflectors to predict eyewitness performance; field-experiments using actual witnesses have limited utility, because ground truth is unknown and the factors across cases vary widely. The field-simulation paradigm overcomes these limitations to look at eyewitness performance under real-world field-conditions while maintaining the control of lab studies. The current study (N=235) used the field-simulation paradigm to examine the utility of reflector variables as predictors of accuracy. Results showed that findings from the lab generalized well to field conditions, as accurate witnesses made decisions more quickly, $F(1, 219)=19.00$, $p<.001$. Also as expected, accurate suspect identification were made more confidently $F(1, 199) = 8.40$, $p <.01$, Cohen' $d = .65$. These results help build on the current literature by demonstrating how witness performance findings generalize to real-world conditions.

Mira Arbonies and Kenobi Donart

M.S. Forensic Psychology
Examining Pre-Admonition Suggestion In Eyewitness Decision-Making Under Real-World Conditions Using the Field-Simulation Paradigm
Faculty Mentor: Dr. Mitchell Eisen

Eyewitnesses commonly learn from police that there is reason to believe the culprit has been apprehended before making an identification. When this happens, even if the witness does not recognize the suspect in the identification test, they are likely to assume the culprit is present in the photographic lineup anyway and choose one of the pictures presented to them. This form of suggestion is referred to in the literature as "pre-admonition suggestion," and has been found to increase the likelihood of innocent suspects being falsely identified. The current study investigated this phenomenon under real-world conditions by using the field-simulation paradigm from Eisen et al. (2017). Participants (N=235) witnessed a staged crime and were immersed in a seemingly real police investigation in which a photographic lineup was administered by uniformed officers. Half the witnesses heard that "the police caught the guy" (suggestion-condition), while half did not (control-condition). As expected, witnesses in the suggestion-condition group spent significantly longer studying the pictures (M=9.93, SD=7.61) compared to the control-condition group (M=15.19, SD=10.03), $F(1,224)=15.03$, p <.001. Also, as expected, participants took significantly longer when making false identifications $F(1,224)=5.45$, p =.02. Overall, these results show that laboratory findings on pre-admonition suggestion generalized well to real-world conditions.

Shelby Detweiler

M.A. Psychology
Permissive Parenting Style and Adult Personality Outcomes
Faculty Mentor: Dr. Heidi Riggio

From the 1960s to today, parenting styles have had a significant influence on the development of children's personalities, and the permissive parenting style has often been left out of research. Previous literature has indicated that permissive parenting style is correlated with many negative personality outcomes. However, this research is mainly focused on children and adolescents, not adults. The current study investigates the relationship between the permissive parenting style and personality outcomes that carry over into adulthood. The central hypothesis is that being raised with a permissive parenting style will result in adverse personality outcomes. This study was set up as a qualitative design between permissive parenting style, social anxiety, self-efficacy, and self-esteem. Participants (n = 320) were recruited through psychology courses at CalStateLA and were asked to take an online survey for 1% extra credit. It was expected that permissive parenting would have a positive relationship with social anxiety and negative relationships with self-efficacy and self-esteem, which was partially supported by multiple regression analysis. In conclusion, it is suggested that permissive parenting style can impact a child's sense of self and competence. These results establish the importance of more up-to-date research into permissive parenting style and personality outcomes in adulthood.

Emi Sakai and Jordan Jeremiah

B.A. Psychology

Can Visualization Techniques Used In The Cognitive Interview Enhance Memory Distortion?

Faculty Mentor: Dr. Mitchell Eisen

Previous research done by our lab demonstrated that when witnesses were led to misidentify an innocent-suspect with a face-tattoo, many witnesses falsely recalled the culprit having a face-tattoo, when he did not. Research regarding the cognitive interview has shown that visualizing a crime can help reinstate memories of the event and improve memory performance. However, what happens when witnesses visualize the crime after committing to a false-identification? Will this still improve memory, or will it enhance memory for the error? In the current study, participants (*N*=725) viewed a car-jacking video and were suggestively led to misidentify an innocent-suspect with a face-tattoo. After making the false-identification, they were asked to describe the suspect. Participants were then promoted to visualize the crime using techniques similar to what is employed when conducting a cognitive interview. As expected, visualizing the crime after falsely identifying the tattooed innocent-suspect significantly increased the likelihood that witnesses would mistakenly recall seeing a face-tattoo on the culprit $\chi^2(1,N=383)=4.07$, $p<.05$. This extends the work of the cognitive interview by revealing that simply imagining the details after being exposed to misinformation can lead to a significant increase of memory distortion.

Tim Nguyen

B.A. Psychology

The Addict in You: A Review of Research on Dopamine Addictions

Faculty Mentor: Dr. Gaithri Fernando

The purpose of this literature review is to explore how dopamine plays a key role in addiction. It examines the brain's reward system known as the mesocorticolimbic pathway and discusses the process of how dopamine is a key neurochemical in forming an addiction. These pathways exist in all creatures, excluding no one from the risk of addiction – so we may all have an addict within us. The presentation will review research on drug addictions and compare it with current research on addictions for non-drug dopamine-inducing behaviors like internet use, gaming, shopping, and sex. The review will showcase similarities between drug and non-drug addiction, such as reduced dopamine receptor activity, altered decision making, and loss of enjoyment from natural rewards, and will discuss concepts like repeat devaluation and temporal devaluation to explain why addicts might struggle to resist their habits. The review will also highlight dangers in addictions caused by technology use today. By summarizing decades of research, this review affirms the importance of dopamine and its role in regulating addiction. Policies and treatments that incorporate this information can help individuals with addictions to overcome addiction more easily, while research on testing these treatments can advance the field of addiction treatment.

Group 2 ▪ Humanities I: Humanities and Communities
▪ University-Student Union – Los Angeles C Room 308C

Marjorie Hunt
M.A. History
The Wild and Unfree: Geographies of Nature and Slavery in Mid-Nineteenth Century Rio de Janeiro
Faculty Mentor: Dr. Kittiya Lee

Since its founding in 1565, the stunning natural landscape surrounding Rio de Janeiro has been a defining feature of the city. By the mid-nineteenth century, Rio—the imperial capital and main port of independent Brazil—was also a city defined by the institution of slavery, with the dubious distinction of the highest enslaved population of any city in the Americas. Taking inspiration from Henri Lefebvre's conception of space as "socially produced," this paper argues that through their daily use of urban space, enslaved Africans played a key role in shaping Rio de Janeiro's cultural geography. Given the cultural importance of the natural landscape in Rio, examining the ways enslaved Cariocas interacted with features of Rio's natural geography is essential to understanding the city's cultural geography. I use the paradigm of the "wildland urban interface" to characterize the overlapping between urban space and natural geographic features that characterized nineteenth-century Rio. Focusing on particular urban places and spaces where enslaved individuals labored, such as the municipal fountains, the coastal waters of Guanabara Bay, and the undeveloped landscape surrounding central Rio, I argue that enslaved Cariocas defined Rio's urban space through their labor and leisure at the urban wildland interface.

Renée M. Tabizón
M.A. Latin American Studies
Generational Outcomes: Mexican American and Mexican Immigrant Experiences in Twentieth Century San Gabriel Valley California
Faculty Mentor: Dr. Enrique Ochoa

This research examines over three generations of two interrelated families in the San Gabriel Valley of Southern California during the twentieth century. Although living less than ten miles apart, with differing immigration statuses, these families navigated work, home, and education in notably different ways despite surface-level similarities. This study investigates how U.S. migration policy, Americanization programs, migratory experiences, socioeconomic status, racist policies, education access, and interpersonal relationships shaped their gendered experiences and outcomes within the cities of Azusa and Monrovia. Building on the historiography of Los Angeles, Mexican Americans, and the borderlands, my research integrates oral histories and personal interviews with archival research. This approach highlights the interplay between individual agency and structural factors in shaping family histories while underscoring the often-neglected heterogeneity of the Mexican origin communities in Los Angeles County. Inspired by my tío Miguel López's 1973 master's thesis, *"A Case Study on the Dynamics of an Effective Community Action Center,"* and Lydia R. Otero's, *In the Shadows of the Freeway: Growing Up Brown & Queer,* I aim to contribute to a deeper understanding of family histories and their broader social implications.

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

With increased accessibility in music production technology, distribution, and social media, anyone can reach musicianship status from the comfort of their homes. As a result, a complex metal scene thrives locally outside the outskirts of the larger music industry. This research study explores the local heavy metal scene in Southern California. Based on interviews rooted in ethnographic research, this study analyzes metal musicians as they navigated their roles as musicians and entrepreneurs. While they incorporated contemporary technology such as social media to popularize their band, the musicians also stuck to the ethos of heavy metal. This tightrope act informed their understanding of and interaction with the local metal scene as well as the larger music industry. Scholars who have explored the prospect of globalization predict a flattening of musical genres and a trend towards global homogenization of music. This study suggests that local scenes, while not very popular, have thrived without conforming to mainstream music trends and the larger music industry.

Jamilet Ochoa Rocha

M.A. Chicana(o) Latina(o) Studies
Resisting Capture: Queer Gestures in Opposition to Hauntings of Surveillance
Faculty Mentor: Dr. David Green

Given the unjust overdependence of law enforcement for public safety and the rise in police brutality in the United States, feminist scholarship and activist efforts have deemed surveillance technologies, such as body cameras, ineffective at addressing anti-blackness in police practices. My research offers an analysis of resistance to racialized forms of technology in today's police state through a focus on communities of color in Long Beach. While researching Long Beach's history and present, Long Beach depends on particular state-sanctioned forms of police violence that are harmful to its vulnerable community members, namely Black, Brown, and queer residents and migrants. I developed a lens to document moments of resistance policing, called "sensations of liberation." Sensations of liberation offer a framework to highlight how to understand and reconceptualize people of color's activism through abolitionist politics. I rely on close readings of photographic images. By drawing on the methodologies and frameworks of Black and women of color feminisms, abolitionist studies, community organizing praxis, and queer and trans* epistemologies. I ask the following: What techniques and technologies do the police employ to surveil queer and people of color in Long Beach? How do queer, trans, and nonbinary migrant communities resist surveillance in Long Beach?

Humberto Hernandez

B.A. Sociology, Women's Gender & Sexualities Studies
Tranifesting Community Transition: On the Binary Structures of ICE, Gender-Based Violence, and the Impacts on Undocumented Gender-Variant People of Color.
Faculty Mentor: Dr. Molly Talcott

The gendered structure of the immigration system enables and is centered around *gender-based violence* that impacts gender-variant people of color. This violence is exacerbated, especially within *community transition programs*, which are programs that provide resources and services for people transitioning back into their communities after detention. Community transition programs similar to the immigration system are structured in a binary manner, failing to encompass the needs of gender-variant people. The scarcity of available resources shows that upon their release from *immigration detention*, the system fails gender-variant people, preventing them from succeeding in their immigration cases. Most sociological research engages with community transition programs through the lens of *recidivism* and deterrence, creating a gap in understanding . In this project, I will conduct an ethnographic study of gender-variant immigrants of color about their experiences with community transition; by drawing upon the framework of *tranifesting (Transformative Manifesting),* exploring how the failure of the current system and its impacts post detention. Ultimately, this project seeks to offer solutions through a *tranifesting framework* with an abolitionist lens centering undocumented gender-variant people of color in dictating, creating, and assessing community transition programs to serve their specific needs post-detention with the aim of healing, care, and success.

Anthony Sales-Hernandez

M.A. History
The Role of Print in the Pre-Revolutionary U.S.-Mexico Borderlands
Faculty Mentors: Dr. Chris Endy and Dr. Enrique Ochoa

This study examines the 1906 Cananea Mine Strike through the lens of print media on both sides of the U.S.-Mexico border, highlighting its broader implications for labor, race, and U.S. foreign investment. The strike revealed Mexican laborers' demands for wage equality with their American counterparts and exposed tensions surrounding labor rights and foreign involvement in Mexican affairs. While only 17% of Mexicans were literate during this period, print media was translated from English to Spanish and circulated over the border. Regardless of the ongoing media repression during Mexican President Porfirio Diaz's leadership information was still accessible. Mexican newspapers, influenced by Porfirian censorship, presented a one-sided narrative that prioritized economic stability and foreign capital, downplaying labor grievances. In contrast, U.S.-based alternative press outlets offered more critical perspectives challenging the major outlets based in Mexico City. The Cananea strike, I argue, illustrates the nuanced interplay between labor unrest, media repression, and the broader socio-political forces that propelled Mexico toward revolution by 1910. In doing so, it highlights the often-neglected role of media in shaping political change during a transformative moment in Mexican history.

Isaac Collins

Master of Social Work
Black Americans Attitudes and Perceptions of Mental Health Services
Faculty Mentor: Dr. Margarita Villagrana

Black Americans are overrepresented in adverse mental health statistics, making up 20% of all Americans

affected by a mental disorder while only being 13% of the total population. Black Americans face significant and varied barriers when attempting to utilize mental healthcare resources. These hurdles have negatively influenced Black Americans help-seeking behavior and attitudes toward mental health services. To better understand help-seeking behaviors and attitudes toward mental health services for Black Americans' who interact with various mental healthcare facets, a systematic literature review was conducted using the Social Work Abstracts, PsycArticles, PsycInfo, Race in Society, America: History & Life, Criminal Justice Abstracts, E-Journals, and Ethnic Diversity Source databases. Findings suggest that barriers of geographic access, racial discrimination, and healthcare affordability significantly impact Black clients' perception of and access to mental healthcare resources. Successfully applied solutions to Black clients' barriers were found to include clients' social circles in their care, and clinicians who reduced stigmatization of utilizing mental healthcare resources also improved client retention.

Eric Jones

Master of Social Work

Environmental Mastery in Addiction Recovery: A Data-Driven Revolution

Faculty Mentor: Dr. Joanna Karczewska

Despite significant advances in addiction treatment, 90% of those needing help never receive it - a systemic failure demanding innovative solutions. This presentation introduces Recovery Compass, a pioneering platform that revolutionizes treatment access through environmental mastery and data-driven personalization. Drawing from empirical research and lived experience, this project addresses three critical gaps: the disconnect between evidence-based options and accessibility, the failure to account for environmental factors in treatment matching, and systemic barriers perpetuating treatment inequity. By integrating financial capability metrics, environmental assessment tools, and personalized matching algorithms, Recovery Compass creates pathways to transformation that extend beyond conventional recovery frameworks. Preliminary development suggests this approach could significantly impact treatment accessibility while advancing social justice in behavioral healthcare. This innovation represents a paradigm shift from treating addiction as an isolated condition to understanding it within the context of environmental mastery, potentially transforming how we approach recovery support for marginalized populations.

Daniela Baffigo

B.A. Communicative Disorders

Local Early-Literacy Resources for Children with Disabilities

Faculty Mentor: Erica Ellis, Ph.D., CCC-SLP

Family involvement and shared reading significantly enhance early literacy skills, including for children with disabilities (Justice & Kaderavek, 2002; Hudson & Test, 2011). However, little is known about how families with children with disabilities engage in library programs or access local resources. This project analyzes survey data (N = 18) of caregivers of children with disabilities from a local early intervention program to explore these patterns. The findings highlight caregivers' library visitation habits, reasons for using the lending library, and weekly reading routines. Additionally, the availability of early literacy programs at public libraries in the Los Angeles area is assessed. Results reveal that library resources tailored for children with disabilities are limited. These findings emphasize the need for increased access to inclusive library programs to support early literacy development. Clinical implications of how libraries can play a vital role in empowering children with disabilities and their families through meaningful, accessible resources and activities will be discussed.

Marie Lassaigne

M.A. Child Development

Cultural Adaptation and Emotional Development: Exploring Resilience and Parent-Child Relationships in Immigrant Families

Faculty Mentor: Dr. Ashley Munger

This study examines how acculturative stress, cultural wealth, bicultural self-efficacy, and parent-child relationship quality, influence emotional regulation and resilience among emerging adults, particularly in the context of immigrant-origin families. Grounded in Kagitcibasi's developmental model of acculturation and Yosso's Community Cultural Wealth framework, this research adopts a strength-based lens to explore the protective and adaptive strategies families employ. Ninety CSULA graduate and undergraduate students participated in this study, representing both immigrant and non-immigrant backgrounds. Participants completed surveys assessing key variables, such as the Bicultural Self-Efficacy Scale (BSES) and the Acculturative Family Distancing Scale (AFDS). Preliminary patterns may suggest that bicultural self-efficacy and strong family relationships may contribute to emotion regulation and resilience, highlighting the potential protective role of bicultural competence in mitigating acculturative stress. These findings could underscore the need for culturally informed interventions that promote resilience in families and challenge deficit-oriented narratives. By emphasizing the intersection of cultural strengths, emotional

adaptation, and family dynamics, this study provides actionable insights for educators and clinicians working with diverse populations.

Manifa Baghomian

B.A. English
Rhoticity in Armenian among Armenian-English Bilingual speakers
Faculty Mentor: Dr. Aaron Sonnenschein

The diasporic Armenian community in the United States is the world's second-largest Armenian diaspora community. What has emerged is a population of Armenian-English bilingual speakers who acquired both languages simultaneously. Due to dominant language contact from English, it is predicted that cross-linguistic transfer will occur among the phonemes, or speech sounds, vulnerable to this transfer in Armenian. Rhotic consonants, which in Standard Eastern Armenian include the voiced alveolar trill [r] and the voiced alveolar tap [ɾ], would be vulnerable to this shift. Rhotic consonants have been subject to transfer in other Armenian dialects, such as in those of Russia and Iran. Due to dominant language interference from English, rhotic consonants may have migrated even farther in the phonetic inventory of Armenian among speakers, with the bunched or retroflex approximant [ɹ] found in speakers use of Armenian as a result of cross-linguistic transfer. By analyzing speech samples from Armenian-English bilinguals, the phonetic shift responsible for this shift in the rhotic inventory can be documented. Documentation would also provide evidence of rhotic consonant shift as a byproduct of cross-linguistic transfer. Observation of this phonetic shift is necessary for educators and speech-language pathologists who work with this community.

Group 3 ▪ Humanities II: Anthropology and Archeology
▪ University Club, Golden Eagle, 1st Floor

Eric Gonzales
M.A. Anthropology
Reimagining Perceptions of Sacred Space at the Cueva de Sangre, Dos Pilas
Faculty Mentors: Dr. Michele Bleuze and Dr. James Brady

The Cueva de Sangre, Dos Pilas, Guatemala is the largest and most complex cave investigated by the Petexbatun Regional Cave Survey between 1990-1993 with more than two miles of passages mapped. The cave contains four entrances with passages running on multiple vertical levels. Because of its complexity, the cave was divided into 11 large segments designated "Operations." The archaeological exploration of the cave utilized equipment and techniques that were not available to the ancient Maya, therefore Indigenous perceptions of this sacred landmark may have differed substantially from that suggested by the project map. My analysis of the archaeological evidence suggests that the Maya were unaware that three Operations, 5-7, accessed through Entrance 2 were part of an interconnected system. Results show a strikingly different form of utilization of these Operations that suggest the ancient Maya utilized this portion of the Cueva de Sangre as a separate cave system altogether with much more restricted access than other segments of the same system.

Hannah Calistri
M.A. Anthropology
Preservation and Contamination: Identifying Pesticides on Ethnographic Woven Materials using Portable X-Ray Fluorescence
Faculty Mentor: Dr. Amira Ainis

Native California basketry is renowned for its technical prowess and stylistic diversity. During the late 19th and early 20th century, Native Californians— having been displaced to Missions— repurposed basketry production for commercial sale. Today, some Native baskets are preserved in museums, but heavy metals like arsenic, lead, mercury, and bromine were historically used to conserve these sensitive collections. Though these pesticides were successful at preserving valuable perishable materials, contaminated collections pose a risk to museum workers, visitors, and tribes. With the passage of the Native American Grave Repatriation and Protections Act (NAGPRA), collections such as the baskets from San Bernardino County Museum (SBCM) require testing before being repatriated to Native American communities. For my thesis research, I am testing the efficacy of non-destructive methods of pesticide analysis on baskets from SBCM. My oral presentation will explain the principles of portable x-ray fluorescence technology and its uses in cultural material analysis, as well as provide background on basket weaving, the commercialization of basketry, and museum practices.

Gina Alfaro[1], W. James Carter III[1,2], Alejandro Ruiz[1]
[1]B.A. Anthropology; [2]B.A. Music, Option in Jazz Studies
Analysis of Historic-era Archaeological Materials from Crystal Cove State Park
Faculty Mentor: Dr. Amira Ainis

In this presentation, we discuss historical artifacts from two historic site components at Crystal Cove State Park in Orange County, including glass and aluminum items. The purpose of our analysis was to examine these historic materials and connect them to human behavior in the mid-20th century using variability in glass styles, dates, and chemical structure. Our results primarily reveal the date-range of historic occupation and use of the site area, distributors and glass manufacturing companies responsible for bottle sales, and patterns of the migration of people during this time by referencing the capital and goods they brought with them. Secondarily, the bottles are economic and social indicators of the people living at or around the site and this analysis places some of the artifacts in the broader context of the racist discrimination that Japanese-Americans faced during the Second World War. The historical archaeological collections, which range from the 1930s to the 1970s, provide information about material culture and social behavior at the time.

Robert Coronado, Jr.
M.A. History
Purépecha Humanism: Indigenous Renaissance Elements in the Relación de Michoacán, c. 1539-1541
Faculty Mentor: Dr. Kittiya Lee

The *Relación de Michoacán*, a sixteenth-century Mexican manuscript authored by Franciscan Fray Jerónimo de Alcalá and Purépecha elites, is the most significant primary source about Pre-Columbian and early colonial Purépecha culture. It is anomalous within the context of colonial codices because the Purépecha did not have a bookmaking tradition like their Maya,

Mixtec, and Aztec counterparts. They did not have a ceramic narrative tradition like other cultures of Mesoamerica; they were a purely oral culture. In this paper, I argue that the collaboration between de Alcalá and Púrepecha elites, and therefore the *Relación*, was the consequence not of Pre-Columbian traditions, but of Renaissance Humanism. Renaissance Humanism can be seen as a throughline in the manuscript by exploring three aspects of its context and contents: (1) humanism's influence on Vasco de Quiroga's founding of and engagement with humanist institutions that facilitated collaboration between Spanish friars and Purépecha persons in Michoacán prior to the manuscript's commissioning; (2) Renaissance chronological and iconographic techniques in the manuscript's text and illustrations, which contrast with contemporary accounts of Michoacán; and (3) depictions and descriptions of Purépecha human sacrifice, cannibalism, and self-governance, which dialogued with contemporary Spanish chronicles, participating in and producing transatlantic debates over indigenous rights.

Nimrat Brar

M.A. Psychology
Trauma & Mental Health Service-Seeking Among Muslim American Young Adults
Faculty Mentor: Dr. Dana Saifan

Over 70% of the global population experiences at least one traumatic event in their lifetime (Benjet et al., 2015), and ethnic minorities encounter trauma more often but are less likely to develop post-traumatic stress disorder (PTSD) than other groups (López, 2017). This study utilized a survey of 324 Muslim American young adults aged 18-25. The Cumulative Trauma Scale measured seven traumatic exposures: collective identity, personal identity, survival trauma, gender discrimination, uprootedness, secondary trauma, and community violence. Participants' reported their PTSD, depression, anxiety, and substance abuse symptoms; perceived helpfulness of prior mental health treatment; and willingness to seek help. Preliminary analyses revealed that personal identity trauma and gender discrimination positively predicted depression, $b = .87$, $SE = .40$, $p = .031$ and $b = 1.49$, $SE = .48$, $p = .002$, respectively. Gender discrimination and secondary trauma positively predicted anxiety, $b = 1.48$, $SE = .42$, $p < .001$ and $b = .48$, $SE = .24$, $p = .046$, respectively. Uprootedness positively predicted perceived helpfulness of treatment, $b = .35$, $SE = .12$, $p = .005$. Gender discrimination negatively predicted help-seeking intentions, $b = -.18$, $SE = .06$, $p = .002$. Implications for trauma-informed mental health interventions will be discussed.

Amanda Jokela

M.A. Anthropology
Illuminating the Subterranean: A Bioarchaeological Analysis of the Cueva de Sangre
Faculty Mentor: Dr. Michele Bleuze

Dos Pilas, Guatemala, a significant lowland Maya capital, underwent extensive investigations of its subterranean features by the Petexbatun Regional Cave Survey from 1990 to 1993. The Cueva de Sangre, approximately 2.5 km southeast of the central plaza at Dos Pilas, is the largest and most complex of the caves. It consists of over 3.2 km of passages running at multiple vertical levels under a small hill. An experimental recovery project utilizing chemical deflocculants, $NaHCO_3$, was carried out to recover waterlogged artifacts from a thick layer of cave mud. Human skeletal remains were recovered in the deflocculation unit in an area where surface collection efforts yielded no skeletal material. This study presents multiple interpretations based on the remains recovered from the Cueva de Sangre. These remains may be the remnants of primary depositions in this area of the cave. If so, a question that begs to be answered is why the Maya would choose to place reverential burials in a highly trafficked area of the cave with plastic mud and seasonal flooding. The bioarchaeological analysis suggests the extent of ritual behavior within the Cueva de Sangre is far more varied than previously thought.

Group 4 ▪ Political Science
▪ University-Student Union – Montebello Room 309

Yen My Tat
B.A. Economics
Impact of Tesla's Market Share Growth on Stock Prices of Other Automakers
Faculty Mentor: Dr. Seolah Kim

The electric vehicles market has grown in recent years due to government incentives, young generation's interests, etc. This paper focuses on the impact of Tesla and studies the impact of Tesla's market share on stock price of its competitors such as Ford, Stellantis, Honda, Toyota, and GM. We used the daily trading stock market data from Wall Street Journal between January and December 2023 and average it out monthly. By running regression, we find that there is an inverse relationship between Tesla market share and the other companies. Tesla's growth in the market negatively affects the other companies' stock prices, but we do not find a significant impact with the market share change.

Jason Chen
B.S. Biological Sciences, Microbiology Option; Minor in Real Estate
African American and LGBTQIA+ Unhoused Communities: Disproportionately Overrepresented Groups in the Unhoused Population
Faculty Mentor: Dr. Theodoric Manley

Over 75,000 individuals in Los Angeles County are unhoused, representing a crucial issue that needs to be addressed. In addition to stemming from a complex array of historical and societal factors, the unhoused population is further burdened by racial and identity-based inequities, with African Americans and LGBTQIA+ youth representing two disproportionally overrepresented groups in the unhoused population. Thus, more work must be conducted to uncover the systemic injustices that perpetuate homelessness and advocate for more equitable solutions. This analysis explores the historical antecedents leading up to the current housing crisis before drawing from evidence-based studies to frame a set of policy choices and recommendations to address the disproportionate number of homeless African American and LGBTQIA+ populations in Los Angeles. I outline current approaches to resolving the homelessness problem before introducing and advocating for Housing First, an evidence-based approach that seeks to empower unhoused individuals by prioritizing housing from the beginning. Critically, I address specific challenges faced by African American and LGBTQIA+ youth unhoused individuals, providing a framework for implementation and recommendations to address such disparities in housing more adequately. As with necessities like food, clothing, and fundamental rights to speech and freedom, housing is a human right.

Giovanna Calderon
B.A. Chicano (a) and Latino (a) Studies
Latinx Businesses in Boyle Heights
Faculty Mentor: Dr. Mark Wild

My research focuses on Latinx small businesses in East Los Angeles from the 1990s to present. Specifically, I focus on el Mercado also referred to as el Mercadito, a shopping center that provides different ethnic products and food. This project aims to understand if Latinx businesses in East Los Angeles operate as social, cultural and or economic anchors. El Mercado provides insight into ethnic commerce in Boyle Heights as the businesses held within its perimeter are varied in products, services and size. Many scholars note that the large focus on Latinx political movements overshadow historical actors and institutions that have impacted Latinx communities. My findings will contribute to an understanding of Latinx entrepreneurship and quieter forms of resistance.

Jeanette Calderon
B.A. History
Dual Immersion After Prop 227
Faculty Mentor: Dr. Enrique C. Ochoa

On June 2, 1998, California passed a law requiring all public-serving institutions to implement English-only programs in their classrooms. For that reason, bilingual education and dual immersion programs would have to cease teaching Spanish-speaking children in their first language. The passage of Proposition 227 reflected a broader debate within California about immigration and language. Immigrants entered the United States from emerging economies such as Asia and Latin America. This demographic change spiked concerns among many Californians about the cultural and linguistic landscape of the state. Californians worried that foreign languages would take over English. These concerns were a key factor in supporting Proposition 227, as some voters believed that English should be prioritized as the common language to ensure better integration and economic and educational outcomes for the immigrants.

Non-English speaking students were impacted as classrooms went from speaking Spanish to English only. Many of these students faced difficulties adjusting to a new language environment, impacting their ability to succeed in school. The implementation of Proposition 227 marked a significant shift in California's educational policy, which affected the state's approach to teaching English learners. Many parents fought against the changing of classrooms from bilingual education to English only. It served participating students in different ways. It served white students as they gained multiculturalism and bilingualism. Latino students kept in touch with their roots and practiced their native language. Parents employed strategies such as calling the schools to demand bilingual education, requesting waivers, and transferring students to other schools. Several programs were able to continue serving students' need for bilingual education after Proposition 227.

Isabella Santillano

B.A. Business Administration, option in Entrepreneurship

Thrive Ai

Faculty Mentor: Edan Epstein

As a business major, I developed a voice AI agency to address the growing need for cost-effective solutions for small businesses. The voice AI industry is rapidly evolving, and I saw an opportunity to help businesses save on operational costs. By offering customizable AI receptionists and outbound agents, businesses can have a 24/7, cost-effective employee capable of handling tasks such as scheduling, answering calls, recording conversations, and more. Through research, I found that many businesses struggle with high operational costs, particularly in customer service and scheduling. In fact, 43% of small business owners cite operating expenses as their greatest challenge. My AI system provides a solution to this by automating tasks, saving businesses valuable time and money. Studies show that AI automation can significantly reduce costs for businesses. With features like cold calling, appointment reminders, and note-taking, my AI enables businesses to focus on growth rather than operational hurdles. This research showcases the transformative power of AI as a vital resource for modern businesses, equipping them with a competitive advantage in today’s rapidly evolving digital landscape.

Arwa Hammad

B.A. Philosophy, Option in Pre-Law, B.S. Political Science, Option in Pre-Law

Stretching Democracy: Third Parties and the Necessity of Democratic Elasticity

Faculty Mentor: Dr. Michael McLendon

Democratic elasticity refers to the capacity of political systems to adapt, stretch, and accommodate diverse perspectives without compromising their stability or legitimacy. My research explores how third parties can play a critical role in enhancing this elasticity by introducing more accountability for our representatives, as well as a “marketplace of ideas.” I argue that the United States' two-party system demonstrates a particularly rigid form of low democratic elasticity, meaning that restrictive representation and limited adaptability to citizens is latent, undermining its ethical legitimacy by failing to treat all citizens as moral equals. Through both normative ethical analysis and historical examples—such as the Liberty Party’s role in abolition and the Green Party’s advocacy for environmental reform—I demonstrate that expanding democratic elasticity through third-party inclusion is essential for fostering both practical adaptability and moral accountability. Using Nozickian principles such as the Entitlement Theory, I highlight the moral obligation of democratic systems to ensure equitable participation and representation. Ultimately, I argue that fostering third-party inclusion is vital for creating more resilient, adaptable, and ethically sound democracies capable of reflecting the complex realities of their citizens.

Group 5 ▪ Biological and Health Sciences
▪ University-Student Union – Los Angeles B Room 308B

Yahan Lin
B.S. Biochemistry
Investigating the roles of TlyA and FtsZ in circadian control of cell division in cyanobacteria Faculty Mentor: Faculty Mentor: Dr. Susan Cohen

Circadian rhythms, driven by an endogenous circadian clock, are daily rhythms of biological
activities. Although found ubiquitously throughout nature, cyanobacteria are the only known prokaryotes to possess a robust clock. The circadian clock of *Synechococcus elongatus*, the model system used to study cyanobacterial clocks, consists of KaiA, KaiB, and KaiC core-oscillator proteins. Under constant light, the clock inhibits cell division for ~6 hours at dusk in a process known as circadian gating, where FtsZ, which assembles the tubulin ring necessary for division, is inhibited. The pathway in which circadian gating is controlled is unknown. Previous work identified TlyA, a rRNA methylase, as a potential inhibitor of FtsZ. We added a strep affinity tag to the N-terminus of TlyA to investigate the potential interactions between TlyA, ClpX, a chaperone protein that restarts cell division, and FtsZ through co-immunoprecipitation. TlyA and ClpX association was not identified. TlyA associates with FtsZ in a non-circadian manner with enhanced interaction at slower growth rates. TlyA and FtsZ did not associate in strains lacking or with a mutated FtsJ domain of TlyA, indicating that the interaction occurs through the FtsJ motif. Taken together, we have identified TlyA to potentially, with yet unidentified factors, inhibit cell division.

Harnawaz Boparai
M.S. Biological Sciences
Short-term Avian Response to Native Oak Restoration on the CSU LA Campus
Faculty Mentor: Dr. Eric Wood

Assessing how species respond to native plant restoration events is critical to understanding if and why urban planners should push for further native plant recruitment in urban areas. We conducted avian point count surveys on the California State University, Los Angeles campus from October to March both in the 2023-24 and 2024-25 academic year to see how much the bird community changed following a large-scale native oak woodland planting event in December 2023. Our results showed a loss in some synanthropic bird species (e.g. House Sparrow) and a gain in some oak reliant bird species (e.g. California Scrub-Jay and Band-tailed Pigeon). Some synanthropic species saw no short-term abundance changes (e.g. House Finch and Northern Mockingbird), and some oak-reliant bird species have not yet colonized the campus following the restoration (e.g. Acorn Woodpecker and Oak Titmouse). Our results show that urban bird communities can rapidly shift after an urban native plant restoration event depending on the species. Further avian point surveys must be done to find more long-term effects following intense native plant restoration on the campus.

India Wesley-Cardwell
M.S. Biological Sciences
Title: *Effects of elevated environmental carbon dioxide (CO_2) on the acid-base regulatory capacity of epaulette shark (Hemiscyllium ocellatum) gills*
Faculty Mentor: Dr. Jinae Roa

As human-produced carbon dioxide (CO_2) 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 ocellatum*). Specifically, our analysis will focus on the gill cells responsible for acidic blood pH regulation: acid(H^+)-secreting cells enriched for Na^+/K^+-ATPase (NKA). Using immunohistochemistry and antibodies against NKA, we will measure the difference in abundance and location of these pH regulatory cells in sharks exposed to normal and elevated environmental CO_2 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.

Karli Miller

M.S. Biological Sciences
The combined effect of light and heat on C3 and C4 grass function
Faculty Mentor: Dr. Christine Scoffoni

Record-breaking heatwaves have been reported worldwide due to climate change. While C4 grasses can function at higher temperatures than C3 grasses, decreases in yield of important C3 and C4 grass crops in response to increased temperatures were found. While past studies have investigated leaf thermal limits across diverse C3 species, very few have looked at the combined effect of heat and light, finding greater thermal sensitivity when stressors are combined. We test for the combined heat and light effect on the efficiency of photosystem II (F_v/F_m) of eleven C3, C4 and C3/C4 intermediate grass species growing in a greenhouse. We constructed leaf thermal response curves of F_v/F_m under high and low light and calculated the temperature at which 50% of F_v/F_m was lost (T_{50}). We found no difference in thermal tolerance to extreme heat across phototypes, with a high sensitivity to heat (T_{50}≈47˚C) compared to values previously reported for other functional groups. Phototypes differed in their light response, with C4 species and C3/C4 intermediate showing up to 2˚C increase in T_{50} when quantified under high light. We discuss the effect of biochemistry, hydraulics, and leaf structure on these surprising results, with implications for crop production and grassland conservation.

Dyanna Jimenez

B.S. Biological Sciences, Option in Microbiology
Gaging the Impact of Proximity to Los Angeles on Sedimentary Microbial Life in the San Pedro Channel
Faculty Mentor: Dr. Gustavo Ramirez

Microbes living in the ocean sediment represent a significant fraction of life on Earth and play a critical role in cycles that maintain our planet's ecological balance. Pollution significantly affects ecosystems, with marine environments being particularly vulnerable. The effect of pollution from Los Angeles, a major coastal metropolis, on the microbial ecology of nearby marine sedimentary habitats is completely uncharacterized. To address this gap, we organized two oceanographic sediment coring campaigns, collecting subseafloor sediment from the Los Angeles and Santa Catalina slopes of the San Pedro Channel. This survey marks the beginning of a comparative analysis of sediment samples from both sides of the channel, where we evaluated variables like sediment and water depth. Marine sediment was cultured and isolated for growth analysis, while molecular samples were extracted, sequenced, and analyzed. Together, these samples represent a unique dataset that provides further insight into subseafloor ecological disturbances. Our sequenced genomes reveal the metabolic pathways employed by these ocean microbes. By understanding their roles of within the sediment, we can advance to the next phase of the study: assessing microbial diversity to gauge the broader ecological impact of our metropolis on subseafloor life.

Elvin Garcia

B.S. Biochemistry
Elucidating the Mechanism of U-to-C RNA Editing in Synthetic DYW-KP Proteins: A Pathway Toward A New Programmable Base Editor
Faculty Mentor: Dr. Michael L. Hayes

Base editing technologies offer the potential for gene therapies by correcting mutations and improving crop resilience. While C-to-U RNA editing operates through a well-characterized hydrolytic deamination mechanism, the reverse U-to-C editing remains poorly understood. Our research investigates synthetic DYW-KP proteins, particularly KP2, KP3, and KP6, which exhibit U-to-C activity *in vivo* but not *in vitro*. Mass spectrometry analysis revealed a 319 Da adduct on KP2 and KP6, suggesting a covalent RNA-protein crosslink. We identified a conserved lysine residue in the active site as essential for U-to-C editing. Structural analysis suggests this lysine forms an ion pair with the catalytic glutamate, which restricts C-to-U activity. Mutational studies showed that replacing this lysine with alanine abolished U-to-C editing while significantly enhancing C-to-U editing, supporting a Schiff base conjugation model where lysine facilitates U-to-C modification. These findings advance our understanding of RNA editing and its potential for programmable gene editing tools. Future work aims to optimize *in vitro* conditions for U-to-C editing and explore applications in gene therapy and crop biotechnology.

Rosanne Huang

B.S. Nutritional Science, Option in Dietetics
The Relationship between Food Pantry Visit Frequency and Diet Quality of Food Pantry Clients in Los Angeles County and Antelope Valley
Faculty Mentor: Dr. Michele Nicolo

With high food insecurity rates in Los Angeles County, many rely on food pantries for basic needs. However, food pantry use is often associated with poor diet quality and micronutrient deficiencies, increasing the risk of chronic diseases. Therefore, the aim of this project is to determine whether there is a relationship between the frequency of food pantry visits and diet quality among adults in Los Angeles County and Antelope Valley. This project utilized data collected from a cross-sectional observational study conducted between July 2024 to August 2024 (n=591) from 14 different sites. Participants were surveyed about their use of food pantries, usual

intake of certain foods, sociodemographic characteristics, and chronic diseases. Food pantry visit frequency, dietary intake (combined intake of fruit and vegetables, sugar-sweetened beverages (SSB), salty snacks, combined intake of cookies and candies), race/ethnicity, and number of reported conditions were analyzed using chi-square tests (SPSS v. 29) to identify significant associations ($p<0.05$). Visiting food pantries once a week or more was associated with optimal fruit and vegetable intake ($p=0.007$). These results suggest that more frequent pantry visits may be associated with a greater intake of fruits and vegetables.

Aqueen Lenon

M.S Kinesiology, Exercise Science
Understanding the effects of resistance training on brain and muscle oxygenation during exercise-induced muscle fatigue.
Faculty Mentor: Dr. Stefan Keslacy

Background: Exercise-induced fatigue affects brain activity primarily through decreased activation in the prefrontal cortex. We hypothesize that muscle fatigue will affect brain-muscle relationship differently between sedentary and athletes. Methods: The exercise consisted of a fatigue-induced bench press sets for eight participants. Oxygenation levels in the left prefrontal cortex and the right triceps muscle were continuously monitored using near-infrared spectroscopy. Data collection is ongoing, statistical analysis will be performed for the symposium. Results: During fatigue, trained participants exhibited higher muscle oxygenation (MuO2HB) and deoxygenation (MuHHB) compared to sedentary (3.767 vs. 2.182; 9.848 vs. 4.017, respectively). No difference was observed in total muscle haemoglobin (MutHB). During the recovery period, MuO2HB and MutHB were elevated in trained participants (4.535 vs. 0.55; 6.587 vs. 2.610, respectively), with no difference in MuHHB. Fatigue induced a 15.68-fold increase in MuO2HB in trained participants (vs. 0.31-fold). During fatigue trained individuals showed a 10-fold increase in cerebral oxygenation (CerO2HB) (16.503 vs. 1.6341) and more than a 20-fold increase in cerebral total haemoglobin (CertHB). There was no difference in cerebral deoxygenation (CerHHB). Conclusion: Our preliminary data indicate that trained individuals maintained higher CerO2HB during the final set, which may contribute to sustained muscle performance.

Matthew Christmann

B.S. Nursing
Student Knowledge of Lead Toxicity
Faculty Mentor: Dr. Stacey A. Warner

Over 9 million lead containing water services lines supply residential neighborhoods in the U.S. with lead toxicity having serious and often permanent consequences for developing children and the overall public. Prior research utilizing the Chicago Lead Knowledge Test (CKLT) measured a mean score of 12.2 in a parent population. University student lead knowledge has not been measured. A quantitative comparative study was conducted on nursing and public health student populations at a large metropolitan university with the CLKT. The overall CLKT mean score for the nursing participants was 12.75, and the overall CLKT mean score for the public health participants was 9.37 ($N = 243$), with noted significance $p < 0.001$, between groups. Educational opportunities and strategies to increase student and public knowledge of lead toxicity are warranted, empowering students to promote community health awareness of lead toxicity.

Teegan Boyd

M.S. Kinesiology
Neck Muscle Functional Characteristics in Individuals with Forward Head Posture
Faculty Mentor: Dr. Leila Rahnama

Forward Head Posture (FHP) is an increasingly common postural deviation in which the head is displaced anteriorly to the shoulders accompanied by an upward tilt of the chin. This changes the stress placed on the muscles of the neck, including those involved in flexion and extension actions. The objective of this study is to better understand how the muscles of the neck are altered in FHP by comparison to those with Neutral Head Posture (NHP). We specifically examined the rectus capitis posterior major (neck extensor) and sternocleidomastoid (neck flexor) muscles for differences in thickness, stiffness, and strength between individuals with FHP and individuals with NHP. The main finding is a significantly lower stiffness in the right rectus capitis posterior major muscle for those with FHP compared to NHP (p=0.026, *Cohen's d*=-1.42); however, there were no significant differences found in the left side or for either side of the sternocleidomastoid muscle. The lower stiffness in FHP may be due to less passive elasticity of the muscle at rest, shortening of the muscle length with FHP, tendon elongation, or decrease in number of sarcomeres. These preliminary findings are from a relatively low sample size (N=15; N_{FHP}=9, N_{NHP}=5) and further investigation is warranted.

Group 6 ▪ Computer Sciences
▪ University-Student Union – Pasadena Room 307

Xuewen Tang
M.S. Information Systems
Establishing an AIGC Shared Service Center within Global IT Architecture
Faculty Mentor: Dr. Song Xing

Global organizations face challenges in generating and maintaining content according to diverse cultural backgrounds in the market; as artificial intelligence rapidly advances, the groups seek ways to stream content creation, improve consistency, and reduce costs across global operations. This project researches the feasibility of establishing an AI-Generated Content (AIGC) Shared Service Center within a corporation's IT architecture to centralize and optimize content generation. Inspired by the existing shared services center for finance and human resources, the AIGC center has the advantage of standardizing branding, automating routine content tasks, and responding quickly to diverse cultural market needs. This study explores current AIGC tools and evaluates their adaptability in cross-culture. By assessing both cloud-based and on-premises solutions, the project proposes an IT infrastructure that supports secure, scalable, and flexible content generation. Additionally, it compares the benefits and risks of developing in-house AIGC capabilities versus third-party outsourcing vendors. Expected outcomes include a framework for building and managing AIGC within global companies and insights into how AI can empower creative processes. This research highlights the potential advantages of an AIGC Shared Service Center, providing a roadmap for implementing AI-driven solutions to meet the increasing demands of the future's digital landscape.

Rajkin Chakrobarty
B.S. Biochemistry
Post transcriptional modifications: thermodynamic insights on the enzymatic amination reaction of Uracil to Cytosine.
Faculty Mentor: Dr. Olaseni Sode

Dysregulation of metabolic pathways and genetic information have been associated to various chronic diseases.[1] As a population that lives longer but suffers from chronic illnesses such as Alzheimer's, breast cancer, and heart failure we call for two main tenants.[2] The first is the pursuit of novel insights that bring a reversible alternative to biochemical processes and second is the development of precisely targeted therapies addressing chronic disease. Recent studies have demonstrated the DYW-KP protein can convert genetic information in a reversible process described as Uracil-to-Cytosine (U-to-C).[3] We modeled the U to C conversion and produced Potential Energy Surface (PES) diagrams with the addition of a water catalyst leading up to an intermediate-imine species (see Figure 1). All calculations were initiated at the Hartree-Fock level of theory, 3-21G basis set and Density Functional Theory, 6-311++G (2d, p) basis set. We report 100% of the proposed pathways are endothermic but the addition of water catalyst and implicit solvent reduces the energy barrier significantly. The next step involves expanding our computational model and examining the resulting thermodynamic landscape.

Isuru Rajapakshe
M.S. Electrical Engineering
Spectral Changes in sEEG as a Biomarker for rTMS Efficacy in Major Depressive Disorder
Faculty Mentor: Dr. Deborah S. Won

Major Depressive Disorder (MDD) affects 322 million people globally, with numbers increasing every year. Repetitive Transcranial Magnetic Stimulation (rTMS) is a non-invasive treatment that uses magnetic fields to stimulate nerve cells in the brain and was FDA-approved in 2008 for MDD treatment. However, conventional methods to evaluate the success of this treatment rely on subjective questionnaires which require a lengthy trial-and-error period. This study analyzed data from 28 MDD patients receiving rTMS treatment. Surface Electroencephalography (sEEG) data and patient-reported scores (namely Montgomery-Åsberg Depression Rating Scale (MADRS) and Generalized Anxiety Disorder Scale (GAD-7)) were collected before and after 36 rTMS sessions conducted over six weeks. Changes in brain region activity were analyzed by computing gamma (30-45 Hz), beta (13-30 Hz), alpha (8-13 Hz), and theta (4-8 Hz) band powers from sEEG signals. Results revealed a significant increase in alpha power in the posterior and occipital regions post-treatment. Notably, alpha power in the frontal pole and posterior regions exhibited a statistically significant linear relationship with patient-reported MADRS scores (F-test, $p=0.038$ and $p=0.007$, respectively). These findings suggest that sEEG-derived alpha power metrics could be a potential biomarker for rTMS treatment efficacy in MDD patients.

Eman Badr

M.S. Electrical and Computer Engineering
Scalable Design of Cyber-Resilient Architectures for Critical Systems.
Faculty Mentor: Dr. Abdullah Al Maruf

Cyber-Physical Systems (CPS) are essential to critical infrastructure, including power grids, healthcare, and transportation, but their increasing connectivity makes them vulnerable to cyber-attacks and system failures. A 71% rise in cyber-attacks on energy infrastructure from 2021 to 2022 underscores the urgent need for resilience strategies. Traditional security methods struggle with the complexity of interconnected systems, where disruptions in one subsystem can cascade across the network. This research proposes a scalable framework to enhance CPS security by identifying vulnerabilities, optimizing system recovery parameters, and improving resource allocation. A novel risk metric quantifies each subsystem's criticality, guiding decisions on resilient architecture design. Using barrier-function-based control and sum-of-squares programming, we derive conditions that ensure system safety even under multiple simultaneous attacks. Our approach is validated through simulations replicating real-world cyber threats, demonstrating its effectiveness in maintaining CPS stability. By developing a scalable and practical solution for securing large CPS, this research contributes to strengthening the resilience of critical infrastructure against evolving cyber threats.

Joseph Tran

M.S. Electrical Engineering
Observability-Blocking Controls for Double-Integrator and Higher Order Integrator Networks
Faculty Mentor: Dr. Abdullah Al Maruf

The design of state-feedback controls to block observability at remote nodes is studied for double integrator network (DIN) and higher order integrator network models. A preliminary design algorithm is presented first for DIN that requires $m+2$ actuation nodes to block observability for the measurement obtained from a set of m nodes. The algorithm is based on eigenstructure assignment technique and leverages the properties of the eigenvectors in DIN. Next, the topological structure of the network is exploited to reduce the number of controllers required for blocking observability. The number of actuation nodes in sparser design depends on the cardinality of a cutset separating the actuation and measurement locations. Later, the design principles are generalized for blocking observability in N-th order integrator network models.

Anirudha Bhaktharahalli Subramanya

M.S. Computer Science
Adversarial Resilience in Large Language Models
Faculty Mentor: Dr. Mohammad Pourhomayoun

Large Language Models (LLMs) have become integral in critical applications such as finance, healthcare, and legal systems, yet they remain highly susceptible to adversarial threats, including data poisoning, model inversion, gradient-based attacks, and jailbreak prompting. This research investigates various adversarial threats, including token manipulation, and prompt injection, which can subtly alter model behavior to produce undesired or harmful outputs. Existing defenses, including adversarial training and heuristic monitoring, often fail to generalize across diverse attack patterns and introduce performance trade-offs. This research proposes a dynamic adversarial defense framework, integrating adaptive adversarial training, reinforcement learning from human feedback (RLHF), and automated model red-teaming. A novel adversarial reinforcement learning (Adv-RL) pipeline is introduced, leveraging self-supervised attack adaptation and prompt optimization to enhance LLM robustness. This work contributes to securing LLM deployments in high-stakes environments by establishing an adaptive security framework that dynamically evolves with the adversarial landscape, ensuring real-time threat detection, mitigation, and robustness adaptation.

Luis Martinez

M.S. Electrical Engineering
Parkinsons Tremor Detection via Apple Watch Accelerometry Data
Faculty Mentor: Dr. Deborah Won

The objective of our present work is to accurately detect tremor in individuals with a deep brain stimulation implant for treating Parkinson's disease (PD), using a wearable accelerometer. We designed our algorithm to detect tremor during all physical activity states, including walking, and with higher resolution that the current gold standard. We obtained Apple watch and IPG accelerometer data from six patients while they performed a series of activities, each for 30 seconds. Our algorithm is based on spectral features using continuous wavelet transform (CWT). We validated our algorithm against the current gold standard for tremor detection in the PD research community, developed by RuneLabs, which provides an estimate of the degree of tremor in 1-minute windows. Ground truth on a higher time resolution was established using a combination of trial logs and visual inspection of the raw accelerometry signals. For subjects who had a tremor-dominant Parkinsonian symptom profile, the CWT-based tremor detection algorithm yielded 97% correct detection. We demonstrate that our algorithm can detect tremor

accurately on a second-resolution time scale. These findings will contribute to the development of closed-loop control of DBS for PD that is more precisely tailored to individual needs.

Group 7 ▪ Engineering
▪ University-Student Union – San Gabriel Room 313

Zeke Blanco and Diego Flores
B.S. Mechanical Engineering
Methane Flame Stability
Faculty Mentor: Dr. Jeffrey Santner

The use of biogas, a renewable resource, as an alternative fuel continues to be studied. This gas mixture is most commonly composed of 40-80% methane, 30-50% carbon dioxide, and less than 10% of numerous other compounds. By creating a biogas surrogate mixture with its two major components we are able to burn the fuel and determine flame stability limits and measure pollutant emissions. As a first step towards this goal, this presentation will use pure methane as our fuel and observe the effects of varying flow rates on flame stability and emissions with a fixed equivalence ratio.

Christian Perez
B.S. Mechanical Engineering
Modeling of Hydrogen Station Upgrade
Faculty Mentor: Dr. David Blekhman

The Hydrogen Station is in the process of being redesigned and optimized to become a cutting-edge refueling station for public and research purposes. The modeling of the Hydrogen station upgrade consists of analyzing data from simulations to make informed decisions about the future configuration of the station. Using a simulated model of the original station layout would allow a substantial analysis of hydrogen production data. The first modeling software used is HySCapE, a mass-based model with results encompassing the amount of mass produced and dispensed by the station in a short period of time. In order to analyze the economic efficiency of the station the HRSAM model was utilized. This simulation provides data on the benefit-cost analysis of hydrogen production and public sales. The next simulation is a more complex thermodynamics model. H2FillS allows for a configurable 2D model of the entire station from production to dispensing and produces results such as pressure and temperature throughout each component of the fueling process. The analysis and understanding of this data are imperative to ensuring a rationally justified configuration of the new station.

Andy Damas
M.S. Mechanical Engineering
Circulation Patterns in Horizontal Rectangular Enclosures due to Humidity in Air
Faculty Mentor: Dr. Arturo Pacheco-Vega

In this work we have studied how differences in humidity in air inside a small two-dimensional square enclosure, simulating a room, can create circulation patterns. The enclosure has dimensions of 10 cm by 10 cm, and it is filled with atmospheric air, which is kept at a constant temperature of 20°C. For the analysis, the vertical walls of the cavity are considered as impermeable, while the humidity of the bottom and top walls are set to 100%, and 0%, respectively. The mathematical model incorporates two-dimensional versions of the conservation equations for mass, momentum, and moisture content of air in Cartesian coordinates, under laminar flow, and steady-state conditions. This set of equations is first discretized and then solved using the Finite Element Method. Using computer simulations, under different operating conditions, we have found that these humidity differences alone create density gradients in the fluid and thus buoyancy forces that cause airflow circulation patterns like those caused by the better-understood temperature-driven natural convection. This investigation advances our understanding of how humidity is transported through air, which is important for applications like building ventilation, meteorology, and moisture control.

Sudheendra Gamoji and William Murillo
M.S. Physics
Combating Thermal Lensing in Gravitational Wave Detectors Through Radiative Cooling
Faculty Mentor*:* Dr. Marina Mondin

The Virgo and LIGO Interferometric Gravitational-Wave Observatories are designed to detect gravitational waves—ripples in spacetime generated by the acceleration of binary neutron stars, black holes, and other massive objects. A laser feeds light in the interferometers where an optical power of up to 750kW builds up. The heat deposited from the stored light reflected at the mirror's center distorts the mirrors in a phenomenon known as “thermal lensing,” which impedes the collection of gravitational wave signals. We propose a radiative cooling apparatus using naturally emitted black body radiation to sap the extra heat directly from the mirror surface, allowing optimal signal extraction.

Alejandro Sanchez

B.S Mechanical Engineering
Improving the performance of lithium-ion batteries at high temperatures for space applications
Faculty Mentor: Dr. Chris Bachman

Space exploration missions, such as JPL's Venus Aerobot which aims to explore Venus's atmosphere, require batteries capable of operating in extreme conditions reaching 100°C. At these elevated temperatures, conventional lithium-ion batteries suffer from rapid performance loss, limiting their use in such demanding environments. This study investigated three electrolyte additives - LiDFP, LiDFOB, and TTE - in various combinations using 2032-coin cells with NMC111 cathodes and graphite anodes. Through the design of experiments, eight different electrolyte formulations were tested to understand their effects on high-temperature performance. Results showed TTE as the most beneficial for high-temperature operation, reducing internal resistance by 44% and extending battery life by 176%. Moreover, combining TTE with other additives produced even better results, with TTE-LiDFOB combinations reducing resistance by up to 62%, demonstrating promising options for high-temperature battery applications.

Henry Amador and Marwin R. Tepanohaya

B.S. Electrical Engineering; M.S. Mechanical Engineering
Investigating the Impact of Oxygen on AQDS-Based Aqueous Redox Flow Batteries
Faculty Mentor: Dr. Chis Bachman

With the increasing demand for sustainable grid-scale energy storage, aqueous redox flow batteries (ARFBs) have emerged as a promising alternative to conventional lithium-ion and vanadium redox flow batteries. Despite the environmentally friendly their widespread adoption is hindered by challenges including lower energy densities and limited cycle life. Previous studies suggest that anthraquinone-2,7-disulfonic acid (AQDS), a widely used organic redox-active material, reacts with oxygen in ambient air during the charge cycle, negatively impacting battery performance. To understand this reaction with oxygen, comparative tests were performed using an 2,7-AQDS/$Na_4[Fe(CN)_6]$ redox couple in two different environments: one under ambient air conditions and the other in a controlled inert atmosphere from electrolyte preparation through full cycling. The results indicate that cells exposed to ambient air suffered a rapid decline in efficiency, becoming unstable after 2-3 cycles. In contrast, the nitrogen-filled chamber with O_2 levels below 5% allowed for stable operation over 15 cycles, albeit with lower overall cycle efficiency. These findings suggest that factors beyond oxygen exposure may contribute to performance degradation. To further isolate the underlying causes, an ongoing experiment to analyze electrolyte specific testing in an H-Cell.

Charlie Sanches

B.S. Mechanical Engineering
Humidity-Induced Natural Convection Currents
Faculty Mentor: Dr. Mario Medina

The study of hygro-convection plays an important role in enhancing climate models, improving weather prediction, and optimizing applications such as building design, energy efficiency, and HVAC system performance. The formation of convection cells by temperature difference is a well-documented phenomenon, with extensive experiments, simulations and analytical solutions, however, a humidity-driven convection cell has been under-investigated and lacks clear governing equations. This experiment aims to gather empirical data for a humidity-driven convection cell within a rectangular cavity to validity an analytical derived solution. A sealed rectangular enclosure, constructed from ABS plastic and transparent acrylic windows, was designed to house the formation of humidity-driven convections cells. The enclosure is designed to emulate a starting condition, where the bottom boundary is set at 100% relative humidity (i.e. water) and the top boundary is set at 0% relative humidity (i.e. silica packets) To monitor humidity and temperature, eight pairs of humidity sensors and thermocouples were placed at various locations within the enclosure. The sensors are connected to an data acquisition system (model#) and plotted using LabVIEW. The enclosure was also imaged using a high-speed camera equipped with schlieren imaging to detect density changes from the convection cells.

Group 8 ▪ Physical Sciences
▪ University-Student Union – Alhambra Room 305

Sergio Avina
M.S. Physics
Airglow: Understanding the Upper Atmosphere of Venus through Infrared Observations of O_2
Faculty Mentor: Dr. Emilie Royer

Understanding the airglow in Venus' upper atmosphere can provide key insights into the atmospheric dynamics at altitudes of 90 to 120 km. We specifically observe O_2 airglow at 95 km and at 1.27 μm. The airglow lies where two different circulation patterns of the Venusian atmosphere mix: the Retrograde Super-Rotating zone 100 km and below, and the Sub-Solar Anti-Solar (SS-AS) Rotation zone 100 km and above. Recent models show a roughly 5-day period Kelvin Wave at these altitudes, which has yet to be proven or disproven by observations. Using measurements taken by the SpeX instrument from NASA's Infrared Telescope Facility (IRTF) in Hawaii, we can take ground-based observations of Venus' entirety over a wide range of wavelengths, including 1.27 μm. Our most recent dataset does exactly this over a range of consecutive days. By extracting data at 1.27 μm specifically, we can observe the change in intensity and morphology of the airglow over a few sets of consecutive days. This, in addition to previous data, should help us deepen our understanding of the dynamics of the Venusian atmosphere. In particular, we aim to determine whether the 5-day Kelvin wave period in the underlying atmosphere is true.

Marlee Rapp
M.S. Physics
Spatially Resolved Star Formation History of IC 1613
Faculty Mentor: Dr. Margaret Lazzarini

The star formation history (SFH) of a galaxy is a measurement of the galaxy's rate of star formation over time. We are measuring the spatially resolved star formation history of IC 1613, a galaxy in the Local Group with low mass and a low amount of metals, which are elements other than hydrogen and helium. Measuring the SFH of IC 1613 is valuable because these properties of the galaxy make it a good nearby analog to the early universe, as galaxies in the early universe also lacked metals. Nearby analogs to the early universe are useful because they are close enough that we can resolve individual stars and other details, unlike galaxies that are farther away. To measure the SFH, we are using images from the Hubble Space Telescope's Local UltraViolet and Infrared Treasury (LUVIT) and using software called MATCH. MATCH compares the distribution of colors and brightness of the stars to theoretical models to fit for the SFH that results in the population of stars present in IC 1613 today. We present the SFH for one region of IC 1613. As the project progresses, we expect to obtain the full spatially resolved SFH for the entirety of IC 1613.

Kenneth Stebbing Cabrera
M.S. Physics
Shocks and Astrochemistry in the Outer Disk of the Protostar L1527
Faculty Mentor: Dr. Susan Terebey

A protostar is a young star in its earliest phase of stellar evolution. When a dense region within a molecular cloud collapses under its gravity, it forms a star-like object, the protostar, surrounded by a rotating disk that will continue to accrete dust and gas from the surrounding molecular cloud until it has depleted. This study will focus on the protostar L1527. Observations of L1527 show that precursor organic molecules in the gas phase are prominent in the outer disk region. Explaining why could lead to a better understanding of the distribution of these molecules in planetary formation. Earlier astrochemistry models show that precursor organics form efficiently but remain locked on the surfaces of dust grains. These models were produced without incorporating shock physics, which could explain the discrepancies as infalling material from the envelope goes through a shock when it impacts the disk. This study aims to probe whether shock heating of the dust grains can account for the desorption of these molecules into the gas phase to match known observations. We generate shock models using conditions prevalent in the outer disk to obtain updated temperature profiles, use them to recompute the chemical abundances, and present our results.

Laura Fredericks and Luis Cruz Vega
B.S. Physics; M.S. Physics
Tracing Potential Building Blocks of Life in the Disks of Two Nearby Young Stars using ALMA data
Faculty Mentor: Dr. Susan Terebey

Studying protostars gives insight into the history of our solar system and the origins of life. A protostar is a star-like object that forms when a dense cloud of interstellar gas and dust collapses due to gravity during the earliest stage of star formation. As the protostar forms, the additional surrounding material coalesces into the disk where planet-formation occurs. This material includes molecules that are precursors to organic compounds. If these molecules survive the stellar formation process, they may become a part of icy comets, some of which crash into planets. Our goal is to determine their survivability by studying their motion within the disk. We

will use data from nearby star-forming regions gathered by the Atacama Large Millimeter Array (ALMA) to study the gaseous components including CO and precursor organic molecules including C3H2. Utilizing ALMA-specific data reduction software, we'll apply the Doppler effect to study the infall speed of the material by creating velocity and moment maps. Afterward, the results will be compared with simulated disk models based on the RadChemT software. The outcome of our research will further test current theories of star and planet formation while bringing us closer to understanding the origins of life.

Evelyn Scott

M.S. Physics
Protostar Disk Dynamics of Oph IRS 63
Faculty Mentor: Dr Susan Terebey

When looking to understand the history of our sun, it only makes sense to look at similar objects in a younger state of development. Astrophysicists call these star-like objects that glow yet have not begun nuclear fusion "protostars." This research compares the STAK model developed by this research group with observational data from the Atacama Long Millimeter Array (ALMA) telescope in Chile. To do so, we examine EM emissions to develop maps of–intensity and velocity using data for the protostar Oph IRS 63 and compare with maps generated by computer model. Specifically, we examine the radio wavelength spectral line transition of $C^{18}O$ and utilize the Doppler effect to find the velocity of the rotating accretion disk. Previously these models have been used to perform similar experiments on the protostar L1527; this experiment's focus is on expanding this process to other protostars. In doing this comparison, we can make more accurate measurement of the protostar's mass and the size of different components of the protostar disk structure.

Marlon Reyes Silva

M.S. Physics
Characterizing High Mass X-ray Binary Populations in Low Metallicity, Low Mass Dwarf Galaxies Using Chandra and Hubble Data
Faculty Mentor: Dr. Margaret Lazzarini

High mass X-ray binaries (HMXB) are systems that contain a high mass star coupled with a compact object companion (a black hole or a neutron star). HMXBs shine brightly in the X-ray spectrum as the compact object pulls in material from the high mass star, creating an accretion disk to form. This accretion disk is what gives off X-ray radiation. The high mass X-ray binary phase is an intermediate stage in the stellar evolution of massive binary stars as it bridges over to a double compact object stage (neutron star - neutron star, black hole - black hole, black hole - neutron star). Studies of HMXBs can then give us information on binary star evolution and early galaxy formation. In my research, I will be identifying HMXBs in nearby, low metallicity, low mass galaxies. These nearby galaxies are similar to galaxies in the early universe, allowing us to gain insight into how these binary star systems evolved at an earlier time in our universe and the processes behind early galaxy evolution, which are difficult to observe directly.

Samuel Groysman

B.S. Biochemistry
Sensitive Imaging of Electroactive Species in Plasmonic Electrochemical Microscopy Enabled by Electrostatic Nanoconfinement
Faculty Mentor: Dr. Yixian Wang

Spatially resolved sensing is a burgeoning area of electrochemistry that, in contrast to traditional electrochemical techniques, allows for the analysis of heterogeneous systems. However, improving the sensitivity of many spatially resolved techniques remains challenging. To that end, this study modifies a novel spatially resolved sensing technique, plasmonic electrochemical microscopy (PEM), with a mesoporous silica film (MSF) to achieve sensitive imaging of electroactive species. MSFs have been shown to separately amplify optical and electrochemical signals. Sensitivity enhancement is proposed to occur due to the attraction of ions to the charged silica films, thereby increasing the local concentration change and magnifying the PEM signal. The performance of the MSF-modified PEM setup was investigated using 1,1'-ferrocenedimethanol (FC) and dopamine. Results revealed up to 37-fold improvement in the detection limit and 23 times improvement in the sensitivity for FC. Importantly, the MSF-modified PEM setup allowed for the quantification of detected concentrations, in contrast to the standard PEM setup, for which R^2 values were unacceptably low. The modified PEM setup also showed increased sensitivity for dopamine detection and was able to visualize localized dopamine release, showing this setup's great promise for biological applications, such as real-time imaging of neurotransmitter release.

Dominique Dang

M.S. Chemistry
Single Nanoparticle Electrochemical Analysis Using Critical Angle Reflection Microscopy
Faculty Mentor: Dr. Yixian Wang

Single Entity Electrochemistry (SEE) utilizes electrochemical methods to analyze individual cells, nanoparticles, and molecules to monitor sample heterogeneity that is often obscured by traditional ensemble measurements. Surface plasmon resonance

microscopy (SPRM) is a label-free optical technique utilizing refractive index changes to provide sensitive responses and has been proven capable of imaging reactions on a nanoscale level. However, due to the use of a gold film as the sensor, background signal interference as well as high material costs limit usage for broader applications. Critical Angle Reflection Microscopy (CARM) is a novel technique that expands on the framework of SPRM whilst addressing its key limitations by utilizing an indium tin oxide (ITO) sensor instead of a gold film and operates below the critical angle. We demonstrated the potential of CARM for electrochemical measurement through a simple redox reaction between ferricyanide and ferrocyanide. Additionally, different incident angles were tested to acquire optimal sensitivity. We also carried out preliminary SEE tests through the underpotential deposition (UPD) of lead on commercial gold nanowires and obtained promising results and will optimize the system to reach single nanowire level measurement.

Doroteo Manriquez

M.S. Materials Science and Engineering
Metalloporphyrinic Metal–Organic Frameworks for Enhanced Photocatalytic Degradation of a Mustard Gas Simulant
Faculty Mentor: Dr. Yangyang Liu

Four porous compounds consisting of zirconium centers linked by organic molecules were created to degrade a mustard gas simulant using light and oxygen. Two of these compounds (PCN-222(In) and PCN-222(Sn)) were three-dimensional and were created using a light absorbing molecule as the linker. The other two (CSLA-21(Sn) and CSLA-21-NH_2(Sn)) were two-dimensional and had the light absorbing molecule grafted onto the structure. The two-dimensional compounds had a significantly faster degradation rate for the mustard gas simulant, with CSLA-21-NH_2(Sn) degrading half of the mustard gas in 1.5 minutes.

Steve Figueroa and Emmanuel Genfior

M.S. Physics
Magnetic Properties of Nanoparticles in Different Carbon-based Matrices
Faculty Mentor: Dr. Armen Kocharian

This talk describes a systematic approach to study synthesis, annealing and characterization of metallic magnetic and nonmagnetic nanoparticles (Copper, Zinc, Iron, Nickel, Cobalt) dispersed in different carbon matrices such as phthalocyanine, and porphyrin. The research delves into the nanostructure images and nanoparticles embedded in carbon and the size-dependent properties of these nanoparticles, by utilizing techniques such as powdered X-ray diffraction (PXRD), scanning electron microscopy (SEM), and high-resolution transmission electron microscopy (HR-TEM) for detailed size and structural analysis. The study establishes a correlation between structural properties using data SEM and HR-STEM images and magnetic characteristics of the nanoparticles, as assessed through physical property measurement system (PPMS). Our results reveal distinct magnetic characteristics across the nanoparticles, with FePc showing the highest saturation magnetization, indicating strong magnetic responsiveness, while FeTCPP displays high coercivity, and strong magnetic saturation making it hard magnet suitable for stable magnetic applications in treatment of cancer cells using magnetic hyperthermia method.

Abstracts of Poster Presentations

Behavioral and Social Sciences

1. Arielle Jonna Guinto, Cristelyn Joyce Chua, Alyanna Alexis Amante, and Michael Loyola

B.S. Nursing
Analyzing Human Trafficking: A Literature Review on Trafficking in the Philippines
Faculty Mentor: Dr. Stefanie Varela

Human trafficking is a prevalent issue in the Philippines—particularly among women and children, with eight in one thousand Filipinos as victims of human trafficking. Trafficking exists in three forms—labor, sex, and child trafficking. There are various root causes, recruiting mechanisms, and combating strategies related to human trafficking, and it is a national concern that leaves lasting impacts on its victims and their families. Despite being ranked as a Tier 1 country by the U.S. Department of State, trafficking still remains a problem in the Philippines due to political instability and lack of resources. Further investigation of the factors that contribute to human trafficking is essential, and the Philippines must amend its implementation and legislation, strengthen training, and increase availability of survivor-centered post-trafficking programs to mitigate cases. Healthcare professionals play a vital role beyond medical interventions, as they stand as frontliners for identifying, reporting, and supporting victims. To fully address this crisis, national priorities must shift towards a trauma-informed approach and allocate the adequate resources necessary to counter trafficking. Given the inadequacy of the Philippines' approach to combat human trafficking, existing anti-trafficking strategies must be modified to be more effective in order to address human trafficking at its core.

2. Tara Choe

B.S. Nursing
The Core Crisis of Organ Trafficking and its Aftermath
Faculty Mentor: Dr. Stefanie Varela

Illegal organ trafficking has become a rising global danger in recent years. One of its main reasons is donor recruitment, which has targeted vulnerable populations and families that are financially burdened. Along with transplant tourism, an act that contributes to this organization as many individuals fly to different countries for unlawful transplant surgery. Leaving many with no medical treatment afterward and worse manifestations of physical decline. Healthcare professionals are now questioning the moral implications of this issue and how a need of protocols should be put in place soon. The impact of it has been recently gaining attention, with possible solutions already taking place within organizations and advocacy actions.

3. Enelea Balba

B.S. Nursing
The COVID-19 Pandemic's Impact on Early Childhood Development
Faculty Mentor: Dr. Stefanie Varela

Following the three-year long COVID-19 Pandemic, it is understood that adult and adolescent mental health took a toll. However, the growth and development of infants and toddlers during and after the Pandemic must be explored, too. The purpose of this research is to identify the degree of impact the COVID-19 Pandemic environment had on early childhood development. Online databases, such as the CSULA Library, JAMA Pediatrics, and PubMed, were utilized in this analysis. It was found that internationally preschoolers' growth was stunted in socioemotional skills, motor skills, and overall development. It was unanimous that mimicking in-person schooling or daycare at home did not fulfill the necessary face-to-face learning. Recognizing these delays is critical to pediatric nursing care and to families of young children raised during the Pandemic. Though this subject is still in development, identifying deficits and providing early intervention is essential in our children's future growth and development.

4. Angel Chen and Beth Santana

M.S. Nutritional Science; B.S Nutritional Science
The Role of Food Pantries in Los Angeles in Promoting Fruits and Vegetables Consumption
Faculty Mentor: Dr. Kathryn Amanda Hillstrom

Eating the recommended five or more servings of fruits and vegetables daily remains a challenge for most U.S. adults. Nationally, only 1 in 10 adults meet this recommendation, while in California, 28% achieve it. This study examines fruit and vegetable intake among Los Angeles County residents who frequent food pantries. Surveys were conducted with community members waiting in line at 15 food pantry locations, gathering data on demographics, dietary intake, and perceptions of food quality. Among 590 respondents, 31.5% reported consuming 3-4 servings of fruits and vegetables daily, 25.5% consumed 5-6 servings, and 15.7% consumed 7 or more servings. These results surpass both state and national averages. Additionally, participants expressed high satisfaction with the availability of healthy food at their food pantries, rating it 8.5 out of 10, with 1 being very dissatisfied and 10 being very satisfied. These findings highlight the important role food pantries play in improving access to fresh produce. By providing fruits and vegetables to underserved populations, food pantries may serve as a critical resource in promoting healthier dietary habits. Enhancing support for these programs could help bridge nutritional gaps and encourage greater consumption of fresh produce among vulnerable communities.

5. Ruth Uribe-Kirby, Fiona Baker, and Ivan Cobian

M.A. Psychology; B.A. Psychology
Consistency in Trauma Reporting: Comparing Single-item vs Multi-item Trauma Questionnaires
Faculty Mentor: Dr. Yvette Szabo

Single-item screeners are used to identify trauma exposure in clinical/research settings but their effectiveness is unclear. This study evaluates consistency between responses on the yes/no screening item on the Primary Care – Post Traumatic Stress Disorder (PC-PTSD) and for events that qualify for PTSD diagnosis on the Stressful Life Events Screening Questionnaire (SLESQ). Data was obtained from a larger, ongoing acute stress study. Participants (N = 125; 73% women; 79% Latine; aged 18-40) were more likely to report a traumatic event on the SLESQ (59%) than on the PC-PTSD (30%). About 65% consistently reported trauma across measures ($p < .001$). Life-threatening accident (OR = 3.17), force/weapon during mugging/robbery (OR = 10.30), loved one killed/suicide (OR = 14.30), childhood physical abuse (OR = 4.20), threatened with weapon (OR 5.20), and witnessing sexual/physical assault or serious injury/person killed (OR = 11.91, all ps< .04) predicted a yes response on the PC-PTSD. Life in danger/seriously injured or physical abuse in adulthood did not. Overall, a single item might not capture all traumatic experiences in a college sample, potentially leading to under detection of PTSD. Future research should examine physical/sexual assault as it was excluded in this study.

6. Noemi Alanis

B.A. Psychology
Parental Perceptions of Math Language and Learning Skills in Educational YouTube Videos
Faculty Mentor: Dr. Corinne Bower

Children are increasingly exposed to digital media from birth, significantly influencing their learning. While educational media aims to support early STEM education and enhance school readiness, its effectiveness depends on design and engagement quality. Parental attitudes towards screen time can also limit technology's educational potential. This study investigates how the amount of math language in 'educational' YouTube videos affects parents' perceptions of their educational value. We analyzed correlations between the proportion of math language and parents' assessments regarding whether their child 1) learned an academic subject, 2) acquired a new skill, and 3) was inspired to start a new project. An online survey asked U.S. parents of 3- to 5-year-olds to identify their children's top three YouTube videos. We analyzed the first 15 minutes of 58 videos labeled as 'educational' to calculate the proportion of math language. Results indicate that parents associate their child's learning of academic subjects like math with videos containing extensive math vocabulary. However, there were no significant correlations between math-focused content and perceptions of learning new skills or motivation for new activities, suggesting that parents may see educational value primarily in academic content.

7. Jordy Ocampo, Mei Ku, and Ivan Cobian

B.A. Psychology, M.A. Psychology
Validating a Control Film & Effects as a Mood Stabilizer
Faculty Mentor: Dr. Yvette Szabo

Lab-based stressors are helpful ways to examine stress in a controlled way. Many use films as a "control" condition, but these have not been formally evaluated. The present study fills this gap by extending a previously used 3-minute clip to 15 minutes and examining participants' psychological and physiological responses before and after the film. Participants (n = 25, Mean age = 23) were primarily Hispanic/Latino (72%) and female (72%). Mood, systolic/diastolic blood pressure (SBP/DBP), and heart

rate (HR) whereas measured pre/post film and intrusive thoughts were measured after the film and one week later. Participants displayed no difference in positive affect in response to the film ($p = 0.35$), nor were there differences in HR ($p = 0.82$), SBP ($p = 0.41$) or DBP ($p = 0.66$). However, there was a significant decrease in negative affect ($p = 0.02$). Participants had little to moderate levels of intrusive thoughts about the film. Results show that the modified polar bear video acts as an effective short-term control film as participants had little to no physiological and mood changes right after. However, more research is needed to understand intrusive thoughts, as participants reported moderate intrusive thoughts a week later.

8. Vanessa Roman and Margaret Kosoyan

M.S. MSN-PMHNP

Suicidal Ideation and Suicide Risk Factors Among the Transgender Population

Faculty Mentor: Dr. Talato Kabore

Gender identity is a fundamental and complex part of one's identity. There is a high prevalence of suicide and suicidal ideation within the trans community due to various social, economic, and environmental challenges. The Minority Stress Model (Meyer, 2023) is the foundation to explain the contribution of internal and external factors impacting research outcomes based on the data collected from transgender individuals in Los Angeles County. A mixed-methods design explores how internal factors such as mental health status, gender identity, and internalized transphobia, along with external factors like discrimination and social support, influence suicidal ideation and suicide attempts. The correlational analysis approach will identify predictors, while the phenomenological approach will highlight common themes driving these adverse outcomes. Findings are expected to reveal essential relationships between internal and external factors, offering valuable insight into how healthcare providers can more effectively address the needs of the transgender population and reduce suicide risk. By identifying these barriers, the research seeks to guide policies that improve gender-affirming care and mental health services for transgender individuals, aiding in reducing health disparities within this vulnerable population.

9. Ivan Farias-Martinez

M.S. Kinesiology

The Effects of Physical Activity Intervention on Motor Skills in Adults with Autism Spectrum Disorder: A Meta-analysis

Faculty Mentor: Dr. Ming-Chih 'Darren' Sung

Motor skill deficits are common in individuals with autism spectrum disorder (ASD), yet they receive less attention than social and communication challenges. Impaired motor skills can affect daily activities, independence, and overall quality of life. Physical activity has been suggested as a strategy to enhance motor skills, but its effectiveness in adults with ASD remains unclear. Thus, the purpose of this study was to examine the overall effect of physical activity interventions on motor skills in adults with ASD. Four databases (PubMed, ERIC, PsycInfo, and SPORTDiscus) were searched for relevant literature using keywords representing physical activity interventions and motor skills in adults with ASD. Studies were included if they implemented physical activity interventions, measured motor skills, and used a pre- and post-test design. A total of 1,208 articles were identified, and six met the inclusion criteria. Effect sizes were calculated using Hedges' g. Results showed a significant medium effect of physical activity interventions on motor skills in adults with ASD under the random-effects model ($g = 0.59$, $SE = 0.24$, $p = .015$, 95% CI [0.12, 1.06]). These findings suggest that engaging in physical activity may be an effective strategy for improving motor skills in adults with ASD.

10. Andrew Impomeni

B.A. Psychology

The Mediating Role of Mindfulness in Race/Ethnicity and Anxiety in College Students

Faculty Mentor: Dr. Dylan Aguirre

This study examined how mindfulness mediates the relationship between race/ethnicity and anxiety levels. It was hypothesized that: 1) Latinx/Hispanic college students would report lower levels of mindfulness compared to non-Latinx/Hispanic college students, 2) lower mindfulness would predict higher anxiety levels, and 3) mindfulness would mediate the relationship between race/ethnicity (Latinx vs. Non-Latinx) and anxiety, with lower mindfulness explaining higher anxiety levels among Latinx students compared to non-Latinx. Data was collected from undergraduate psychology students at California State University, Northridge ($N = 1,023$) during the 2023–2024 academic year. The Mindful Self-Care Scale and GAD-7 were used as measures. Mediation analysis was conducted using the PROCESS Macro for SPSS, controlling for gender. Results showed that Latinx/Hispanic students reported significantly lower mindfulness compared to non-Latinx/Hispanic students ($b = -6.52$, $p < .001$), with lower mindfulness

significantly predicting higher anxiety (b = -.06, p < .001). The indirect effect of race/ethnicity on anxiety through mindfulness was significant (b = .42, 95% CI = [.20, .64]), while the direct effect of race/ethnicity on anxiety was no longer significant after accounting for mindfulness (b = .45, p = .29). This study opens a window for addressing mental health disparities within Latinx/Hispanic populations via mindfulness-based interventions.

11. Daniela Salazar

B.A. Psychology
The Moderating Role of Gender in the Association Between Growth Mindset and Math Anxiety
Faculty Mentor: Dr. Corinne Bower

With math anxiety affecting many students, this study investigates how a growth mindset influences it, particularly in relation to gender differences. Prior research has shown that fostering a growth mindset can significantly reduce math anxiety and improve math self-efficacy (Samuel & Warner, 2021). However, little research has examined how this relationship varies between men and women. This study uses a correlational design by analyzing data from male and female participants to examine the strength of the relationship between math anxiety and growth mindset. Results revealed a significant negative correlation for both genders, with men showing a stronger correlation (r = -0.91, p = 0.002) than women (r = -0.52, p = 0.003). A Fisher's Z test confirmed that the difference was statistically significant (Z = -1.97, p = 0.025). These findings suggest that while a growth mindset is associated with reduced math anxiety across genders, the relationship is stronger for men. This highlights the need for gender-specific approaches and culturally informed strategies. Future research should explore the reasonings driving this disparity, focusing on how cultural identity and systematic factors influence the relationship. Additionally, integrating growth mindset practices into curricula and teacher training can promote equity and support diverse populations.

12. Gabriel Alaniz

M.A. Psychology
Conformity at a Cost: Code-Switching and Its Mental Health Implications for Muslim Americans
Faculty Mentor: Dr. Dana Saifan

Extensive research explores emotional and psychological risks associated with estrangement among bicultural individuals. However, limited understanding exists regarding the socioecological conditions contributing to these risks. Muslim Americans experience unique stigmatization amid prevalent Islamophobia in the United States, placing them at risk for adverse mental health outcomes. Consequently, they may engage in code-switching across various social contexts in exchange for social inclusion. This study investigated the role of code-switching in predicting mental health, sense of belonging, and help-seeking intentions among Muslim American young adults. Data was drawn from a larger survey. Participants included 277 individuals aged 18-25 (M=21.81, SD=2.25) identifying as either Arab (50.2%) or South Asian (49.8%). Participants were majority female (80.9%) and second-generation (74.4%). A multivariate regression analysis revealed a significant positive relationship between code-switching and anxiety, b=1.88, SE=.31, p<.001, and depression, b=2.49, SE=.35, p<.001. Additionally, code-switching was negatively associated with help-seeking intentions, b=-.16, SE=.04, p<.001, and belonging within the family, b=-.44, SE=.05, p<.001, the Muslim community, b=-.47, SE=.04, p<.001, and American society, b=-.28, SE=.04, p<.001.These results demonstrate an association between code-switching and worsened mental health, diminished belonging, and reduced help-seeking intentions. These findings highlight the need for culturally inclusive environments that expel the pressures of code-switching.

13. Andrea Gutierrez-Gallardo

B.A. Psychology
Social Status & Anxiety in Muslim American Young Adults
Faculty Mentor: Dr. Dana Saifan

Individuals who come from a lower socioeconomic status are generally deprived of the efforts to reduce anxiety (Zvolensky, 2018). Past studies have explored the relationship between socioeconomic status and other mental health disorders, yet there was minimal research that examined how an individual's socioeconomic status related to anxiety. Data was gathered from August to November 2020 using a 20-25 minute online survey of 277 Arab and South Asian Muslim American young adults ages 18-25 (M =21.86, SD =2.29). The study aimed to answer the following research question: How does socioeconomic status predict self-reported anxiety problems? We also examined demographic factors such as immigrant generational status, gender, ethnicity, and age. Socioeconomic status negatively predicted anxiety scores (b = -.78, SE = .20, p < .001). There are significant implications of the need for more mental health services in lower socioeconomic communities.

14. Kenobi Donart, Zarife Agin, and Mei Ku

M.S. Psychology; B.A. Psychology; M.A. Psychology
Stressful life events and mental health: Emotion dysregulation accounts for depression, anxiety, and stress symptoms
Faculty Mentor: Dr. Yvette Z. Szabo

Exposure to stressful life events (SLEs; e.g., abuse, car

accidents) is linked to mental health. Difficulties in emotion regulation (ER), or trouble managing emotional experiences, play a key role in associations between SLEs and mental health. This study examines if ER difficulties account for the relationship between SLEs and psychological distress and identifies specific ER domains underlying this relationship. Participants were 198 adults (Mage=19.95, range 18-30), majority Hispanic (84.5%) and female (72.3%). Participants completed online measures of SLEs, ER difficulties, and psychological distress. Exposure to SLEs correlated with global ER difficulties, as well as the domains of nonacceptance of emotions, impulse difficulties, and access to ER strategies. ER difficulties were also significantly correlated with distress. Global ER difficulties partially accounted for the relationship between SLEs and distress ($p < .001$, 29.8% mediated), as did all domains of ER examined. This study extends prior research linking ER difficulties to the relationship between SLEs and mental health. Nonacceptance of emotions, impulse control difficulties, and limited access to ER strategies were particularly important. Interventions targeting these specific ER domains may reduce psychological distress. Replication is needed; future research should examine patterns between ER and mental health among both clinical and non-clinical samples over time.

15. Selvin Aguilar

M.A. Psychology

Finding the Sweet Spot

Faculty Mentor: Dr. Debra Moreno Garcia

The effects of higher education stress on college students can hinder their ability to engage in behaviors that promote positive well-being. However, prosociality may help mitigate these effects and boost overall mental health. Thus, this study aim was to predict the influence of *prosocial behaviors*, *academic stress*, and *year in school* on minority college student well-being. 249 college students aged 18-35 and predominantly Latino, participated in this study. The majority (38%) reported their school status as seniors. Using a multiple regression analysis, the study measured the three predictor variables on the PITT Well-Being scale. These variables all statistically significantly predicted students' well-being, $F (3, 153) = 13.507$, $p < .001$, $R^2 = .209$. Prosocial behavior was the strongest predictor in the model, contributing 33% to students' well-being. Interestingly, academic stress contributed -32.6 % as a negative predictor, demonstrating that the more stressed students are, the lower their well-being score. Study results support previous findings that higher education stress induced by "tight deadlines" and "workload pressure," for example, impairs well-being, while prosociality alleviates the negative impact of these stressors. Findings suggest that acts of kindness and community involvement may serve as a cost-effective strategy to enhance students' well-being and reduce stress.

16. Marilu Medrano, Yazzmine Deleon, and Erik Vargas

B.A. Psychology

From Selfies to Self-Esteem: The Effects of Social Media on Adolescent Girls

Faculty Mentor: Dr. Debra Moreno-Garcia

As social media usage continues to grow among adolescents and emerging adults, concerns about its impact on mental health and psychosocial development have escalated. Previous findings have shown that early exposure to social media can lead to negative self-perceptions, contributing to issues of low self-esteem, anxiety, and identity confusion, potentially leading to dangerous consequences such as suicide ideation. The current study examines the relationship between social media use and self-esteem in adolescent females, hypothesizing that higher social media engagement negatively impacts self-esteem and early psychosocial development. A total of N=147 female participants, ages 18-25, were surveyed regarding their social media habits during adolescence and their current self-esteem. To measure perceptions of psychosocial development, they viewed a TikTok video of premature psychosocial development. A one-way Multivariate Analysis of Variance was conducted to examine the relationship between social media use and psychosocial development and self-esteem. Results showed a significant impact of social media use on self-esteem [$F=(2,144)=9.71$, $p<.001$]. Late adolescents with high social media usage have a higher sense of self-esteem. These findings suggest that emerging adults garner self-validation and worth in social media spaces, which, in turn, heightens their self-esteem. Thus, the pursuit of self-validation persists within social media.

17. Lisette G. Bailey and Evelyn Mojarro-Pedroza

M.A. Psychology; B.A. Psychology

Voting Trends Among Hispanic Americans: A Comparative Study of 2016 through 2022 Was "Latinos for Trump" a real change in voting behavior or media sensationalism?

Faculty Mentor: Dr. Heidi Riggio

Hispanic communities are some of the fastest-growing groups within the United States and are expected to become an increasingly decisive factor in future elections. Understanding what motivates these communities to vote on policies is essential for developing those policies. During the 2024 presidential election, the media suggested that large groups of Hispanic voters were shifting from supporting

Democratic candidates and policies to Republican ones. Using data from the U.S. Census Bureau's Voting and Registration Data, the American National Election Studies (ANES), and Pew Research voter exit polls, we are conducting a secondary data analysis to determine whether there was, in fact, an increase in Hispanic voters moving from Democratic to Republican candidates. Additionally, we will examine any commonalities within the Hispanic Republican community, such as annual income, education level, gender, or marital status. We predict that the media exaggerated the shift and that those individuals who do vote Republican share certain commonalities that may explain their voting choices beyond ethnicity alone.

18. Evelyn Mojarro-Pedroza, Shelby Detweiler, and Lisette Bailey

B.A. Psychology; M.A. Psychology
Permissive Parenting Style and Antisocial Personality
Faculty Mentor: Dr. Heidi Riggio

From the 1960s to today, parenting styles have had a significant influence on the development of children's personalities, and the permissive parenting style has often been left out of most research. Previous literature has indicated that permissive parenting style is correlated with many negative personality outcomes. However, this research is mainly focused on children and adolescents, not adults. The current study investigates the relationship between the permissive parenting style and personality outcomes relating to social functioning. The primary hypothesis is that being raised with a permissive parenting style will result in antisocial personality traits. This study was set up as a correlational design connecting permissive parenting style, narcissism, social desirability, and social interest. Participants (n = 320) were recruited through psychology courses at CalStateLA and were given an online survey for 1% extra credit. It was expected that permissive parenting would have positive correlations with narcissism and negative correlations with social desirability and social interest, which was partially supported by multiple regression analysis. In conclusion, it is suggested that permissive parenting style can lead to the development of maladaptive social functioning. These results establish the importance of more up-to-date research into permissive parenting style and personality outcomes in adulthood.

19. Sara Cruz and Carmine Escamilla

M.S. Counseling, Specialization in Rehabilitation
Further Investigations on Challenges that Black Americans with Bipolar Disorders are Facing During the Diagnostic and Treatment Processes
Faculty Mentor: Dr. Cailine Kim

The following research project examined the various challenges faced by the Black community concerning bipolar disorders, particularly in the diagnosis and treatment processes. Previous studies indicate that bipolar disorders are among the most difficult conditions to diagnose and treat. The diagnostic process is often complicated by issues such as symptom overlap with other psychiatric conditions and a predominance of depressive symptoms over manic or hypomanic symptoms, which can hinder access to appropriate therapeutic services. More significantly, Black individuals encounter additional socioeconomic, cultural, and systemic barriers when seeking diagnosis and treatment. Using a systematic review approach, our project aimed to further explore these unique challenges. Specifically, our findings revealed that counselors' racial biases and high comorbidity rates among Black individuals suffering from substance use negatively influenced the diagnostic process, leading to higher rates of misdiagnosis within the Black community. Additionally, our project discovered that Black individuals' reluctance to adhere to treatment may be exacerbated by their mistrust of the healthcare system, which stems from historical experiences of racism. Further research should investigate the impact of race on the diagnosis and treatment of bipolar disorders to help educate clinicians in addressing these barriers and ultimately enhance the quality of care they provide.

20. Julie Diaz

M.A. Chicana(o) and Latina(o) Studies
The Oaxacan Experience and Utilization of Curanderismo in Los Angeles, examining the efforts to healthcare access
Faculty Mentors: Dr. Lani Cupchoy and Dr. Sandra J Gutierrez De Jesus

The Oaxacan experience and utilization of Curanderismo in Los Angeles and the efforts to access healthcare. This research challenges traditional Western medicine and examines the radical approach to healing through holistic healing that heals the mind, body, and spirit in the Los Angeles-Oaxacan community. The Latinx community in the U.S. is often overlooked and the access to health care is often unfeasible due to various factors such as citizenship status, language barriers, and health insurance. It is important to bring awareness to cultural practices and how they can prompt wellness through holistic healing. Exploring and understanding the various methods the Oaxacan community practices to heal and community build. Through oral history data,

such as testimonies, this research examines what beneficial tools are being used to prompt health and wellness. Taking a qualitative approach, I relied on testimonies to give an insight into the sacred practices of holistic healing that are utilized in the Oaxacan community. Community members shared remedies to heal and how the healing process can positively impact the mind. It is crucial for community change that we understand the history of our ancestors and the connection it has to contemporary issues in society.

21. Kylee Q. Robinson

M.F.A. Television, Film, and Theatre (Option: Writing)
In the Beginning: An Artist's Genesis
Faculty Mentors: Dr. Karyn Lawrence, Dr. Randee Trabitz, and Dr. Ligiah Villalobos

Humans share similar chapters and experiences throughout their lives – love, sex, joy, grief, death, faith/lack of faith in God. The genesis of all human experiences was biblically recorded depicting the first man and first woman, although the life of the first woman is hardly expanded upon. Eve was a full person, with real wants and thoughts and choices. In the modern day, we have historical stories and personal testimonies we can draw upon to understand how one might survive the loss of a loved one, or what to expect when expecting. Eve would have had no reference about how to navigate the challenges of a hard and sometimes unfair life once God cast her and Adam out of the Garden of Eden. This play focuses on Eve's journey from an adolescent child in the Garden to a great-great-grandmother to humanity in the Desert, questioning her Father, the Creator, and her goodness in His "perfect" world. She ultimately wants to answer the questions, "Who am I?" and "Why am I here?" This play is meant to tell Eve's story, challenge God's perfect design, and remind the audience that even when life feels bad, it is good.

22. Christian Martinez

B.S. Microbiology

Building a Plasmonic Electrochemical Microscopy System for Real-Time Imaging of Neurotransmitter Release

Faculty Mentor: Dr. Yixian Wang

Dopamine is a critical neurotransmitter for many systems in the body and is responsible for many physiological actions in the brain. A deviation from our body's baseline, specifically low levels of Dopamine, can result in many neurodegenerative diseases, such as Parkinson's disease, depression, and Alzheimer's disease. Previous studies successfully introduced unique approaches for detecting dopamine release from PC12 cells with high sensitivity. However, each method includes drawbacks such as labels, cost, labor-intensive, or sacrificing sensitivity for selectivity. Utilizing a novel Plasmonic Electrochemical (PEM) system, research was conducted to achieve optimal electrochemical sensing signals utilizing SHSY5Y neuroblastoma cells. This study explores two methods for potential detection of dopamine release using PEM coupled with Cyclic Voltammetry. Method 1 utilized human neuroblastoma cells adhered to a glass slide 100 µm above the sensor, while Method 2 involved directly seeding human neuroblastoma cells onto a mesoporous silica-coated gold chip. Redox cycles were successfully measured in both setups indicating electrochemical signal; however, challenges such as signal attenuation, ohmic resistance, and collagen interference were identified. Future improvements include segmenting gold chips to reduce ion travel distances and using direct electrode connections to enhance signal accuracy. These modifications aim to optimize PEM for sensitive and selective dopamine detection.

23. Tshering Y. Bhutia

B.A. Psychology

Optimizing tissue clearing protocols to investigate three-dimensional circuits in rodent spinal cord following injury

Faculty Mentor: Dr. Michael Selvan Joseph

Spinal cord injuries (SCI) can cause severe motor and sensory impairments, including paralysis. While locomotor training through repetitive motion improves stepping ability, the mechanisms of recovery remain unclear. Tissue-clearing protocols provide unique insights by allowing cell localization and could help in uncovering mechanisms behind SCI recovery. Using an adapted version of the Passive CLARITY Technique (PACT) and System-Wide control of Interaction time and kinetics of Chemicals (SWITCH) protocols to create three-dimensional images of our tissues using light-sheet microscopy. Our preliminary results demonstrate successful clearing of post-fixed rat spinal cord (SC) tissue, with clear imaging of glial cells marked by glial fibrillary acidic protein (GFAP) and neurons indicated by neuronal nuclei (NeuN). Currently, we are clearing a mouse spinal cord with a complete transection injury subjected to a small muscle circuit test to measure spinal learning, known as the Paw Withdrawal Learning (PaWL) protocol. By labelling known learning markers in the brain: proto-onco gene CFOS and Calcium/calmodulin-dependent protein kinase II (CaM-KII), as well as special interneuron ChX-10, we aim to investigate learning occurring within the SC. Subsequently, signaling of our labeled proteins would therefore demonstrate learning within the spinal cord post-injury, offering insights for improved rehabilitation strategies.

24. Robert Juarez, Elijah Ortiz, Lisya Tanujaya, and India Wesley-Cardwell

B.S. Biology; B.S Biochemistry

A comprehensive analysis of methods for the preparation of histology samples

Faculty mentor: Dr. Jinae Roa

Histology is a powerful biomedical technique used to study complex biological systems. In general, histology technicians prepare thin tissue sections for microscopic examination, and job growth for clinical histology technicians is among the highest for any occupation as the health of an aging population increasingly relies on histology-based diagnostic medicine. In non-human research, histology is used less as diagnostic tool and more as a comparative tool for exploring cellular, tissue, and whole-animal physiology. However, histology protocols can vary depending on tissue type, size, preservation state, etc.; and altering one step in the protocol can significantly decrease the overall efficacy of the process. Here, we explore techniques to increase the viability of our histological sections by using (1) specialty microscope slides, (2) heated water baths, and (3) overnight plate warmer incubation. At the end of this project our goal is to have an optimized tissue histology protocol that can be used to successfully investigate the

tissue physiology of marine animals.

25. Lauren Hill

M.S. Environmental Science, Environmental Biology
Population structure and breeding origins of two songbird species migrating through a Southern California mountain pass
Faculty Mentor: Dr. Eric Wood

This study examines migratory bird population structure along the Pacific Flyway in an understudied region, emphasizing the linkages between a newly recognized avian migratory corridor in Southern California and probable breeding destinations for avian migrants using this passageway. Each spring, Bear Divide funnels tens of thousands of birds through a narrow, low-elevation mountain pass in Los Angeles County. Combining four years of bird banding data and high-resolution genetic markers from DNA extracted from tail feathers collected from two long-distance migratory songbird species, the Wilson's Warbler (Cardellina pusilla) and Yellow Warbler (Setophaga petechia) that passed through Bear Divide between springs 2021-2024, this study will leverage and build upon the Bird Genoscape Project's existing genoscape database to 1) Examine the genetic population structure and probable breeding origins of Wilson's and Yellow Warblers at Bear Divide, 2) Compare passage timing between species and sub-populations, as well as across years, and 3) Identify differences in migratory body condition and morphometrics of species and sub-populations. As both species face population declines and are of special conservation concern, identifying which genetically distinct populations migrate through Bear Divide is essential for understanding their migratory behaviors, population statuses, and spatial distributions, while also addressing gaps in knowledge.

26. Jennifer Flores

B.S. Biology, Option in Microbiology
Investigating the Effect of Nanoplastics on SH-SY5Y Cells through Scanning Ion Conductance Microscopy
Faculty Mentor: Dr. Yixian Wang

Nanoplastics (NPs), synthetic polymers ranging from 1 nanometer to 1 micrometer, are prevalent everywhere and pose risks to human health and the environment. NPs are directly released or derived from the degradation of plastics. Due to their size, nanoplastics can be easily ingested, inhaled, or absorbed through the skin, entering tissues and crossing biological barriers like the blood-brain barrier. Studies suggest nanoplastics may induce oxidative stress, inflammation, and cytotoxicity, affecting cellular function; the full extent of their effects remains uncertain, necessitating further research. This study examines nanoplastics' effect on the cell membrane of SH-SY5Y neuroblastoma cells using scanning ion conductance microscopy (SICM). SICM is a high-resolution imaging technique used to study the topography of soft, non-conductive biological samples in aqueous environments. In this study, the cells were treated with increasing concentrations of commercial 30nm carboxylate-modified polystyrene NPs for 1-hour before fixing and performing SICM. Resulted images show that higher NP concentrations caused increased roughness and membrane damage. Future studies will explore polyethylene NPs. This research was funded by the National Institute of Health Academic Research Enhancement Award (NIH R15NS120157). CSU-LSAMP is funded through the National Science Foundation (NSF) under grant #HRD-2308501 and the Chancellor's Office of the California State University.

27. Sophia Diaz

M.S. Biological Sciences
Comparative DNA Barcoding Analysis of Ostracod Crustacean Gut
Faculty Mentor: Dr. Elizabeth Torres

Micro-invertebrates are key contributors to marine ecosystem functioning, as they inhabit every marine niche and maintain biological communities. Ecological relationships are largely understudied for many marine micro-invertebrates, including cypridinid ostracod crustaceans. The species-specific bioluminescent mating behaviors of some Caribbean cypridinids are thought to be the main driver of speciation, leading to high biodiversity. However, ecological factors like diet, habitat, and dispersal can also play a role in the formation of new species. Little is known about cypridinid diets or the habitats that they occupy during the day. This project is the first to use DNA sequencing and microscopy to identify the gut contents of cypridinids. Six cypridinid ostracod species from Panama and California were subjected to gut content analysis. DNA sequencing results were successful for all study species, showing variation in fish, algal, and invertebrate gut contents across all six species. No significant dietary patterns related to geography, habitat, or bioluminescence have been determined and we are currently troubleshooting microscopy methods to visualize gut contents. Characterizing the diet of cypridinids is foundational to the understanding of ostracod ecology as a potential contribution to speciation.

28. Ricard Cipian

B.A. Philosophy
Reactivation of HHV6A and EBV in Young Adults: A Potential Trigger for Multiple Sclerosis
Faculty Mentor: Dr. Mohammad Baroon

The prevailing view for the onset of Multiple Sclerosis is that it is an "outside-in" driven pathology. It's believed

that primary infection with Epstein Barr Virus (EBV) in those with a genetic susceptibility to MS, drives the production of auto-reactive B cells that infiltrate the Central Nervous System from the periphery and seed the CNS with EBV. Upon infection of the CNS with EBV, an autoimmune response to the brain from the periphery leads to MS diagnosis and neurodegeneration. We propose an “Inside Out” model of MS genesis where HHV6-A is responsible for the earliest histological findings observed in MS lesions and the development of the Wilkins lesion where debris from cellular injury induced by HHV6-A replication leading to the development of autoimmune processes to neuronal proteins like myelin, setting a precedent for MS development. Human herpesvirus 6A (HHV6A) is ubiquitous and undergoes latent and periodic reactivation in the cerebral compartment of young adults. This reactivation may contribute to the development of gliopathy, a dying-back phenomenon characterized by swelling of the inner lamella of the axon, demyelination, apoptosis, or necroptosis of oligodendrocytes (ODC’s) and their precursors as suggested by Theiler's Murine Encephalomyelitis Virus (TMEV) animal Experimental Allergic Encephalomyelitis (EAE) model.

29. Marilyn Heidecker

B.S. Biochemistry

Gas Chromatography Paired with Time-Of-Flight Mass Spectrometry (GC-TOFMS) Analysis of Cholesterol and Squalene in Aged Latent Fingerprints by Exposure to Different Light Sources

Faculty Mentor: Dr. Petr Vozka

Fingerprint evidence has been used for identifying suspects and accomplices at a crime scene for over a century. However, more information could be inferred from latent fingerprints to gain the most from criminal evidence, especially when they have a compromised ridge pattern. By tracking the degradation of chemical components in fingerprint residue, an aging model could be developed to help investigators create a time frame for the crime. Researchers have attempted other approaches for a predictable model but have yet to overcome the challenges. Our study into the photooxidation behavior of squalene and cholesterol in latent fingerprints over time builds on preliminary research that found similarities in the regression of normalized peak area ratios of squalene and cholesterol from two donors over a nine-week period. We will compare fingerprints from three donors aged over six weeks in three lighting conditions and analyze the target lipids using gas chromatography with time-of-flight mass spectrometry (GC-TOFMS).

30. Isabel A. Garcia

M.S. Chemistry

Evaluating the Effect of Polystyrene Nanoplastics on the Abnormal Aggregation of Alpha Synuclein

Faculty Mentor: Dr. Yixian Wang

Alpha-synuclein, a protein recently linked to Parkinson’s Disease, is typically found in its monomeric state but can aggregate into toxic oligomeric or fibril forms that contribute to neuronal cell death. Research indicates that alpha-synuclein aggregation can be triggered by various factors, including oxidative stress and environmental toxins. Very limited studies have investigated the possible contribution from nanoplastic pollution to this. Understanding this mechanism is crucial for revealing how nanoplastics might influence cellular health and potentially accelerate the development and progression of Parkinson’s Disease. This project aims to investigate the impact of nanoplastics on the abnormal aggregation of alpha-synuclein. Specifically, the aggregation of monomeric alpha-synuclein, both in the presence and absence of nanoplastics 0.03 μm carboxylate-modified polystyrene nanoplastics, was analyzed. Aggregates were characterized using Atomic Force Microscopy (AFM) and Circular Dichroism (CD) spectroscopy. The results showed that, over a six-day period, the observed results were contradictory to those reported in literature. While fibrils and aggregates are shown in the protein samples, those with nanoplastics observed little to no fibrils or aggregates present. This project is supported by the CSUBIOTECH 2024 Faculty-Graduate Student Research Collaboration Grant Program and the MORE Bridges to the PhD Program, and NIH (R15NS120157).

31. Karolina Bielec

B.S. Biology

Critical Angle Reflection Imaging for Electrochemical Detection of Dopamine

Faculty Mentor: Dr. Yixian Wang

Dopamine is a vital neurotransmitter involved in regulating physiological and behavioral functions, including mood, motor control, and decision-making. Disruptions in dopamine levels are associated with various neuropsychiatric disorders. While electrochemical sensing is a widely used method for dopamine detection, optical techniques provide real-time imaging of dopamine concentration variations. One such technique, critical angle reflection imaging (CARi), uses total internal reflection (TIR) at material interfaces for highly sensitive surface imaging. In CARi, collimated light reflects off a sensor chip, and a detection camera captures images based on refractive index changes near the surface. This project focuses on developing and optimizing EC-CARi for simultaneous optical and electrochemical dopamine sensing, with enhanced sensitivity achieved through platinum black sensor

modification. Indium tin oxide (ITO)-coated glass coverslips have been identified as effective sensors, successfully generating CAR signals and measuring redox reactions. Dopamine is introduced into a bulk solution with minimal spatial heterogeneity to validate the system's ability to capture electrochemical and optical signals. To further enhance sensitivity, the sensor surface is modified using electrochemically deposited platinum black, a material known to improve sensor activity, aiming to create a robust and efficient platform for dopamine detection.

32. Alfredo Gonzalez, Jaelyn Asamoah, and Aiden Reyes

M.S. Chemistry; B.S. Biochemistry, B.S. Biological Sciences

Investigating the Relationship Between Thermal Hysteresis and Ice Recrystallization Inhibition Activity in Hyperactive Insect Antifreeze Protein Mutants

Faculty Mentor: Dr. Xin Wen

During cryopreservation, large ice crystals grow at the expense of smaller ones, resulting in grain coarsening, known as ice recrystallization (IR). This thermodynamically favorable process is driven by differences in surface energy, as smaller crystals are less stable than larger ones. IR is associated with cellular damage during cryopreservation, therefore, molecules capable of preventing IR are being investigated for their ability to serve as cryoprotective agents (CPAs). Antifreeze proteins (AFPs) are one of nature's survival strategies in cold environments that can inhibit ice crystal growth by binding to specific ice crystal surfaces. Hyperactive AFPs, such as those from terrestrial arthropods, can non-colligatively lower water's freezing point without significantly affecting its melting point, a phenomenon called thermal hysteresis (TH). However, the ice recrystallization inhibition (IRI) activity of some hyperactive AFPs remains uncharacterized, and the relationship between TH and IRI is poorly understood. Here we use a splat cooling assay to investigate the IRI activity of a hyperactive AFP from *Dendroides canadensis* (DAFP-1). Additionally, DAFP-1 mutants with reduced and doubled TH activity were analyzed to explore the link between TH and IRI. These findings advance our understanding of AFP cryoprotection mechanisms and aid in developing novel CPAs for biomedical and industrial applications.

33. Puron Rahman

M.S. Chemistry

Inhibitory Effects of a Beetle Urine Antifreeze Protein on Human Kidney Stones

Faculty Mentor: Dr. Xin Wen

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 Dendroides canadensis are similar, however, no stones have been found in D. canadensis. Antifreeze proteins (AFPs) found in many organisms are known to lower the freezing temperature of the body fluids of the organisms and inhibit ice growth. Only four in hemolymphs, which are DAFP-1, DAFP-2, DAFP-4, and DAFP-6. Our previous studies showed that the isoform, DAFP-1, can effectively inhibit the crystallization of a hemolymph sugar, trehalose, in the beetle. Interestingly, DAFP-6 is the only hemolymph DAFP also found in the beetle's urine. We hypothesize that DAFP-6 can inhibit the formation of CaOx. Bovine serum albumin (BSA) was used as a protein control in this study. The CaOx stones were then collected and analyzed using microscopy and gravimetric methods. Furthermore, the forms of the CaOx stones were analyzed using Fourier-transform infrared (FT-IR) spectroscopy. This study suggests a potential use of beetle proteins in inhibiting human kidney stones.

34. Alexcia Marie Garcia and Janida Williams

B.S. Biological Sciences; B.S. Public Health

The impact of Conventional Microwave exposure on the purification of DAFP-1

Faculty Mentor: Dr. Xin Wen

This experiment investigates how a conventional microwave is a fast, efficient method for purifying the antifreeze protein DAFP-1. Antifreeze proteins inhibit ice recrystallization through heat stability, allowing them to maintain function at high temperatures around 80º C. Current purification techniques for DAFP-1 are time-consuming and tedious, prompting a conventional microwave as an alternative. This study used microwave irradiation to induce Cell lysis and prioritize our DAFP-1 protein extraction. Results indicated that heating cultured bacteria w/ lysozyme at 6s intervals for a total of 30s is the most optimal for protein recovery and importunity degradation. Increasing microwave heating round twice at 6s intervals has been proven to have no significance. This method offers simple, time-efficient ways for purifying antifreeze proteins.

35. James Che, Anay Rosas, Hannah Mohammadi, and Ashley Choi

B.S. Biochemistry, B.S. Chemistry, B.S. Biological Sciences, and B.S. Microbiology
Comparison of Two Induction Methods to Optimize a Recombinant Antifreeze Protein Expression
Faculty Mentor: Dr. Xin Wen

Antifreeze proteins (AFPs) have wide industrial applications, such as in foods, biopharmaceuticals, and biotechnology. Due to its high demand, the hyperactive AFP from Dendroides canadensis (DAFP-1) is often produced recombinantly in Escherichia coli (E. coli) where its expression inside the host often relies on the addition of isopropyl β-D-thiogalactopyranoside (IPTG) when the host reaches a specific growth stage. As an induction agent, IPTG mimics lactose binding to the lac operon to release from the bacteria's promoter, enabling RNA polymerase to initiate translation of the gene of interest, when the host reaches a specific growth stage. However, this method requires continuously monitoring cell growths, which can be time-consuming and labor-intensive for large-scale protein production. In this project, we apply autoinduction method by taking the advantages of E. coli's preference for glucose over lactose. The combination of glucose and lactose are used to replace the step of adding IPTG to induce the gene of dafp-1. The results of the two methods (IPTG vs auto-induction) are compared. The production of the hyperactive DAFP-1 is further optimized.

36. Parker Saikley

B.S. Microbiology
Investigating the Role for Rbp2 in the regulation of the circadian clock in cyanobacteria
Faculty Mentor: Dr. Susan Cohen

Circadian rhythms are biological processes that follow an approximately 24-hour cycle and govern a wide range of physiological functions. Cyanobacteria are the simplest system in which circadian rhythms have been rigorously tested, where *Synechococcus elongatus* is the model system for elucidating the molecular details of the clock. These rhythms are regulated by a core oscillator comprised of KaiA, KaiB, and KaiC proteins. This oscillator drives global gene expression patterns, regulates cell division, and facilitates natural transformation. Using fluorescent fusion proteins, it was found that during the day, KaiC is found diffused throughout the cell, while at night, KaiC localizes to the cell pole. Recent studies have shown that the RNA-binding protein Rbp2 is critical in maintaining KaiC's localization to the cell pole. Deleting *rbp2* results in a longer circadian period and disrupts the nighttime localization of KaiC highlighting its importance. Rbp2 has also shown to co-localize with KaiC at night. Here we investigate the KaiC-Rbp2 association using fluorescence microscopy. Specifically, we are interested in how RNA(s) influences the interaction between KaiC and Rbp2. Using mutant variants of Rbp2 that disrupt the RNA-Binding activity, Rbp2-R42A-F44A-F46A, we found that Rbp2 localization to the cell poles is severely reduced.

37. Javier Ramirez and Heidi Silvas

B.S. Biological Sciences; B.S. Molecular Cellular and Developmental Biology
Characterizing the Function and Location of Extra Cellular Matrix Protein in Fruit Fly Genital Structures
Faculty Mentor: Dr. Ben Vincent

Animal body parts develop because their cells receive instructions from the genome. The process of forming body parts with particular shapes can be studied in fruit flies: they develop quickly, and their structures can be quantified using microscopy. Fruit flies can also be manipulated genetically – RNA interference disrupts specific genes within structures, and *in situ* hybridization labels RNA in tissues. We have found that the extracellular matrix (ECM) defines the shape of a particular genital structure called the posterior lobe, and disrupting the ECM protein Dumpy has a dramatic effect on this structure. There are other ECM proteins that exist in the fruit fly genome and are expressed in genitalia; however, the function and precise location of these genes has yet to be measured. In this study, we will use RNA interference and *in situ* hybridization to determine whether different ECM genes play a role in genital development, and whether that role is the same between genes. We anticipate that these experiments will more precisely define the role of ECM proteins in animal development, which may be useful for understanding the function of their human homologs and how that function is disrupted in disease.

38. Maximilian Mobley

M.S. Molecular Microbiology
Characterizing the relationship between KtrA and the core oscillating proteins of Synechococcus elongatus
Faculty Mentor: Dr. Susan Cohen

The circadian clock is the internal timekeeping mechanism of an organism which allows the organism to be able to anticipate the daily environmental changes due to Earth's rotation. *Synechococcus elongatus* PCC7942 is a freshwater unicellular cyanobacterium and the simplest organisms to have a robustly tested circadian clock. The cyanobacterial circadian clock is composed of the KaiABC complex. Recent studies have identified KtrA as associating with the Kai complex. KtrA functions to regulate potassium transport. The present study aims to fully characterize the relationship of *ktrA* with the core oscillator and determine the role of

potassium in the context of the clock. By inhibiting potassium transport of potassium into the cell with 4-aminopyridine, we observed longer periods of circadian rhythms of gene expression. This lengthening implies a connection between potassium and the circadian clock. Future experiments aim to attach both a Strep and Yellow Fluorescent Protein(YFP) tags to KtrA to verify associations with the oscillator and localization patterns. Finally, we aim to overexpress KtrA by coupling it to an inducible promoter and monitoring the expression of the protein with a luciferase reporter. With these three aims, this study plans to characterize the relationship *ktrA* has with the circadian clock.

39. Zander Milburn

M.S. Biological Sciences
Identifying the RNA(s) molecules associated with Rbp2 throughout the circadian cycle in cyanobacteria
Faculty Mentor: Dr. Susan Cohen

Among prokaryotes, cyanobacteria are distinct in possessing a well-characterized and robust circadian clock, with *Synechococcus elongatus* PCC 7942 serving as a model organism for exploring the molecular mechanisms of this biological rhythm. Circadian rhythms are governed by a 24-hour biological cycle and are essential for optimizing cellular fitness in response to environmental fluctuations. In cyanobacteria, the circadian clock is driven by the interaction of three core proteins: KaiA, KaiB, and KaiC. These oscillator proteins control various cellular processes such as global gene expression which is done through rhythmic phosphorylation and dephosphorylation cycles of KaiC. Our lab has previously identified RNA-binding protein 2 (Rbp2) as a pivotal component of the circadian clock in S. elongatus. Rbp2 is a eukaryotic-like RNA-binding protein with a single RNA recognition motif that has been implicated in an association with KaiC, though this interaction does not occur in vivo implying some other component is required. Deletion of *rbp2* leads to pronounced circadian defects, highlighting its role in sustaining clock functionality. Additionally, expressing Rbp2 point mutants with impaired RNA-binding activity results in long-period rhythms, suggesting that Rbp2's RNA-binding capability is an important aspect in circadian regulation. My research focuses on characterizing the RNA molecules bound by Rbp2 through sequencing approaches.

40. Nidhi Alle and Lorraine Orgaz

B.S. Biochemistry; B.S. Biology
Investigating the role for RNA in the interactions between circadian clock proteins KaiC and Rbp2 in Synechococcus elongatus
Faculty Mentor: Dr. Susan Cohen

Circadian rhythms are biological processes recurring approximately every 24 hours that regulate physiological functions. In cyanobacteria, *Synechococcus elongatus* is used as a model system; these rhythms are driven by a KaiABC core oscillator. Recent studies have shown that the RNA-binding protein Rbp2 associates with KaiC and is important for clock function. The RNA binding activity of Rbp2 is crucial for regulating the circadian clock as either the loss of rpb2 or expression of RNA binding mutants results in various circadian defects. This study investigates the role of RNA in mediating the association with KaiC and Rbp2, using co-immunoprecipitation. Rbp2 was purified at different circadian times using a Strep tag, revealing a peak association with KaiC at dusk. To determine if Rbp2 binding to RNA is needed for its association with KaiC, we analyzed the RNA-binding-deficient mutant Rbp2-Y4A and treated samples with RNase A at 0, 0.2, 0.5, and 1 mg/ml. Both wild-type and mutant Rbp2-Y4A associate with KaiC, indicating RNA binding isn't needed. RNase A treatment boosts the association, suggesting RNA may inhibit it. These findings show RNA binding isn't required for Rbp2's association with KaiC at dusk but may affect downstream processes in circadian clock function.

41. Skellie Orantes Chun

B.A. Chemistry
Investigating the U-to-C and C-to-U RNA editing mechanisms used by synthetic DYW:KP
Faculty Mentor: Dr. Michael Hayes

Sequence-specific RNA and DNA editing tools that convert cytidine to uridine (C-to-U) and adenosine to inosine operate through a hydrolytic deamination mechanism, requiring an active site zinc ion and a glutamate residue. In plant organelles, enzymes containing DYW-PG domains likely catalyze C-to-U editing using this traditional deamination pathway. A synthetic enzyme KP6 from the DYW-KP family has C-to-U RNA editing activity *in vitro*, which was enhanced by the presence of carboxylic acids. However, attempts to observe U-to-C editing by KP6 *in vitro* were unsuccessful, even with the addition of potential amine or amide donors. Also, C-to-U editing and U-to-C editing did not occur simultaneously when a mixture of C and T-target RNAs were added to enzymatic assays, ruling out a pyrimidine transaminase mechanism. Further analysis revealed that RNAs with modified bases from expression of KP6, KP2, and KP3 were significantly enriched in interphase fractions of an acidic guanidinium thiocyanate phenol: chloroform separation, suggesting the formation

of covalent crosslinks with KP proteins. Mass spectrometry analysis of purified KP2 and KP6 proteins showed secondary peaks with mass shifts of 319 Da. This observation led to a proposed U-to-C crosslinking mechanism, where an enzymatic lysine residue attacks the C4 position of uridine.

Education

42. Qiong Wu

M.A. Child Development

Examining Challenges of Chinese Immigrant Male Early Childhood Educators through Acculturation and Cultural Capitals

Faculty Mentor: Dr. Yafen Lo

Facing the dual challenges of being ethnic and gender minorities in the predominantly female field of early childhood education (ECE) in the United States, Chinese immigrant male ECE teachers have shown remarkable dedication and resilience in their professional journeys. This study employs the Community Cultural Wealth (CCW) and Acculturation frameworks to explore the experiences of three Chinese male ECE educators. Through content analysis, it examines how these educators navigate racial and gender-based barriers while identifying the personal and environmental factors that contribute to their persistence and professional fulfillment. Consistent with Su et al. (2009), participants encountered subtle racial microaggressions and often downplayed ethnic biases. However, all three teachers reported facing more significant gender-based barriers than ethnic ones, while also leveraging unique opportunities to challenge gender stereotypes in ECE. They primarily adopted an integration strategy during acculturation, utilizing cultural capitals such as aspirational, linguistic, familial, navigational, social, and transnational resources. These findings challenge Yosso's CCW framework (2005), suggesting the need to redefine "community" for immigrants to include transnational resources, which varied with participants' age and English proficiency. This study underscores the importance of inclusive workplaces to foster diversity, improve retention, and recognize the contributions of underrepresented groups in ECE.

43. Ysabel Jumarang

B.A. Psychology

Parental Awareness of Educational Content in Children's YouTube Videos

Faculty Mentor: Dr. Corinne Bower

It has been found that children ages 0-8 years spend approximately two and a half hours on a screen each day, especially watching online videos (Rideout & Robb, 2020). Parent engagement in learning activities within their home is associated with increases in school readiness (Barnett at al., 2020) and with their children's learning outcomes (Siddiqui, 2023). As such, we explored the extent to which parent awareness of what their child watches on YouTube is related to the educational content in these videos. Through an online survey, parents across the U.S. (N=358) reported the three most recent YouTube videos their child watched and answered demographic questions and YouTube-related questions. For example, parents were asked to rate if they were familiar or not with each of three videos. The content of all of the videos was then coded to be educational or not. The results suggest that the more educational the content, the more awareness parents had about what their child was watching, suggesting that parental awareness may promote access to educational materials. Additionally, parent awareness was negatively correlated with the child's age, possibly reflecting shifting parental monitoring strategies or assumptions about older children's ability to select appropriate content independently.

44. Holly Yee

B.A. Psychology

Open Minds, Open Education Resources: Attitudes and Access in Higher Education

Faculty Mentor: Dr. Austin Attaway

Open Education Resources (OER) are important to offset educational costs. There are not many studies that look into individual components—namely students' attitudes towards OER and none that compare professor and student attitudes towards OER. We hypothesized that positive attitudes will be positively correlated to OER usage for both students (H1a) and professors (H1b) (Otto, 2021; Georgiadou & Kolaxizis, 2019) and that both professors and students have positive attitudes towards OER that are positively correlated to OER usage (Georgiadou & Kolaxizis, 2019; Otto, 2021). We collected cross-sectional survey data using snowball sampling (N = 485), yielding 29 professors and 456 students. There is a significant positive relationship between positive affect and cognition for students, but not professors. No significant relationship was found for professors or students between positive affect and OER use and positive affect and negative affect. The second hypothesis was partially supported with a comparison between professors and students revealing significant differences between groups only on cognition and negative affect. For cognition, separate analyses revealed that this was due to students' positive affect significantly predicting higher scores on the cognitive measure, but not for professors. For negative affect, separate analyses revealed that students scored higher on negative affect than professors.

45. Elizabeth Plascencia and Marie Lassaigne

B.A. Psychology; M.A. Child Development
YouTube's influence on college students' mindset, resilience and perceived parental influence
Faculty Mentor: Dr. Austin Attaway

Bandura's Social Learning theory says that people acquire skills by watching and modeling others (Yilmaz et al., 2019). YouTube provides new ways to learn (Yilmaz et al., 2019), influencing students' mindsets and resilience, while primary caregivers remain the main source of guidance. Parents' views on failure can shape children's mindset (Haimovitz & Dweck, 2016), negative responses can lead to avoidance (Aditomo, 2015). Resilience, the ability to recover from setbacks, plays a role. (Cassidy, 2015; Yeager & Dweck, 2012). Our study investigated the influence of YouTube videos on college students' mindset, resilience, and their relationship with perceived parental intelligence mindset (PPIM), and failure mindset (PPFM). A sample of 156 CSULA students (ages 18-65) watched a 2-minute YouTube video depicting a growth or fixed mindset, completed mindset, resilience, (PPIM) and (PPFM) scales. While no significant changes in mindset or resilience were found, mindset showed a trending increase. Pre-mindset scores positively correlated with PPIM ($r = .308$, $p < .001$), and negatively correlated with PPFM ($r = -.199$, $p = .013$). These findings highlight the potential role of media and parents in shaping student mindsets and resilience.

46. Valeria Valencia, Laura To, and Jocelyn Quintana

M.S. School Psychology
Exploring School Psychology and Special Education Practices in Mexico
Faculty Mentor: Dr. Nicole Garcia

School psychologists play a critical role in supporting immigrant students. Little research has been conducted regarding special education practices in Mexico, and even less in school psychology. Our team developed a survey and utilized snowball sampling to reach practitioners in Mexico in order to gain an understanding of school psychology and special education practices in Mexico. Survey results provide a better description of the current school psychology and special education practices in Mexico, allowing for comparisons with the US. The questions covered demographic information, job responsibilities, and opinions on practitioner roles in fields related to school psychology and special education student supports. Specifically, major comparisons in educational requirements, roles, and expectations have been found. These results provide valuable insight on trends and current school psychology and special education practices in Mexico which assist in filling the gap in existing literature for Mexico practices. This survey serves as a catalyst that encourages further research and partnerships between practitioners in the United States and Mexico.

47. Arpit Vaishya and Robert Garcia

M.S. Computer Science; B.S. Electrical Engineering
Enhancing STEM Success Through Simulations and Innovative Teaching
Faculty Mentors: Dr. Lexi Hwang, Dr. Jeffrey Santner, and Dr. Leo Hong

Traditional chemistry courses often fail to meet the unique needs of engineering students, making it challenging for them to connect foundational concepts to real-world scientific problems. To address this gap, the NSF-funded SPACE program integrates computational modeling and real-time simulations to bring chemistry concepts to life. These tools provide dynamic visualizations of molecular and atomic interactions, enhancing students' conceptual understanding, engagement, and application of knowledge. Over two years, the program was piloted at CSULA with 23-25 students per cohort in a first-year chemistry course. Combining evidence-based strategies with an asset-based approach, the program focuses on building students' confidence, motivation, and sense of belonging in STEM. Preliminary findings based on pre- and post-surveys, progress tracking, and student feedback revealed significant gains in STEM identity, interest, and performance. Students also demonstrated improved problem-solving skills and a deeper understanding of chemical reactions, with measurable growth ($p<0.05$). Positive learning experiences, including hands-on activities and peer collaboration, further encouraged students' persistence in STEM fields. The program offers a replicable model for creating inclusive STEM education, bridging foundational chemistry learning with practical engineering applications. The presentation showcases the potential of integrating simulations with innovative teaching methods to support freshmen engineering students who are underserved in STEM.

48. Daniel Yang

B.S. Biological Sciences
Development of undergraduate teaching lab manual: Multiple Heavy Metal Detection via Anodic Stripping Voltammetry
Faculty Mentor: Dr. Yixian Wang

Heavy metals such as mercury and lead are pollutants widely spread throughout the environment. Due to growing concerns with heavy metal levels in water

sources, the field of heavy metal detection is currently undergoing massive changes. This includes the use of electrochemical methods such as anodic stripping voltammetry (ASV), which can detect heavy metals in parts per billion (ppb) and parts per trillion (ppt). Anodic stripping voltammetry also has the advantage of being cheap, affordable, and portable. Thus, we designed an undergraduate electrochemistry lab for CHEM 4530 to teach the importance of heavy metal detection, the principles of ASV, techniques for detecting multiple analytes in one experiment, and the operation of the PSTrace electrochemical software. The manual was adapted from the PalmSens manual “Detection of Multiple heavy metals by Stripping Voltammetry” and improved upon after running multiple test experiments. Changes in sample pH, deposition time, and experimental parameters were made to optimize the manual for reproducibility and ease of use. The lab was carried out in Fall 2024, and students received mixed outcomes, showing a need for further modification to the procedures. We gratefully thank CREST-CATSUS for funding and supporting our research.

49. Kajal Bhandare, Latika Kapoor, Yu Wang, and Sirisha Mahesh

M.S. Information Systems
AI Model to Assess the Impact of Wildfire on Housing Affordability in Southern California
Faculty Mentor: Dr. Shilpa Balan

Wildfire plays a crucial role in shaping housing dynamics, fire-resilient design, and land use planning while also causing widespread destruction and economic instability. The loss of homes results in significant financial setbacks. Local businesses are required to amend post-wildfire operations facing disruptions in supply chains which can drastically affect their revenue. The state of California remains one of the most vulnerable regions to wildfires. With the recent wildfires in Los Angeles, we were driven to investigate this topic further. In our analysis, we study the extent of wildfire impact on the housing market using an AI model we built for this research. Our findings indicate that increased wildfire activity disrupts rental markets often driving up prices due to rising insurance costs. The challenges caused by wildfire have now resulted in stricter building codes and fire-resilient housing designs to help support long-term community sustainability.

50. Isha Patil, Rishab Lakhotra, and Rutik Narute

M.S. Computer Science
Flow-Guided Dynamic Filtering and Iterative Feature Refinement with Multi-Attention for Joint Video Super-Resolution and Deblurring
Faculty Mentor: Dr. Armando Beltran Verdugo

This work presents VSRDB, a joint learning scheme to restore clean, high-resolution videos from blurry, low-resolution ones. Unlike methods that address super-resolution or deblurring separately, this approach tackles both challenges simultaneously. The Flow-Guided Dynamic Filtering (FGDF) enables precise motion-aware kernel estimation, while the Iterative Feature Refinement with Multi-Attention (FRMA) improves feature quality through iterative updates. The proposed framework, FMA-Net, achieves significant improvements in video restoration metrics, outperforming state-of-the-art methods by achieving a PSNR improvement of 1.03 dB over RVRT* and 1.77 dB over BasicVSR++. It also enhances temporal consistency, with a tOF score of 1.92 compared to 2.40 for RVRT. Extensive experiments on datasets like REDS4 and GoPro demonstrate that FMA-Net delivers superior results in both quantitative metrics and visual quality. By combining FGDF and FRMA, this method effectively handles motion blur and low resolution, making it a robust solution for video restoration tasks. These results highlight the potential of joint super-resolution and deblurring techniques for real-world applications.

51. Mathew Xie

B.S. Mathematics
Analyzing Fibril Size in Digital Microscopic Images
Faculty Mentor: Dr. Yixian Wang

This project supports research into the impact of nanoplastics on the aggregation of fibrils, which is linked to Parkinson's Disease. We aim to automate the measurement of the average fibril size in digital microscopic images to conclude nanoplastic pollution does not trigger fibril aggregation. The automatic analysis of these fibrils is essential to save time and provide data to researchers. The main objective of this project is to develop an algorithm to extract the average size of fibrils, where the size of a fibril is the length of the longest line passing through it. For our result, we want to plot a histogram of the ranges of sizes against the number of fibrils for each size range. We wrote a Python script to analyze the fibrils automatically. By setting a threshold to filter out the background, we iteratively loop through each pixel of the frame to separate each fibril, pass the fibril into a function to find the lengths of the lines passing through it, and plot a histogram with the fibril size data. We successfully labeled fibrils from images and measured their sizes, which is consistent with visual observation.

52. Alston Tang

B.S. Computer Science, Minor in Mathematics
Optimizing the Genetic Algorithm for Machine Learning
Faculty Mentor: Dr. Jie Zhong

Genetic Algorithm (GA) is an optimization algorithm inspired by nature and evolution that can be applied to various optimization problems, including machine learning (Brownlee, n.d.). While initially considered for training neural networks, backpropagation has since been used to train Neural Networks, with GA not being considered since (Galvan and Mooney, 2021). Despite allowing for a more global search of the parameter space to reach the global optima (Brownlee, n.d.), GA's costly nature is a significant issue. These costs are attributed to large population sizes, costly population evaluation per generation, and having to run for many generations to achieve the desired result, as observed in initial testing of the algorithm. However, the question remains: Can GA performance in machine learning be improved? The answer is yes. Using various techniques, including dynamic exploration/exploitation tuning, guiding

mutations, and rank-based roulette wheel selection, modifications have been made to the canonical GA to improve its performance in training neural network parameters. Results show that the implementation is twice as effective as canonical GA and can be improved even further.

53. William Pasillas, Derreck Soriano, and Isuru Rajapakshe

B.S. Electrical Engineering
Changes in neural network associations with RTMS for depression
Faculty Mentor: Dr. Deborah Won

Major depressive disorder (MDD) afflicted an estimated 21 million adults in the U.S. in 2021, according to the National Institute of Mental Health. Repetitive transcranial magnetic stimulation (rTMS) was approved by the FDA to treat medically refractory MDD. The subjectivity of psychological questionnaires and the lack of biomarkers makes treatment and diagnosis challenging. Our objective is to determine changes in association between neural regions as measured by phase lag index (PLI). Data was collected from 20 patients with MDD who completed rTMS treatment at Brainstim Center (BSC), TMS clinics and completed pre- and post-treatment assessments. Target brain region for the stimulation and stimulus parameters are set to the given clinical indication but is customizable. Surface EEG from 21 electrode locations in a standard 10-20 montage are acquired at rest and after 36 sessions of TMS, along with scores from two standard questionnaires (MADRS and the GAD-7). PLI was computed using MATLAB code to the sEEG. PLI was averaged across frontal, central and posterior regions to check for connectivity. Results show significant increases in PLI between central and frontal regions. All methods used in this study were determined exempt from review by Cal State LA's Institutional Review Board (Ref. # 23-116X).

54. Andres Dominguez and Patricia Guzmán

B.S. Computer Science
AI/ML-Powered UAV Swarms for Disaster Management
Faculty Mentor: Dr. Manveen Kaur

Unmanned Aerial Vehicle (UAV) swarms hold the potential for numerous safety-critical applications, such as Flood Risk Assessment, locating early indicators of wildfires, and post-disaster Search and Rescue . Their advantage of collecting data from large areas coupled with the addition of Artificial Intelligence/ Machine Learning (AI/ML) for analyzing the data hold immense promise for leveraging UAV swarms to aid disaster management efforts. While rising edge computing systems with GPU acceleration capabilities have conceptually empowered UAVs to run AI/ML models independently, research in this field has been majorly simulation-based. This has created a lack of understanding of how resource-constrained UAV swarms can utilize AI/ML-based data analysis while meeting real-time (RT) disaster management requirements in diverse environments. Using open source CIFAR-10 image dataset, we test the abilities of a range of systems that can serve as edge computing systems for UAV swarms, including NVIDIA Jetson Orin, Raspberry Pi 4, and Intel NUC, in supporting AI/ML models of different computational complexities, starting with simpler K-NN models and going up to complex Convolutional Neural Networks. The insights gained from this study will guide the development of a UAV swarm testbed to test and validate disaster management applications in real-world settings.

55. Nathan Brieu

B.S. Mechanical Engineering
Experimental simulation and optimization study of the hydrogen-rich gas production via a methanol steam reforming reactor
Faculty Mentor: Dr. Petr Vozka

Internal combustion engines(ICEs) powered by fossil fuel combustion continue to be the primary power source in transportation. However, a significant portion of the energy in fuels is lost as heat, and relatively few efforts have been focused on recovering this waste heat from ICEs. This investigates the use of waste heat to produce hydrogen-rich, high-energy-density syngas. A three-cylinder, water-cooled indirect diesel engine fueled with diesel/biodiesel/hydrogen blends serves as the heat source at varying engine loads (15, 30, 45, 60 Nm) at 2000 rpm. The exhaust heat powers a methanol-steam-reformer reactor (MSR) with methanol-to-water (MtW) molar ratios of 0.5, 1, 1.5, and 2. The maximum hydrogen content (70.3%) in syngas occurs at 30 Nm and an MtW of 1. Three novel algorithms (DSC-MOPSO, MOSPO, and MOGWO) are employed to optimize the operation parameters to maximize hydrogen content. After optimization, the hydrogen content increases to 73.2% with DSC-MOPSO, 73.0% with MOPSO, and 72.7% with the MOGWO algorithm, with error magnitudes between -0.167% and +0.273%. This research demonstrates that by employing an onboard MSR unit, ICE waste heat can be effectively utilized to produce a gas with high hydrogen content.

56. Luis Salgado, Jose Hernandez Villasenor, Hector Vazquez, Benjamin Fletes, and Edrei Pliego

B.S. Civil Engineering
Assessing Coastal Flood Driver Dependencies and Evolution Along the United States Pacific Coast
Faculty Mentor: Dr. Joseph Lucey-Renteria

Coastal flooding is a rising global concern. The United States (US) Pacific coast, uniquely, experiences significant modulations of marine water levels (can vary by ~2 m), and waves which are critical to coastal total water level developments. Intensifying precipitation increases exposure to extreme surface runoff and fluvial flows. Sea level rise has steadily increased the average marine water levels, and climate change will increase wave activity. While these flood drivers can individually result in flooding, the simultaneous phasing of multiple drivers in compound flood events can have greater impacts. However, the dependence between flood drivers and their evolution in time has yet to be critically quantified. This study quantifies the dependencies between fluvial flows, precipitation, waves, and marine water levels across the US Pacific coast while evaluating the potential evolution between flood drivers. The rate at which individual hydrologic and marine annual maximum event magnitudes are increasing is also investigated. Correlations express the magnitude and evolution of dependencies between marine (waves and marine water levels) and hydrologic (precipitation and discharge) flood drivers. Future work will expand this analysis to the Gulf and Atlantic Coastlines.

57. Alex Alvarenga

B.S. Civil Engineering
Evaluating Satellite Observations of AIRS and CrIS for Data Continuity in Drought Monitoring
Faculty Mentors: Dr. Alireza Farahmand and Dr. Jingjing Li

Droughts have both short-term and long-term effects on ecosystems, the environment, and governments in affected regions. While the long-term effects of droughts cannot be understated, early detection can mitigate short-term impacts, such as those on agriculture and vegetation. Previous studies have demonstrated the potential of NASA's Atmospheric Infrared Sounder (AIRS) satellite for drought early detection using vapor pressure deficit (VPD), relative humidity (RH), and temperature (T) data. Building on this foundation, AIRS-based drought indicators have been delivered to the U.S. Drought Monitor (USDM) since 2017. As the AIRS mission is expected to be decommissioned soon, next-generation infrared sounders, such as the Cross-track Infrared Sounder (CrIS) aboard the Joint Polar Satellite System (JPSS) satellites, need to be evaluated to ensure the continuity of drought-relevant data products delivered to the USDM. As a preliminary step, this project investigates weekly average maps of VPD, RH, and T created from the data of these satellites. Comparisons for one week in May 2023 reveal differences in these variables between the two satellites. This analysis is used for assessing the feasibility of using CrIS for future drought monitoring programs. Ultimately, this work aims to ensure the continuity of data products critical for early drought detection.

58. Carlos Lopez and Apryl Sperling

B.S. Mechanical Engineering
The Role of Nitinol Actuators in Miniaturized Satellites for Cost-Effective Space Applications
Faculty Mentor: Dr. Jim Kuo

In spacecraft design, optimizing mass, volume, and energy can enhance reliability and longevity. Therefore, reducing the design complexity (e.g. number of components) in deployable mechanisms is paramount. Currently, these mechanisms often rely on motors, actuators, and complex mechanical systems that introduce additional weight, energy consumption, and potential points of failure. Shape memory alloys (SMAs), such as a nickel-titanium alloy known as nitinol, present a simple solution for actuated joints by utilizing their unique thermomechanical properties to potentially reduce the number of components and energy required to carry out a movement. For one-time deployments, nitinol-based SMAs likely consume less total energy than motors, as they require only a single heating cycle to actuate. This study investigates the performance of nitinol as an actuator in space deployable applications such as solar panel arrays, solar sails, and radiators. Key parameters analyzed include: the force output per actuator, deployment speed, and the energy required to heat the nitinol to its activation temperature. By demonstrating nitinol's capacity to simplify deployment mechanism designs and improve energy efficiency, this research highlights its potential to improve the compactness and operational dependability of in-space systems.

59. Kaelin Bohl

B.S. Mechanical Engineering
Additive Manufacturing: Using 5-head Extrusion 3D printing to Measure the Physical Performance of Multi-material Structures
Faculty Mentor: Dr. Salvador Rojas

Traditional manufacturing methods such as machining (subtraction of material from raw stock) can be time consuming, costly, and limited to single material composition without additional assembly methods. In some cases, complex 3D parts and features may not

even be achieved through traditional manufacturing methods. Additive manufacturing and Fused Deposition Modelling (FDM), also known as 3D printing, has become a key tool in manufacturing for its low cost of fabrication, supporting community of users, and rapid prototyping of parts that range in complexity. Some FDM 3D printers give users the ability to combine multiple materials to fabricate parts with aesthetic or multifunctional purposes. Yet, some 3D printers are only dual extrusion and only two materials may be used in a single part which can limit the freedom to explore multifunctional parts with different physical properties. This research utilizes a Prusa XL with the ability to combine five different materials with five different tool heads to print multi-material structures and demonstrate multiple physical properties. This research will assess the quality, limitations, and functionalities of combining a variety of materials demonstrating anisotropy, shape memory effect, and conductivity.

60. Cristian Hernandez and Jonathan Martinez

M.S. Electrical Engineering
Online Control of a Scaled HVAC Test-bed
Faculty Mentor: Dr. Curtis Wang

Modern buildings rely on HVAC systems to efficiently regulate indoor climate and optimize energy consumption. However, many HVAC systems fail to achieve optimal performance due to inadequate sensor integration and improper control strategies. This project focuses on developing an advanced HVAC control system using a subscaled test bed designed to replicate real-world thermal conditions. The test bed will be enhanced with IoT-enabled sensors and actuators to improve data collection and control precision. To simulate occupancy, small heating elements will generate localized heat loads, while motorized components will emulate movement between rooms, providing a dynamic environment for testing control strategies. A Model Predictive Controller (MPC) will be implemented to optimize HVAC operation based on real-time sensor feedback, ensuring energy-efficient climate regulation while maintaining occupant comfort. By integrating IoT-based sensing, predictive control, and enhanced test bed capabilities, this project aims to develop a scalable solution for improving HVAC efficiency. The findings will contribute to intelligent climate control strategies that reduce energy waste and enhance thermal comfort in modern buildings.

61. Jordan Doose

M.S. Computer Science
Computer-Vision Based Landing Guidance for Autonomous Marine Exploration
Faculty Mentor: Dr. Salvador Rojas

While advancements in the field of marine robotics have led to more accessible monitoring of urban effects on marine ecosystems, most systems require a human pilot, and long-term study requires significant investments of time and money. This study explores the application of autonomous systems to reduce the investment required to perform long-term monitoring with robotic explorers, and the methods by which such an autonomous system can be safely implemented. The proposed system builds upon previous research on the computer vision-based estimation of local sea state to perform landing site identification on an autonomous aerial platform, avoiding hazards such as rough surface state, dangerous protrusions, and wildlife. A YOLO11-classify model is applied to segmented images from an onboard camera to produce a grid of hazard scores, and landing target identification is performed by successively approaching the most suitable site until an area matching given constraints is found. Application of this autonomous system has the potential to allow for sustainable long-term monitoring of water bodies, marine ecosystems, and broader monitoring where deployment of smaller surface or subsurface explorers is required.

62. Hector Gardea

B.S. Electrical Engineering
Soft Robotic Propulsion based on Bioinspired Jellyfish
Faculty Mentor: Dr. Salvador Rojas

Current underwater robotics for oceanic exploration presents challenges such as the disruption of marine life. Thus, a new approach to oceanic mapping, surveying, and exploration is necessary. This study looks at the jellyfish architecture which has no specialized interior bodily structure, lungs, brain, or heart, yet demonstrates a remarkable peristaltic-like locomotive mode for traveling efficiently underwater by pulsating their gelatinous mesoglea bell shaped body. Jellies are made up of up to 95% water and their lightweight structure allows them to float and drift. Specifically, the silky jelly (Colobonema sericeum) is one of the fastest and most efficient jelly in the world. This research aims to understand the biological mechanisms and structure underlying the jelly's efficient propulsion methods and transfer these design principles into a synthetic system to develop an environmentally friendly soft robot. Material choice of the soft robot itself is extremely important as it must undergo continuous deformations to move as the jelly does. This research will demonstrate the ability to combine soft materials with an actuation method to replicate the propulsive movements of the

jelly. The motion of the system will be measured to gain an understanding of the effective parameters.

63. Jonathan Flores

M.S. Mechanical Engineering
Preliminary Design of a Soft Robotic Tentacle for Grasping Based on a Bioinspired Octopus Arm
Faculty Mentor: Dr. Salvador Rojas

The deep sea is vastly unexplored and presents an immense number of challenges for current technological approaches which include the use of rigid systems to manipulate delicate objects that can easily harm and alter sensitive structures that may change their biological makeup under stress. The ability to catch and study marine life sustainably while keeping in mind the safety of the environment is vital to new discoveries with the potential to unveil information such as the effects of climate change. This research takes inspiration from the octopus, a soft-bodied system with highly flexible tentacles, to design a dexteric continuum arm for the purpose of grasping and manipulation of objects with varying geometry and stiffness. The preliminary design will focus on the different types of fabrication methods of soft material such as silicone, thermoplastic elastomers (TPE), and thermoplastic polyurethanes (TPU). The material will be tested to show desired movement of the proposed architecture. With a proper stiffness, the architecture will then demonstrate bending, stretching, and compression.

64. Jose Mario Gutierrez

M.S. Electrical Engineering
Bio-inspired Approach to Wave Disturbance Detection and Positional Control
Faculty Mentor: Dr. Salvador Rojas

In this work, we explore a robotic system designed to detect and respond to wave disturbances for achieving a fixed localization in aquatic environments. The system utilizes flex sensors to interpret wave forces and translate them to motor-driven responses, in order to maintain a position. Inspired by the sensory mechanisms of catfish whiskers and pores that mimic house sensory receptors, we aim to develop a control loop that dynamically adapts to environmental forces. To validate our approach, we have designed a sensor test rig incorporating a wave simulator. These controlled experiments allow us to refine sensor feedback mechanisms and optimize the control loop before deploying the system in real-world aquatic conditions. Our research contributes to the broader field of bio-inspired robotics by demonstrating how biological principles can inform robotic perception and control in dynamic fluid environments.

65. Damian Salas

B.A. Geography
All Burnt Up: Changes in California Wildfires and their Consequences on Air Quality
Faculty Mentors: Dr. Jingjing Li and Dr. Alireza Farahmand

Wildfires damage habitats, ecosystems, infrastructure, and human life, while also contributing significantly to air pollution. It seems almost impossible to go a year without a wildfire in California. Our project aims to investigate the extent of the change in wildfires in California and their impacts on air quality using two case studies of Woolsey Fire in 2018 and Bobcat Fire in 2020. A set of time series was created to study the trends of wildfire counts and acreage burned using the historic wildfire data sourced from the California Department of Forestry and Fire Protection from 1900s to 2023. We also created maps using ArcGIS to visualize the impacts of two wildfire events on air quality of Particulate Matter 2.5 (PM2.5) concentrations acquired from the Environmental Protection Agency. Time series of PM2.5 concentrations were analyzed for pre- and post-wildfire events using the surrounding air quality stations within a 40km proximity. The results show an increase in both wildfire frequencies and burned acreage with the most destructive events occurring in the past decade. We also observed sharp increases in PM2.5 concentrations during the two wildfire events, pushing air quality to levels detrimental to the health of both vulnerable and general populations.

66. Erik Weisner

M.S. Geological Sciences, Option in Hydrogeology
Assessing Pre- and Post- Wildfire Stream Runoff from the Bobcat Fire in Los Angeles Basin
Faculty Mentors: Dr. Jingjing Li and Dr. Alireza Farahmand

With wildfires becoming increasingly common in Los Angeles and the surrounding areas, understanding their impact on surface runoff from storms is more critical since it can lead to flooding and landslides. The 2020 Bobcat Fire burned more than 115, 997 acres of the San Gabriel Mountains Angeles National Forest from September to November and is one of the largest fires in Los Angeles County's history. In this study, we utilized the Army Corps of Engineers' Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS) software, to simulate discharge under pre- and post-fire conditions for the Bobcat Fire. This approach allowed us to examine the fire's impact on runoff response within the burned watershed. We selected rainfall events occurring before and after the Bobcat Fire to model the pre-fire conditions, and post-fire responses. The model is validated with the streamflow records obtained from the United States Geological Survey stream gages, located either within or downstream of the burned area. This study shows how wildfires affect hydrologic and land surface properties provide a tool for managing the post-fire environment and for long-term environmental and resource planning.

67. Jared Sweatman

M.S. Physics, Option in Research
A Study on the Sun's effects on Titan's Atmospheric Airglow using Data from the Cassini Spacecraft
Faculty Mentor: Dr. Emilie Royer

Titan is Saturn's largest orbiting body and is the only moon containing an ionosphere in our solar system. With an atmospheric pressure about 60 percent greater than Earth's atmosphere, and a surface that contains standing bodies of liquid, including water, Titan stands as a unique astronomical body within our Solar System. Our project seeks to analyze the data gathered by the Cassini spacecraft to better understand the effects of Saturn's Magnetosphere and Solar Activity on Titan's Atmospheric Airglow. Our project will involve in developing a model that will simulate the upper atmospheric response to magnetospheric events presented by the Saturn-Sun system. The goal of the model will be to better understand the airglow presence during these events to better study Titan's upper atmosphere. We expect that the model will accurately describe the given data and serve as a foundation for additional data collected by the Dragonfly mission launching in July 2028.

68. Jose Coreas Guzman

M.S. Environmental Science
Investigating Heatwave Dynamics along the Los Angeles River Using Geospatial Analysis
Faculty Mentors: Dr. Jingjing Li and Dr. Alireza Farahmand

Heatwaves are becoming more frequent and severe due to climate change, which poses risks to urban environments, public health, and ecosystems. These risks include increased heat-related illnesses, higher energy demands, and greater stress on aquatic life. In densely populated cities like Los Angeles, heatwaves intensify the Urban Heat Island effect (UHI), where urban

areas experience higher temperatures than surrounding rural regions. The Los Angeles River, a critical component of the city's ecosystem, plays both natural and engineered roles within the urban landscape. Its potential to mitigate heat during extreme weather events presents an important area of study. This research examines the spatial dynamics of heatwaves along the Los Angeles River using geospatial tools to analyze temperature variations in areas adjacent to the river. Landsat 8 satellite images were obtained from USGS Earth Explorer platform to detect surface temperature changes during heatwave events. ArcGIS Pro was used to process these images, applying 1-meter and 100-meter buffer zones around the river to assess the impact of proximity on temperature patterns. By integrating high-resolution satellite data with geospatial analysis, this study offers valuable insights to inform urban planning and climate adaptation strategies aimed at enhancing resilience against extreme heat events in Los Angeles.

69. Angel Morales

M.S. Physics

Spectroscopic Analysis of Solar Radiation Interactions with Titan's Upper Atmosphere Using Cassini Data

Faculty Mentor: Dr. Emilie Royer

Titan, Saturn's largest moon, possesses a dense nitrogen atmosphere that interacts with solar radiation and energetic particles, resulting in unique atmospheric airglow emissions. This project investigates these interactions using spectroscopic data from the Cassini mission to analyze processes such as atmospheric transport, dynamics in the upper atmosphere, and atmospheric escape. By focusing on UV emissions, the study leverages Cassini UVIS datasets to explore how solar flux and energy influence Titan's upper atmosphere using a Python-based data pipeline. This spectroscopic approach aims to provide a quantitative analysis of nitrogen airglow emissions as well as provide new insights into Titan's upper atmospheric dynamics, contributing to the broader understanding of planetary atmosphere's solar interactions.

70. Madison Ngo

B.S. Biochemistry

AuNP-Modified Sensor for Enhanced Dopamine Detection

Faculty Mentor: Dr. Yixian Wang

Dopamine is a monamine neurotransmitter that plays roles in controlling memory, mood, and other bodily functions. Changes in dopamine concentration have been associated with psychiatric disorders such as schizophrenia and Parkinson's disease. Electrochemical sensors have been of interest to the scientific community for their cost-effective setup. However, some issues with these sensors include a limited sensitivity and selectivity, which is why an adequate design for a surface modified sensor is necessary. The current study investigates a dopamine sensor modified by gold nanoparticles, which are a widely used nanomaterial in surface modification. Gold nanoparticles have characteristics such as good biocompatibility in biological environments, large surface area, and unique optical properties. We developed a gold nanoparticle-modified sensor on gold rod electrodes that shows enhanced sensitivity to dopamine. Our future goal is to adapt this system to a surface plasmon resonance microscopy (SPRm) setup to image the real-time release of dopamine.

71. Tommy Taing

B.S. Chemistry

Utilization of Titanium and Indium-based Porphyrin Metal-Organic Frameworks for Fabrication of Photovoltaic Solar Cells

Faculty Mentor: Dr. Yangyang Liu

Photovoltaics have seen much interest as a source of renewable energy, with recent interest in analyzing the impact of metal organic frameworks (MOFs) on the performance of solar cells. MOFs are porous, crystalline, tunable structures made of metal nodes and branching connective ligands. The MOFs application in solar cells makes for a prospective alternative to current silicon-based cells due to utilization of cheap, nontoxic, and potential for high capacity. The paper used titanium or indium-based nodes and porphyrin ligand tetrakis(4-carboxyphenyl)porphyrin (TCPP) to synthesize MOFs for use as the light capturing dye in solar cells. The effectiveness of light capture was analyzed by comparing the MOFs against each other, and the integration of iron or tin into the ligand for each respective MOF to determine its effect on solar cell performance. The fabrication of solar cells consists of a conductive fluorine tin oxide doped glass substrate, semiconducting titanium oxide, MOF dye, hole transporting material, and a gold counter electrode. The power conversion efficiency of light to electricity was measured and analyzed between all MOF types.

72. Eric Gutierrez

M.S. Physics

Magnetic Properties of Pyrolytic Polyethylene with Diamond Powder

Faculty Mentors: Dr. Oscar Bernal and Dr. Armen Kocharian

In this project we aim to create pyrolytic carbon samples from polyethylene alone and polyethylene with diamond powder. The goal is to obtain a ferromagnetic sample from both pyrolytic products and compare their

magnetization at various temperatures. The introduction of diamond powder should promote the formation of a ferromagnetic structure, which would allow for a higher magnetization even at room temperature. This is important because diamond has already been proven to be a rising material in semiconductor physics due to its physical properties like its hardness, thermal conductivity and wide bandgap of 5.5 eV. Through pyrolysis, diamond could exhibit ferromagnetic behavior and thus, introduce magnetic properties to its various uses. This could potentially lead to its use in spintronics, a topic that holds promise in quantum computing by creating more powerful and efficient quantum bits.

73. Andy Ruiz

M.S. Chemistry, Inorganic and Organic Chemistry
Investigating V-shaped Linkers in Metal-Organic Frameworks for Carbon Capture Applications
Faculty Mentor: Dr. Yangyang Liu

Carbon capture and storage (CCS) is a filtration technology for emission sources to remove carbon dioxide (CO_2). With the continuing rising levels of CO_2 into the atmosphere, the need for suitable materials for CCS is also increasing. Current materials used for CCS have yet to meet the goals for the technology. Metal-organic frameworks (MOFs) have been in use for CCS previously with varying success. With our investigation we hope to design and synthesize MOFs capable of high carbon dioxide adsorption and selectivity with stability at various temperature and pH conditions. Using a “V-shaped” organic linker as a template, several linkers will be synthesized containing functional groups with the prospective to improve carbon capture. These V-shaped linkers will be paired with metals that have been previously studied to create stable MOFs.

74. Cristian Maldonado

B.S. Chemistry
Synthesis of Pegylated Zirconium MOFs for Targeted Drug Delivery in Cancer Treatment
Faculty Mentor: Dr. Yangyang Liu

This study investigated the potential of Metal Organic Frameworks (MOFs) for pH-responsive drug delivery due to their high surface modifiability and strong drug encapsulation capabilities. To achieve this, the study incorporated 4-Amidemethylbenzene acid (4_AMBA) with three zirconium-based MOFs using a solvent-assisted ligand incorporation (SALI) method. This allowed the MOFs to then be modified with the polymer polyethylene glycol (PEG), resulting in the observed pH responsiveness. Powder X-ray diffraction (PXRD) and gas sorption isotherm were used for characterization, and ultraviolet–visible spectroscopy (UV-VIS) was used to monitor drug release. Results showed a significant difference in drug release at two different pH levels, indicating the pH-responsive nature of the drug delivery system. Among the three MOFs, UiO-66 exhibited the most promising pH responsivity in drug release, highlighting the effectiveness of the incorporation of PEG. These findings suggest that PEGylated MOFs could have the potential to reduce the side effects of chemotherapy and enable targeted drug delivery to cancer cells.

75. Kaycee Willis

M.S. Material Science and Engineering
A Novel Photo-Responsive Metal-Organic Framework for Direct Air Capture of Carbon Dioxide
Faculty Mentor: Dr. Yangyang Liu

Direct air capture (DAC) of carbon dioxide is one proposed solution to combat rising atmospheric CO2 levels, which contribute to climate change, global warming, and ocean acidification. Due to their high porosity and tunability, metal-organic frameworks (MOFs) have shown to be promising candidates for DAC of CO2. CO2 molecules can be adsorbed by the MOF and then released using high temperature or low pressure, which is energy intensive. To lower the energy requirements of the adsorption-desorption cycle, this study aims to create a photo-responsive MOF to act as an outer shell to the MOF. The entry of CO2 can be controlled by the photo-responsive shell acting as a gate, which is opened and closed with light irradiation. Synthesis of this photo-responsive MOF linker is underway and is being characterized through nuclear magnetic resonance spectroscopy (NMR). In future work, complete synthesis of the photo-responsive MOF will be undertaken and will be studied with multiple techniques such as gas adsorption capacity isotherms and breakthrough analysis (BTA) to determine dynamic and competitive CO2 capture.

76. Alexandra Fisher and Sumdra Cao

B.S. Chemistry
Thermodynamic and Structural Insights into Curcumin-β-Cyclodextrin Inclusion Complexes via UV-Vis and NMR Spectroscopies
Faculty Mentor: Dr. Yong Ba

This study investigates the formation of inclusion complexes between curcumin, a compound with noted anti-cancer and anti-inflammatory properties, and β-cyclodextrin (β-CD) derivatives to enhance curcumin's solubility and stability in aqueous environments. Curcumin’s limited clinical application, due to its low solubility and sensitivity to physiological conditions, prompted the exploration of β-CD, 2-hydroxypropyl-β-cyclodextrin (2-HP-β-CD), and (2,6-di-O-methyl)-β-cyclodextrin (DOM-β-CD) as potential solubility

enhancers. These complexes were synthesized under controlled conditions varying in temperature from 25°C to 45°C. The resulting complexes were analyzed using UV-Vis and NMR spectroscopy to determine the equilibrium constants, changes in Gibbs free energy (ΔG), enthalpy (ΔH), and entropy (ΔS). The thermodynamic data indicated that the inclusion complex formation is an exothermic and entropy-reducing process, with DOM-β-CD showing the greatest efficacy by exhibiting significantly lower ΔG values. The molecular interactions and structural conformations of curcumin within the β-CDs were further elucidated through 1D 1H NMR and 2D 1H NOESY spectra, confirming the successful formation of these complexes. These findings highlight the potential of β-CD derivatives in improving the delivery and stability of curcumin, suggesting broader applicability in therapeutic settings. Future work will focus on the kinetic stability of these complexes to better understand their behavior in biological systems.

77. Naomi Samarasinghe

M.S. Chemistry

Modified Metal-Organic Frameworks-Mediated Nucleic Acid Stabilization: Protecting RNA from Enzymatic Degradation

Faculty Mentor: Dr. Yangyang Liu

Ribonucleic acid (RNA) vaccines had the arduous task of tackling the pandemic, coupled with booster shots, this neat little package was sent through our bodies via lipid nano particle (LNPs). LNPs have done their part but have come short on a number of fronts: stability, toxicity, storage conditions, and encapsulation inefficiency. The solution comes in the form of an incredibly porous material with high surface area: Metal Organic Frameworks (MOFs). This will focus on synthesis, stability, and efficacy of MOF-808 for drug delivery purposes. MOF-808 is one in a small pool of MOFs that are biocompatible and because of this the ability to use it for *in vivo* experiments. MOF-808 is constructed of Zirconium nodes, which is a preferable factor for human studies because of its low reactivity with other tissues within the body, allowing it to pass via urine. Modified MOFs can act as a protective barrier or cage, shielding the center from enzyme degradation and maintaining its biological activity. A stable cage with a hollow center leaves room for a safe, transportable payload: nucleic acids RNA or DNA. This approach offers a potential solution for a critical challenge in nucleic acid-based areas.

78. Sophia Grusnis

M.S. Physics

Comparison of Surface Properties Between Enceladus and Europa

Faculty Mentor: Dr. Emilie Royer

Enceladus and Europa are icy satellites of Saturn and Jupiter, respectively. Although they are in different systems, they are expected to have similar surface properties due to their icy surfaces and potential plume activity. The Cassini mission has provided the confirmation of plume activity on Enceladus, highlighting its dynamic nature and potential habitability. In this study, we investigate the surface properties and plume regions of Enceladus and Europa through the analysis of ultraviolet (UV) phase curves. Initially, we will employ photometric and spectroscopic techniques to derive a first look at a disk-integrated UV phase curve for Enceladus, enabling us to refine our understanding of its global surface characteristics. Subsequently, these methodologies will be extended to disk-resolved data for both Enceladus and Europa, allowing us to examine localized surface features and their potential association with plume activity. By generating color maps, we will compare specific regions of the two moons, focusing on identifying similarities and differences that could inform our understanding of their geophysical and plume-related processes. This research serves as a precursor to the upcoming data collection by the recently launched Europa Clipper mission, providing critical insights that will guide future exploration and our broader understanding of these icy satellites.

79. Cathryn E. Price

M.S. Physics

Unveiling the HMXB Population of Holmberg II: A Multi-Wavelength Study with Chandra and Hubble

Faculty Mentor: Dr. Margaret Lazzarini

High Mass X-ray Binary (HMXB) systems are made up of compact objects like neutron stars or black holes that are in close orbit with a high mass star. The compact object in the system accretes matter from the massive star, producing strong X-ray emissions. This project aims to utilize archival data from the Chandra X-ray Observatory and the Hubble Space Telescope (HST) in the X-ray, optical, and ultraviolet bands to identify and characterize HMXB systems in the nearby Holmberg II dwarf galaxy. This study is significant because it will help establish HMXB populations not yet identified in the literature, offering deeper insights into the complex processes of massive binary stellar evolution in specific environments. The first step in achieving this goal involves analyzing Chandra X-ray data to identify hard X-ray point sources, which will serve as promising HMXB candidates. These findings will then be used to compile a X-ray catalog, which can be used for further

study. Ultimately, the goal is to use this catalog to identify and analyze potential HMXB companion stars and calculate key measurements, such as HMXB age distributions and production rates, providing important constraints for theoretical models of these systems.

80. Jonathan Davidson

M.S. Mathematics
Monochromatic Rectangles in Grids
Faculty Mentor: Dr. Jason O'Neill

Ramsey theory is a branch of mathematics that studies how patterns must emerge when structures are large enough. The Monochromatic Rectangle Problem asks "How large must a colored grid be in order to guarantee a rectangle whose vertices have the same color." Past approaches to this problem have used probability theory to give estimates on the dimensions of these grids as a function of the number of colors used. These probabilistic methods fail to provide explicit examples of colored grids that exist on the threshold of monochromatic rectangles appearing. Our research uses a combinatorial design theory approach to investigate and construct colored grids at this threshold. We were also able to generalize our approach to the three dimensional version of the Monochromatic Rectangle Problem to find bounds that improve upon probabilistic approaches.

81. Robert Alexander

B.S. Physics
Measuring the Radial Velocity of Extra Galactic High Mass Binary X-ray System
Faculty Mentor: Dr. Margaret Lazzarini

In this project, I am studying one high mass X-ray binary system candidate in the nearby galaxy M33 (Triangulum), that was first detected using overlapping X-ray observations from the Chandra X-ray Observatory and optical/ultraviolet observations from the Hubble Space Telescope. The data was collected using the DEIMOS spectrograph at the Keck observatory in Hawaii. This data is in the visible optical part of the electromagnetic spectrum. Observations were done on three separate nights (epochs). By measuring changes in the radial velocity, we can determine if there is in fact motion indicative of a binary system. HMXBs are a phase in the evolution of binary star systems where there is a massive star and a high mass compact object such as a black hole or neutron star orbiting each other. Studying HMXBs is helpful in our understanding of gravitational wave detection as these are caused by the merging of two large objects, such as a high mass star and a black hole.

82. Sasha Margolies

M.S. Physics
Spatially Resolved Star Formation History of Sextans A
Faculty Mentor: Dr. Margaret Lazzarini

The star formation history (SFH) of a galaxy gives crucial information about the circumstances of a galaxy's formation by measuring the star formation rate over time. My research investigates the spatially resolved SFH of the low metallicity irregular dwarf galaxy Sextans A. A low metallicity galaxy means that its chemical composition hasn't been altered by past generations of stars, making it very similar to those found in the early universe. I use data from the Hubble Space Telescope (HST) survey called the Local Ultraviolet to Infrared Treasury (LUVIT). This survey combines near ultraviolet, optical and near infrared data to resolve stars out to a distance of about 3.8 Mpc. I am using a color magnitude diagram (CMD) based model called MATCH to generate the SFH. CMDs look at the color and brightness distribution of stars and compare it to theoretical models to infer the history of star formation observed in the galaxy today. This model fits for dust extinction, which is an improvement on the historical methods. I anticipate my final results to be in line with previous SFH measurements for Sextans A. These results will be significant to the continuing advancement of galactic formation and its circumstances.

83. Yabo Ogunduyile

B.S. Mechanical Engineering, Minor in Physics
Analyzing High-Mass X-ray Binary Systems using High-energy X-Ray Telescope NuSTAR
Faculty Mentor: Dr. Margaret Lazzarini

This project analyzes the high-mass X-ray binaries in Andromeda (M31) using data collected from the high-energy X-ray NuSTAR telescope. An X-ray binary system comprises a compact object, a black hole or neutron star, that accretes material from a companion star, forming an accretion disk that emits X-ray radiation. NuSTAR is a space-based X-ray telescope designed to detect high-energy X-ray radiation, with a higher bandpass allowing observers to distinguish neutron stars and black holes. We will use NuSTAR observations overlapping with the Chandra X-ray Observatory and Hubble Space Telescope observations. With this multi-wavelength dataset, we will better understand stellar populations, allowing us to identify features of companion stars, differentiate compact objects, and more accurately age high-mass X-ray binary systems. As a result, we refine theoretical models that predict binary evolution, deepening our understanding of stellar evolution and the cosmos.

84. Mitchell Jacobs

M.S. Physics

Structure-Property Relationships in Halocarbons: A Systematic Investigation of Radiative Properties through Spectroscopy and DFT

Faculty Mentor: Dr. Karine Le Bris

Accurate quantification of halocarbons' radiative properties has been a crucial pursuit in understanding their climate impacts. For specific compounds like perfluoroalkanes, high-resolution infrared absorption spectra combined with density functional theory (DFT) calculations have revealed complex relationships between molecular structure and global warming potential (GWP) [3]. These methodological improvements are supported by standardized protocols for generating reference spectra, including some extensively documented and rigorous error analysis and artifact removal procedures established in the two decades [4]. The significance of these improved methods in regard to the climate is exemplified nicely in two key findings: when applied consistently across compounds, 42 species showed radiative efficiencies differing by >10% from previous assessments, and the cumulative impact of halocarbons amounts to approximately 18% of CO2's current radiative forcing (0.38 W m^{-2}) [1]. These results (among others) highlight the importance of standardized, rigorous methods for measuring and calculating the climate impacts of halocarbons and related compounds. Building on this foundation, investigation into the structure-property relationships in halocarbons through a combination of high-resolution FTIR spectroscopy and DFT calculations may be beneficial to the existing body of knowledge.

85. Ernesto Ramirez, Jr.

M.S. Physics

Spectral Classification of High Mass X-Ray Binaries in M33

Faculty Mentor: Dr. Margaret Lazzarini

M33 is a small spiral galaxy orbiting near our Milky Way galaxy. Because of its close proximity to our own galaxy, we are able to conduct surveys of the stars that reside within M33. The Chandra ACIS Survey of M33 (ChASeM33) and Panchromatic Hubble Andromeda Treasury: Triangulum Extended Region (PHATTER) surveys of M33 allowed for the identification of candidate high mass X-ray binaries (HMXBs). HMXBs are star systems 8 times the mass of our own Sun where a black hole or neutron star violently absorbs material from the companion star. M33's close proximity to our Milky Way galaxy allows for ground based observation with the Deep Imaging Multi-Object Spectrograph (DEIMOS) instrument at the Keck Observatory. DEIMOS allows astronomers to see what elements makeup stars and can determine how massive our HMXB candidates are. With DEIMOS we are attempting to determine the spectral type of the candidate companion star in HMXB systems.

Last Year's Cal State LA Statewide Competition Delegates
CSU Student Research Competition,
California Polytechnic State University, San Luis Obispo, April 26-27, 2024

Aundia Dianat, Behavioral, Social Sciences & Public Administration II, Graduate, 1st Place
M.S. Forensic Psychology
The Biasing Nature of Gang Evidence: Inducing Memory Errors for Evidence of Past Criminal Behavior
Faculty Mentor: Dr. Mitchell Eisen

Ayse Durak
Master of Social Work
How Gender and Sexuality Influence Body Satisfaction
Faculty Mentors: Dr. Anh-Luu Huynh-Hohnbaum and Dr. Seth Kurzban

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

Jocelyn Alfaro
M.S. Biological Sciences
Locomotor exercise on inflammatory and plasticity makers in severely contused spinal cord injured rodents
Faculty Mentor: Dr. Michael Joseph

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

Aaron Cruz
M.S. Biological Sciences
Blue Light as a Potential Antimicrobial Therapeutic Agent
Faculty Mentor: Dr. Hyunsook Park

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 Jie Zhong

Matthew Engquist
M.S. Material Science, Minors in Biomedical Engineering and Mathematics
Scan-Strategies in Additive Manufacturing: Can We Control Microstructure?
Faculty Mentors: Dr. Mohsen Eshraghi

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

Frank Sposato
Master of Social Work
The Impact of Education on Rural Ugandan Girls and Their Communities
Faculty Mentor: Dr. Jieru Bai

Acknowledgments

We would like to express our deepest gratitude to those who have been instrumental in the organization of this event and have provided us with invaluable support.

In addition, we would especially like to thank our student volunteers, faculty, staff, CREST-CEaS, Office of Graduate Studies, and Phi Kappa Phi for their vital support.

University-Student Union 3rd Floor Plan