



16th Annual SDSU Student Symposium

a showcase of discovery, innovation and creativity



Conrad Prebys
Student Union
March 3-4, 2023

SDSU | Student Symposium

SDSU

Student
Symposium

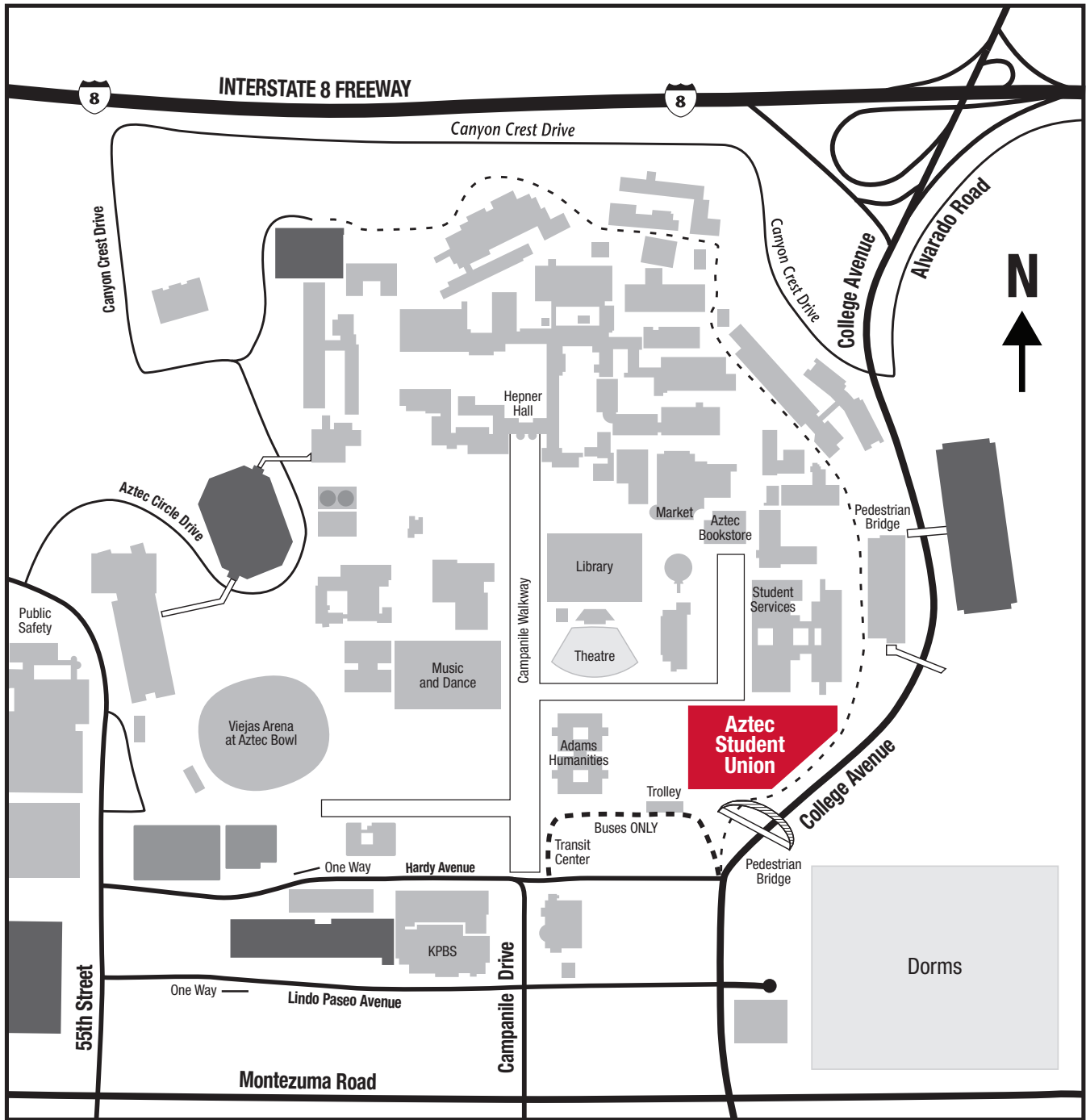
16th Annual SDSU Student Symposium

**March 3 and
March 4, 2023**

A showcase of discovery,
innovation and creativity

SDSU | San Diego State
University

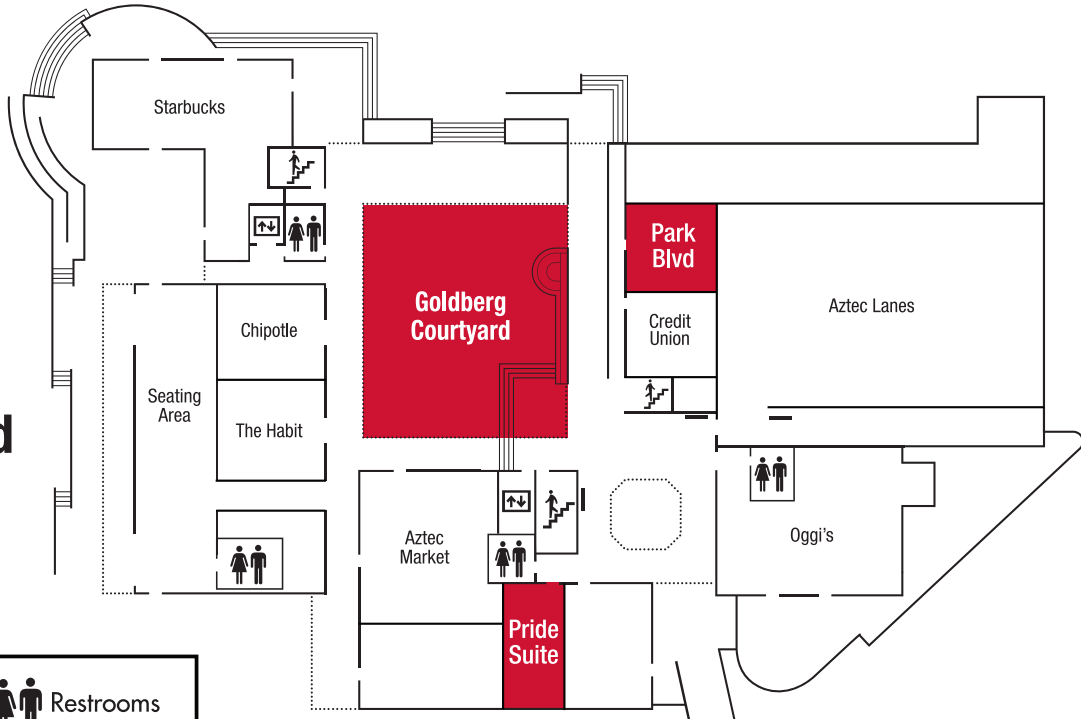
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SAN DIEGO STATE UNIVERSITY CAMPUS MAP

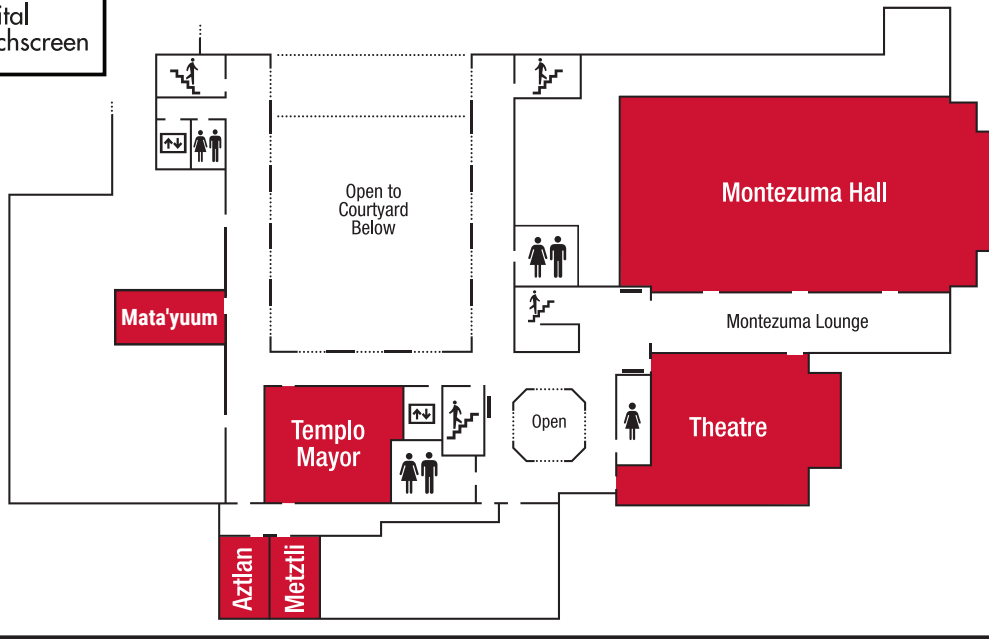


Ground Level

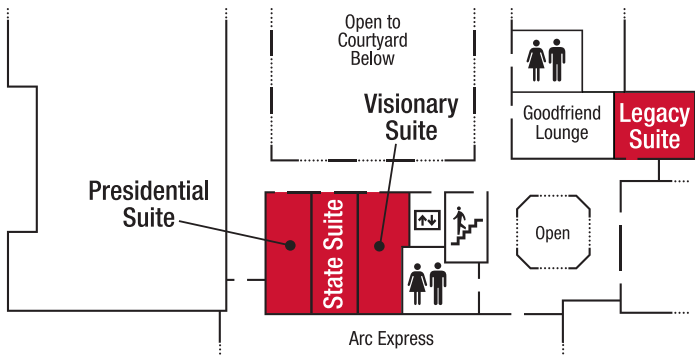


Stairs Restrooms
 Elevator Digital Touchscreen

2nd Floor



3rd Floor



Friday, March 3, 2023 - Grad/Sponsors/CSU/Gradslam Tables

9:00 am – 5:00 pm

Montezuma Hall

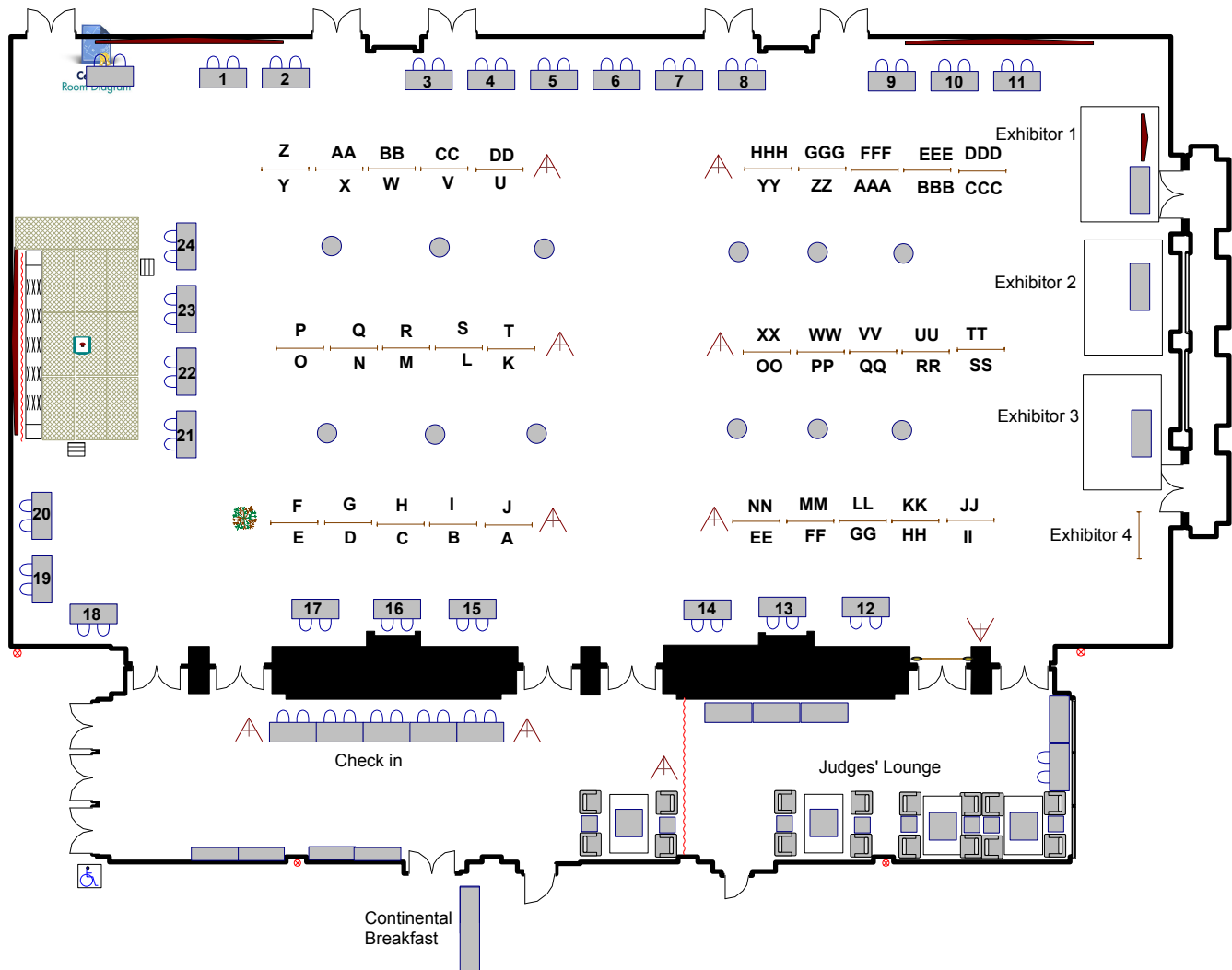
Table 1	9:00 am-11:00 am	College of Education	MA in Autism/ BCBA certification
Table 1	1:00 pm-3:00 pm	College of Education	MA in Autism/ BCBA certification
Table 2	10:00 am-2:00 pm	College of Education	Preliminary Teaching Credentials (5th year post bacc program)
Table 3	10:00 am-2:00 pm	Center for Regulatory Science	MS & Advanced Certificate in Regulatory Affairs
Table 4	10:00 am-2:00 pm	College of Arts and Letters	MA in Philosophy
Table 5	11:00 am-1:00 pm	College of Education	Masters in School Counseling
Table 6	9:00 am-12:50 pm	Public Affairs	MPA
Table 6	1:10 pm-3:00 pm	College of Engineering	MS in Electrical Engineering and MS in Computer Engineering
Table 7	9:00 am-10:50 am	College of Arts and Letters	Master of Science in Big Data Analytics Program
Table 7	11:10 am-1:00 pm	College of Arts and Letters	MA in Linguistics
Table 8	11:00 am-1:00 pm	College of Arts and Letters	Geography (MA, MS, PhD)
Table 9	11:00 am-1:00 pm	MBA, MSBA-FTP	Fowler College of Business
Table 10	9:00 am-1:00 pm	Health and Human Services	JDP Interdisciplinary Research on Substance Use
Table 11	9:00 am-5:00 pm	College of Education	Dual Language and English Learner Ed: MA in Ed, Prof Dev. Certificates & Bilingual Credentials?
Table 12	9:00 am-5:00 pm	Platinum Sponsor	Hologic
Table 13	9:00 am-5:00 pm	Gold Sponsor	Northrop Grumman
Table 14	9:00 am-5:00 pm	Silver Sponsor	Qualcomm
Table 15	9:00 am-5:00 pm	Platinum Sponsor	Eli Lilly and Company
Table 16	9:00 am-5:00 pm	CSU Research Competition Opportunities and Grad Slam	
Table 17	9:00 am-5:00 pm	Journal	Journal of Young Investigators
Table 18	9:00 am-5:00 pm	College of Sciences	Masters in Psychology (MA and MS)
Table 19	9:00 am-5:00 pm	College of Health and Human Services	MA in Speech-Language Pathology, Doctor of Audiology, Ph.D in Language and Communicative Disorders
Table 20	9:00 am-12:50 pm	Health and Human Services	School of Public Health JDP
Table 20	1:10 pm-3:00 pm	Global Campus	MPH
Table 21	9:00 am-12:50 pm	College of Arts and Letters	Masters in Sociology
Table 21	1:10 pm-3:00 pm	COS Biology	CMB-JDP
Table 22	9:00 am-5:00 pm	Health and Human Services	Masters of Science in Athletic Training
Table 23	9:00 am-5:00 pm	Global Campus	MPA, MS Electrical Engineering, MA Teacher Leadership, MS Hospitality and Tourism Management, MS Meeting and Event Management, Web and Mobile (Adv. Cert), Preliminary Administrative Services Credential, MS Big Data Analytics, MA Ed Leadership & Administrative, Professional Data Science Advanced Certificate Services Credential Combo
Table 24	9:00 am-5:00 pm	Fowler College of Business	Sports MBA

Saturday, March 4, 2023 - Sponsors/CSU/Gradslam Tables

9:00 am – 2:00 pm Montezuma Hall

Table 12	9:00 am-2:00 pm	Platinum Sponsor	Hologic
Table 13	9:00 am-2:00 pm	Gold Sponsor	Northrop Grumman
Table 14	9:00 am-2:00 pm	Silver Sponsor	Qualcomm
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Table 16	9:00 am-2:00 pm	CSU Research Competition Opportunities and Grad Slam	
Table 17	9:00 am-2:00 pm	Journal	Journal of Young Investigators

Montezuma Hall and Montezuma Lounge Poster and Exhibitor Layout



We would like to thank our Sponsors

Platinum Sponsors:



Gold Sponsor:



Silver Sponsor:



**Adela de la Torre**

President
San Diego State University

March 3, 2023

Dear colleagues and guests,

I want to welcome you to the 2023 SDSU Student Symposium (S³) at San Diego State University! This is the 16th year of this university-wide event that highlights the outstanding research, scholarship, and creative endeavors that distinguish SDSU. It is a wonderful opportunity to celebrate the discovery, innovation, and creativity that our undergraduate and graduate students bring to their academic experiences. It is also a forum for sharing their discoveries, insights, and performances with our university family and the broader community.

We are so proud that nearly 400 students are presenting original scholarly and creative work this year. More than 70 of them will receive awards for field-specific excellence and impact. Ten of those students whose entries are judged to be truly exceptional will later represent SDSU at the annual California State University Student Research Competition, which will be held at SDSU on April 28th and 29th!

I am so proud of our phenomenal student researchers, and am also grateful for the 250+ faculty, staff, and volunteer experts who are generously giving their time to evaluate the oral, poster, exhibit, and research presentation components of this annual event. Dedication like theirs is what enables SDSU's commitment to leading-edge research and creative endeavors for all.

This symposium represents the spirit of SDSU as a highly diverse, highly impact-driven research university. It is a vibrant, tangible expression of our students' capabilities as future leaders and innovators who will impact their communities and solve the world's greatest challenges.

Please join me in celebrating our incredible students and their very impressive work.

Adela de la Torre, Ph.D.
President
San Diego State University

**Hala Madanat**

Vice President of Research and Innovation
San Diego State University

Thank you for participating in the 2023 San Diego State University Student Symposium (S³)!

S³ is an incredible venue for our students to present work they've spent the past year – and sometimes longer – developing. At SDSU, we want every student to have access to high-impact activities like research, scholarship and creative activities. We support students interested in participating in fieldwork, learning bench science, creating new art, examining our world through the lens of scholarship, and much more. At S³, students have the opportunity to share their work with our larger community, and learn about the endeavors of their peers. It's an excellent opportunity to exchange ideas and learn from one another, and that's why S³ is one of my favorite events of the academic year!

Students: You are essential to the SDSU's rapidly growing research enterprise. Each year, thousands of you participate in discovery, helping faculty advance research, scholarship, and creative activities. You elevate our research, and your involvement makes us a stronger institution. I hope your participation in high-impact activities like research, scholarship and creative activities helps you grow as scholars, and allows you to identify paths that are both fulfilling and full of possibilities!

Hala Madanat, Ph.D.

Vice President of Research and Innovation
San Diego State University

**Marissa C. Vasquez**

Associate Professor of
Postsecondary Educational Leadership

Dra. Marissa C. Vasquez is an Associate Professor of Postsecondary Educational Leadership, teaching doctoral and master's courses in the Department of Administration, Rehabilitation, and Postsecondary Education. She is a community college scholar that uses an anti-deficit lens to understand and interrogate the pre/post transitional experiences of community college and transfer students, particularly first-generation and racially minoritized communities. As the Associate Director of the Community College Equity Assessment Lab (CCEAL), a national research laboratory at SDSU, she leads efforts to assist community colleges in identifying and assessing challenges to equity-centered institutional effectiveness, and developing problem-solving strategies and solutions. Dra. Vasquez also leads the SEMILLAS Research Team, which seeks to not only further scholarship on community college students, but also engage them in research. Her team recently received a national award for their SEMILLAS Research Fellowship Program, a summer institute that is designed to introduce community college students to social science research. Dra. Vasquez is co-Editor of the Journal of Applied Research in the Community College and is on the editorial board for the Journal of Hispanics in Higher Education.

A native of the South Bay, she earned her A.A. from Southwestern College, B.A. in English from UC Berkeley, M.A. in counseling from the University of San Diego, and her Ed.D. in Community College Leadership from San Diego State University.

Social Media:

Twitter: @mvasquez619

www.marissa-vasquez.com



Emma O'Regan

Recent graduate from the School of Art and Design
Designed the new S³ logo and branding
San Diego State University

Emma O'Regan transferred to SDSU from Cabrillo, her local community college, in 2020. Through Emma's SDSU Design Studio class, she and her colleagues were given creative problems that needed solutions. The students were tasked to create the new S³ logo and branding. Emma's design was selected by a committee of faculty and staff from across the campus.

She created the logo as one continuous line to show motion and activity which connects to students and learning. The S and 3 connect at one anchor point, but not at the others, to show similarity and difference. She wanted to keep the logo clean and bold so that it could be scaled up or down and still be eye-catching. This logo has no clear beginning and end which represents change, evolution and growth. In addition to the S³ logo, she designed social media and poster assets, which focused on typography and form. She worked with the SDSU brand colors to create an engaging gradient. She chose to make "Innovation" yellow because it connotes happiness and creativity and added simple shapes that allude to SDSU architecture that blend into the background.

Emma loves Graphic Design because of the power in visual communication and the universal understanding of graphics (as opposed to words). Her favorite field of design is UI/UX because of how fast it is evolving and the need for it in our digital world. Her all time favorite aspect of design is drawing, which she's been doing since she was young. Her style has evolved, but her subject has always stayed the same: people, figures, and stories from her day to day life. After graduating from SDSU, she accepted a full time job as a Graphic Designer at Four Fin Creative Agency where they work with sustainability focused companies. When Emma's not working she enjoys hiking, surfing, reading, or spending time with her friends and family.



Thursday, March 2, 2023 - Registration

1:00 pm – 4:30 pm Aztec Student Union, Templo Mayor

Friday, March 3, 2023 - Registration

8:00 am – 4:00 pm Aztec Student Union, Montezuma Lounge

Friday, March 3, 2023 - Continental Breakfast

8:00 am – 10:00 am Aztec Student Union, Montezuma Lounge

Friday, March 3, 2023 - Opening Remarks

8:30 am – 9:00 am Aztec Student Union, Theater Room 270

Friday, March 3, 2023 - Sessions A-E

Time	Session Number	Session Type	Session Title	Presentation Location
9:00 am	A-1	Oral	Behavioral and Social Sciences 1	Park Boulevard
	A-2	Oral	Behavioral and Social Sciences 2	Mata'yuum
	A-3	Oral	Biological and Agricultural Sciences 1	Pride Suite
	A-4	Oral	Biological and Agricultural Sciences 2	Aztlan
11:00 am	B-1	Oral	Behavioral and Social Sciences 3	Mata'yuum
	B-2	Oral	Biological and Agricultural Sciences 3	Pride Suite
	B-3	Oral	Humanities, History, Literature, Philosophy 1	Metzli
	B-4	Oral	Humanities, History, Literature, Philosophy 2	Visionary Suite
1:00 pm	C-1	Oral	Behavioral and Social Sciences 4	Park Boulevard
	C-2	Oral	Biological and Agricultural Sciences 4	Pride Suite
	C-3	Oral	Humanities, History, Literature, Philosophy 3	Metzli
	C-4	Oral	Humanities, History, Literature, Philosophy 4	Visionary Suite
	C-5	Oral	Physical and Mathematical Sciences 1	Aztlan
	C-6	Oral	Engineering and Computer Science 1	Mata'yuum
	C-7	Oral	Health Nutrition and Clinical Sciences 1	Legacy Suite
3:00 pm	D-1	Oral	Biological and Agricultural Sciences 5	Mata'yuum
	D-2	Oral	Humanities, History, Literature, Philosophy 5	Metzli
	D-3	Oral	Humanities, History, Literature, Philosophy 6	Visionary Suite
	D-4	Oral	Physical and Mathematical Sciences 2	Aztlan
	D-5	Oral	Engineering and Computer Science 2	Legacy Suite
	D-6	Oral	Health Nutrition and Clinical Sciences 2	Pride Suite
11:00 am	E-1	Oral	Dr. Diane K. Smith Memorial Session 1	Templo Mayor
1:00 pm	E-2	Oral	Dr. Diane K. Smith Memorial Session 2	Templo Mayor
3:00 pm	E-3	Poster	Dr. Diane K. Smith Memorial Session 3	Templo Mayor

Friday, March 3, 2023 - Sessions F-J

Time	Session Number	Session Type	Session Title	Presentation Location
9:00 am	F-1	Poster	Behavioral and Social Sciences 5	Montezuma Hall
	F-2	Poster	Behavioral and Social Sciences 6	Montezuma Hall
	F-3	Poster	Biological and Agricultural Sciences 6	Montezuma Hall
	F-4	Poster	Biological and Agricultural Sciences 7	Montezuma Hall
	F-5	Poster	Engineering and Computer Science 3	Montezuma Hall
	F-6	Poster	Engineering and Computer Science 4	Montezuma Hall
	F-7	Poster	Physical and Mathematical Sciences 3	Montezuma Hall
	F-8	Poster	Physical and Mathematical Sciences 4	Montezuma Hall
	F-9	Poster	Physical and Mathematical Sciences 5	Montezuma Hall
	F-10	Poster	Health Nutrition and Clinical Sciences 3	Montezuma Hall
11:00 am	G-1	Poster	Behavioral and Social Sciences 7	Montezuma Hall
	G-2	Poster	Behavioral and Social Sciences 8	Montezuma Hall
	G-3	Poster	Behavioral and Social Sciences 9	Montezuma Hall
	G-4	Poster	Biological and Agricultural Sciences 8	Montezuma Hall
	G-5	Poster	Biological and Agricultural Sciences 9	Montezuma Hall
	G-6	Poster	Biological and Agricultural Sciences 10	Montezuma Hall
	G-7	Poster	Engineering and Computer Science 5	Montezuma Hall
	G-8	Poster	Engineering and Computer Science 6	Montezuma Hall
	G-9	Poster	Physical and Mathematical Sciences 6	Montezuma Hall
	G-10	Poster	Physical and Mathematical Sciences 7	Montezuma Hall
1:00 pm	H-1	Poster	Behavioral and Social Sciences 10	Montezuma Hall
	H-2	Poster	Behavioral and Social Sciences 11	Montezuma Hall
	H-3	Poster	Behavioral and Social Sciences 12	Montezuma Hall
	H-4	Poster	Biological and Agricultural Sciences 11	Montezuma Hall
	H-5	Poster	Biological and Agricultural Sciences 12	Montezuma Hall
	H-6	Poster	Biological and Agricultural Sciences 13	Montezuma Hall
	H-7	Poster	Physical and Mathematical Sciences 8	Montezuma Hall
	H-8	Poster	Health Nutrition and Clinical Sciences 4	Montezuma Hall
	H-9	Poster	Health Nutrition and Clinical Sciences 5	Montezuma Hall
3:00 pm	I-1	Poster	Behavioral and Social Sciences 13	Montezuma Hall
	I-2	Poster	Behavioral and Social Sciences 14	Montezuma Hall
	I-3	Poster	Behavioral and Social Sciences 15	Montezuma Hall
	I-4	Poster	Biological and Agricultural Sciences 14	Montezuma Hall
	I-5	Poster	Biological and Agricultural Sciences 15	Montezuma Hall
	I-6	Poster	Business Economics and Public Administration/Education 1	Montezuma Hall
	I-7	Poster	Physical and Mathematical Sciences 9	Montezuma Hall
	I-8	Poster	Health Nutrition and Clinical Sciences 6	Montezuma Hall
	I-9	Poster	Health Nutrition and Clinical Sciences 7	Montezuma Hall
1:00 pm	J-1	Exhibit/Poster	Visual Arts 1	Montezuma Hall

Saturday, March 4, 2023 - Registration

8:00 am – 11:00 am Aztec Student Union, Montezuma Lounge

Saturday, March 4, 2023 - Continental Breakfast

8:00 am – 10:00 am Aztec Student Union, Montezuma Lounge

Saturday, March 4, 2023 - Sessions K

Time	Session Number	Session Type	Session Title	Presentation Location
9:00 am	K-1	Oral	Behavioral and Social Sciences 16	Park Boulevard
	K-2	Oral	Behavioral and Social Sciences 17	Visionary Suite
	K-3	Oral	Behavioral and Social Sciences 18	Legacy Suite
	K-4	Oral	Biological and Agricultural Sciences 16	Mata'yuum
	K-5	Oral	Physical and Mathematical Sciences 10	Pride Suite
	K-6	Oral	Business Economics and Public Administration / Education 2	Aztlan
	K-7	Oral	Business Economics and Public Administration / Education 3	Metzli

Saturday March 4, 2023 - Lunch Reception

11:45 am – 1:45 pm Aztec Student Union, Montezuma Hall

Saturday March 4, 2023 - Keynote and Closing Awards

2:00 pm – 4:00 pm Aztec Student Union, Montezuma Hall

Awards

Awards will be presented at the closing award ceremony on Saturday, March 4, 2023, to recognize the most outstanding presentations in research, scholarship, and creative activities at the SDSU Student Symposium. The awards are as follows:

President's Awards

Nine President's Awards of \$500 will be given to the most outstanding oral presentations across all disciplines. Those receiving a President's Award will represent SDSU at the California State University (CSU) Student Research Competition which will be held on campus at San Diego State on April 28 and 29, 2023.

President's Award for the Arts

One President's Award for the Arts of \$500 will be given to an outstanding presentation in the performance arts or exhibit category. The awardee will represent SDSU at the California State University (CSU) Student Research Competition, which will be held at San Diego State on April 28 and 29, 2023.

Dean's Awards

Sixteen Dean's Awards of \$250 will be given for oral or poster presentations. Awards will go to the top presentations in each college.

Provost's Awards

Sixteen Provost's Awards of \$200 will be given for poster presentations. Awards will go to the top presentations in each college.

Undergraduate Research Excellence Awards

Ten Undergraduate Research Excellence Awards of \$150 will be given for oral or poster presentations across all disciplines recognizing scholarly achievement.

Library Awards

Five Library Awards of \$250 will be given for oral or poster presentations. Awards will go to the best projects using library resources and collections, including, but not limited to printed resources, databases, primary resources, and materials in all media.

Research Awards for Diversity, Inclusion, and Social Justice Awards

Diversity, social justice, and inclusiveness reflect some of the values at the core of our university mission. Five \$250 awards will be given to the best oral or poster presentations that exemplify our ongoing commitment to diversity, inclusion, and social justice.

Outstanding Creative and Performing Arts Award

One Outstanding Creative and Performing Arts Award of \$250 will be given.

Arts Exhibit Award

One Arts Exhibit Award of \$250 will be given.

Summer Undergraduate Research Program (SURP) Awards

Two \$250 awards will be given for oral or poster presentations by students who have participated in the SURP program.

Arts Alive Award

The Arts Alive SDSU Award is offered to an outstanding student from any academic program who integrates the arts as part of an interdisciplinary research project that addresses cultural or sociopolitical issues. One award of \$250 will be given.

Charles Wei-Hsun Fu Foundation Philosophy Award

The Charles Wei-Hsun Fu Foundation Philosophy Award is for students doing excellent research in the field of philosophy and encourages a special niche where philosophy students can shine. This award is open to all students who are engaged in philosophical research that are presenting an oral project at S³. One award of \$500 will be given.

The SDSU Student Symposium Award

The Center for Regional Sustainability (CRS) fosters research; establishes collaborations across campus and with partners from business, government, and education; and generates solutions that enhance the natural environment, economic vitality, and social equity in the greater San Diego-Tijuana region. CRS sponsors the SDSU Student Symposium Sustainability Award to recognize student work that focuses on creating a more just, equitable, and sustainable world by integrating vital environmental, social, and economic needs of the present while ensuring future prosperity. One award of \$250 will be given.

Women in Engineering Awards

The Women-in-Engineering (WIE) award has been presented during the yearly SDSU Student Symposium since 2015. This award aims to promote women student engineers/ researchers from the College of Engineering at the undergraduate (BS) and graduate (MS/PhD) degree education levels. The first, second and third prize amounts are \$250, \$200 and \$150, respectively and will be awarded to the top three women engineers/researchers from the College of Engineering based on S³ oral/poster judging criteria. This award is sponsored by Dr. Satish Sharma, Director, Antenna and Microwave Lab (AML), Department of Electrical and Computer Engineering.

HSI Award

The Office of HSI and Regional Affairs Student Research award goes to the top student whose research furthers our understanding of serving Latinx, Chicana, or Hispanic students in higher education, or contributes to the commitment to honor our designation as an HSI. Two awards of \$250 will be given.

Sustainability Award

The primary mission of the Center for Regional Sustainability (CRS) is to advance sustainability through regional collaborations in higher education, research, stewardship, and outreach to ensure that generations of students will gain the skills and abilities that will allow our binational region to grow, prosper, and sustain itself in the long term. CRS sponsors the SDSU Student Symposium Sustainability Award to recognize student work that focuses on creating a more just, equitable, and sustainable world by integrating vital environmental, social, and economic needs of the present while ensuring future prosperity. One award of \$250 will be given.

***Please note** – Students receiving one award will not be considered for additional awards.

Saturday, March 4, 2023

Lunch Reception

11:45 am - 1:45 pm, Aztec Student Union, Montezuma Hall

Keynote Address and Closing Awards Ceremony

2:00 pm - 4:00 pm, Aztec Student Union, Montezuma Hall

Saturday afternoon events are open to all student presenters, mentors, judges, moderators, sponsors, and volunteers.

Closing Awards Ceremony 2023 Student Symposium

Welcome

Keynote Address

Awards*

HSI Award

Women in Engineering Awards

Sustainability Award

Charles Wei-Hsun Fu Foundation Philosophy Award

Arts Alive Award

Summer Undergraduate Research Program (SURP) Award

Arts Exhibit Award

Outstanding Creative and Performing Arts Award

Research Awards for Diversity, Inclusion, and Social Justice

Library Awards

Undergraduate Research Excellence Awards

Provost's Awards

Dean's Awards

President's Award for the Arts

President's Awards

* Photos will be taken of each recipient as they receive the award. Group photos will be taken immediately after the ceremony. Recipients are encouraged to stay for group photos.



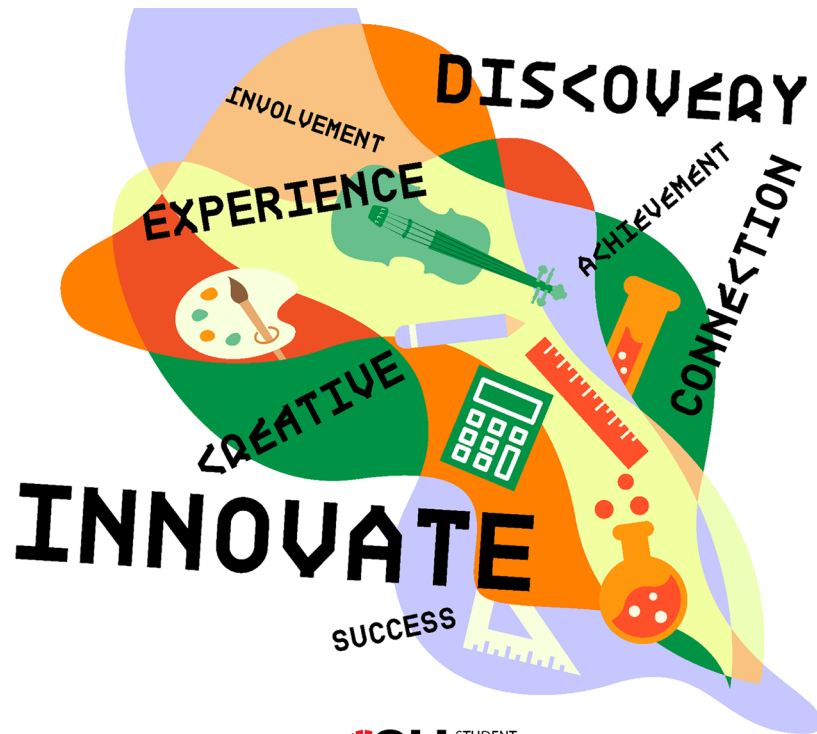
Thi Kieu Trang Dang

Major: Graphic Design

Designed for the 2023 CSU Student Research Competition
San Diego State University

My name is Thi Kieu Trang Dang, and I am a designer/student based in San Diego. I am originally from Vietnam, and I came to the U.S. to obtain my B.A. in Graphic Design. I specialize in typography, illustration, and digital marketing design. Ever since I was young, I always wanted to follow a creative career, which would eventually lead me to join SDSU. One of the reasons why I pursued a more artistic education was my interest in comic books. I hope to polish my graphic design skills in order to create my comic books in the future.

For this year's CSU Student Research Competition at SDSU, I wanted to create a design that reflects our university and the many fields of study. The CSU logo has the letter "C" modified following the shape and texture of the sun ray, representing California. It also connects to the symbol of the Hepner Hall arch of SDSU. For the poster, it consists of a collage of free form illustrations in combination with icons ranging from science to art, appealing to all subjects and majors across California. The key words consisting of innovation, discovery, experience, etc. are integrated with the illustration in order to clarify the message of the event and to add interest to the illustration.



THE BEST RESEARCH, CREATIVITY AND SCHOLARSHIP
FROM ACROSS THE CSU.

APRIL 28-29, 2023

CONRAD PREBYS AZTEC STUDENT UNION

CSU Research Competition



CALIFORNIA STATE UNIVERSITY
GRAD SLAM
 THREE-MINUTE THESIS COMPETITION
2023

HOSTED BY

SDSU | San Diego State
 University

GRAD SLAM COMPETITION

The CSU Grad Slam, which began in 2020, is a competition for the best short oral research presentation by a graduate student. It is based on the internationally popular “**Three Minute Thesis**”. The CSU Grad Slam provides an opportunity to showcase the exceptional graduate research conducted across the CSU campuses. Students have 3 minutes and one slide to present their thesis, project, or other creative work to a non-specialist audience.

During the competition, graduate students will be judged by a panel based on their ability to successfully engage a non-specialist audience while communicating key details about their research in **three minutes or less with just a single PowerPoint slide**.

Each campus is allowed to nominate two participants. The **top two** graduate student oral presentations at the 2023 SDSU Student Symposium will be nominated to participate in Grad Slam 2023.

This year, SDSU will be hosting the 3rd annual CSU-wide Grad Slam on **May 5, 2023**, via Zoom webinar.

Watch the **8 finalists** from last year’s competition.

View the **three recent award winners** from the 2022 Grad Slam.

For more information about the 2023 Grad Slam, please contact gra@sdsu.edu.

(U) = Undergraduate; (M) = Masters; (D) = Doctoral



Student Symposium

Oral Presentations

Friday, March 3, 2023

Sessions A-D and E-1 to E-2

Each oral presentation is allotted 10 minutes followed by a 5-minute question and answer period. Participants and guests are asked to enter or leave the rooms only between presentations.



(U) = Undergraduate; (M) = Masters; (D) = Doctoral

Friday, March 3, 2023

Session A: Oral Presentations

Session A-1

Behavioral and Social Sciences 1

Friday, March 3, 2023 9:00 am

Park Boulevard

100 9:05 am

The Perfect Student

Jorge Vazquez, Criminal Justice (U)**101 9:20 am**

Quality of Professor-Student Interactions

Amaya Wingfield, Health Communication (U)**102 9:35 am**

Classroom Leadership: Comparing Professor Leadership Styles and Their Affect on Student Engagement

Eric MacPherson, Communication and Psychology (Double major) (U)**103 9:50 am**

Examining the Effects of Instructor Immediacy on Student Mental Health Disclosure

Amairany Nabi, Communication Studies (M)**104 10:05 am**

Smile, you are in the classroom: The role of instructor non-verbal immediacy on academic self-esteem

Devanie Ottalagano, Communication (M)**105 10:20 am**

Building skills in primate conservation education: Assessing the impact of a one-day workshop

Jadyn Skipper, Anthropology (U)

Session A-2

Behavioral and Social Sciences 2

Friday, March 3, 2023 9:00 am

Mata'yuum

106 9:05 am

Examining Community Perspectives on Equitable Public Restroom Access and Quality in San Diego

Jonathen Vazquez Ramirez, Public Health (U)**107 9:20 am**

Development and deployment of a comprehensive social survey to understand public restroom access and related health concerns among San Diegans experiencing homelessness

Giovanna Zampa, Social Work (U)**108 9:35 am**

Creating a Scorecard for Public Restrooms in San Diego County to Address Accessibility, Cleanliness, and Safety

Sara Rodrigue, Public Health (U)**109 9:50 am**

Study of the relationship between face mask use and face touching frequency in public areas:

Naturalistic Study Design

Sydney Niesen, Public Health (U)**110 10:05 am**

The Urban Sustainability, Livability, and Equity Commuter Project

Christopher Ritter, Public Administration (U)**111 10:20 am**

Commuting as a Student

Kiersten Aviles, International Economics (U)

Session A-3

Biological and Agricultural Sciences 1

Friday, March 3, 2023 9:00 am

Pride Suite

112 9:05 am

Structural and kinetics analysis of the catalytic mechanism of human IDH1

Marissa Balagtas, Biochemistry (U)**113 9:20 am**

Role of macrophages in the development of ovarian cancer stem-like cells

Luisjesus Cruz, Joint Doctoral Program in Cell and Molecular Biology (D)**114 9:35 am**

The Color Stability of Various Genetically Mutated Samples of C-Phycocyanin

Jesse Baker, Masters of Nutritional Science (M)

(U) = Undergraduate; (M) = Masters; (D) = Doctoral

115 9:50 am

In Vitro Characterization of RIG-I Knockout Cell Lines to Determine the Mechanisms of Action of the Oncolytic Immunotherapy VAX014
Amanda Parikh, Biology (U)

116 10:05 am

Establishing R132Q IDH1 sensitivity to reducing agents
Rachel Khoury, Chemistry, Emphasis in Biochemistry (U)

117 10:20 am

Does choline increase exercise-induced neurogenesis following developmental alcohol exposure?
Stanley Liang, Psychology (M)

Session A-4

Biological and Agricultural Sciences 2

Friday, March 3, 2023 9:00 am

Aztlan

118 9:05 am

Geographic barriers and climate change threaten a rare perennial herb
Meredith Yokoyama, Biology (U)

119 9:20 am

Resilient Restoration: Drought Resilience Amongst Southern California Quercus agrifolia Populations on Tribal Lands
Alexandra Hoff, Evolutionary Biology (M)

120 9:35 am

Rice bran protein isolation and heavy metal content
Carlos Noriega, Foods and nutrition (U)

121 9:50 am

Can species adapt fast enough to climate change? A resurrection experiment of the scarlet monkeyflower in California
Ashley Regan, Environmental Science (U)

122 10:05 am

Exploring the Genomics of Hops: Insights into Domestication, Genetic Markers, and Cultivation Strategies
Mohammad Ali Shah, Biology - Cellular and Molecular Biology (U)

123 10:20 am

Hybridization might confer protection against psyllid-induced defoliation in Eucalypts
Rosalinda Diaz, Bioinformatics and Medical Informatics (M)

Friday, March 3, 2023 Session B: Oral Presentations

Session B-1

Behavioral and Social Sciences 3

Friday, March 3, 2023 11:00 am

Mata'yuum

124 11:05 am

The Impact of Abuse and Incarceration on Coparenting
Nicolé Mendoza, Sociology (M)

125 11:20 am

Parents' Readiness to Change in Childhood Obesity Prevention Programs
Sydnie Domingue, English (U)

126 11:35 am

Parenting Beliefs and Child Guidance Practices in the African American Community
Shanice Swan, Child and Family Development (M)

127 11:50 am

Attitudes surrounding having children shifting among millennials and Gen-z; Birth Rate Declining
Olivia Moran, Business Marketing (U)

128 12:05 pm

Lived Experiences of Young-Adult Spanish-English Bilinguals with and without a history of Developmental Language Disorder
Halie Doan, Speech Language Hearing Sciences (U)

129 12:20 pm

Evaluating Current Measures of Cognitive Processing for Use with Multilingual Children
Sophie Levi, Language and Communicative Disorders (D)

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Session B-2

Biological and Agricultural Sciences 3

Friday, March 3, 2023 11:00 am

Pride Suite

130 11:05 amInvestigating the Role of Pyroptosis in *Trichomonas vaginalis* Pathogenesis

Brayden Young, Microbiology (U)

131 11:20 am

SoxB1-2 Mediated Chromatin Remodeling During Stem-Cell-Based Tissue Regeneration

Mallory Cathell, Cell and Molecular Biology (D)

132 11:35 amInvestigating the Role of Pyroptosis in *Trichomonas vaginalis* Pathogenesis

Michiko Adams, Biology (Cell and Molecular) (U)

133 11:50 amInvestigating the role of motility in *Trichomonas vaginalis* pathogenesis

Bryn Baxter, Microbiology (M)

Session B-3

Humanities, History, Literature, Philosophy 1

Friday, March 3, 2023 11:00 am

Metzli

134 11:05 am

"It's Possible!" Disney and Diversity

Zakk Mannella, Master of Fine Arts in Theatre Arts
Musical Theatre (M)**135 11:20 am**

Name It, Claim it: Antiracism in Music Directing

Van Angelo (Baum), Theatre Arts: Musical Theatre (M)

136 11:35 am"There's This Disruption Happening Before Your Eyes":
Strategies for Decolonizing a White Landscape

Jill Holslin, Art & Design MFA (M)

137 11:50 amAutistic Musicality: Viewed Through the Lens of
the Neurodiversity Model of Autism

Isadora Flores, Master of Music Composition (M)

138 12:05 pm

Large, In Charge: Get Used to It

Lindsey Grant, MFA Theatre Arts: Musical Theatre (M)

Session B-4

Humanities, History, Literature, Philosophy 2

Friday, March 3, 2023 11:00 am

Visionary Suite

139 11:05 am

Photography and Abolitionism: A Visual Dialogue

Briana Betschart, History (M)

140 11:20 amAn Introduction to Archaeology of Childhood
with Artifacts of the Whaley House

Savannah Castleman, Anthropology (U)

141 11:35 amCarmen Argote At The San Diego Museum Of
Contemporary Art

Isis Exum, Studio Arts & Art History (U)

142 11:50 am#CancelLatinidad: Power Relations and Media
Representations in Contemporary Reggaetón
and Latine Culture

Eva Gomez, Women's Studies (M)

143 12:05 pmCrafting Palatable Citizens: Indigenous Dietary
Americanization

Cassandra Onstad, History (M)

144 12:20 pm

Lucid Philosophy

Carlos Melendrez, Philosophy (U)

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Friday, March 3, 2023

Session C: Oral Presentations

Session C-1

Behavioral and Social Sciences 4

Friday, March 3, 2023 1:00 pm

Park Boulevard

145 1:05 pm

Financial Toxicity Among Underserved Breast Cancer Survivors

Andrea Van Bebber, Psychology (U)**146 1:20 pm**

We All Count, El Cajon. A Survey on the Middle-Eastern Community in El Cajon City

Nasser Mohieddin, Big Data Analytics (M)**147 1:35 pm**

Health-Related Quality of Life in Hispanic-American Adults: Associations between Demographic Factors and Cancer Fatalism

Megan Korhummel, Psychology (U)**148 1:50 pm**

Her Turn to Learn: Expanding Girls' Education in Afghanistan

Sandrien Mekany, Political Science (U)**149 2:05 pm**

No Person Shall Willfully Resist, Delay, or Obstruct: The Criminalization of Activists and Organizers Resisting Homeless Encampment Sweeps

Nicolas Gutierrez III, Criminal Justice and Criminology (M)

Session C-2

Biological and Agricultural Sciences 4

Friday, March 3, 2023 1:00 pm

Pride Suite

150 1:05 pm

Modulation of marine tubeworm metamorphosis through a sigma factor-like regulator

Andy Fedoriouk, Cell and Molecular Biology (D)**151 1:20 pm**Genome-scale metabolic model of the microalgae *Dunaliella salina* – From CO₂ and light to pigments and antioxidants**Jenna Armstrong, Bioinformatics / Medical Informatics (M)****152 1:35 pm**Population Genomics of the Invasive Pink Rice Borer Moth, *Sesemia inferens***Scott Monahan, Biology (U)****153 1:50 pm**Understanding the Metabolism of Recently Isolated Infectious Bacterium, *Bordatella atropi***Ila Peeler, Cellular and Molecular Biology M.S. (M)****154 2:05 pm**Pharmacological suppression of the sweet receptor T1R3 impacts pancreatic islet development and gene expression in the zebrafish, *Danio rerio***Christine Cho, Environmental Health Sciences (M)**

Session C-3

Humanities, History, Literature, Philosophy 3

Friday, March 3, 2023 1:00 pm

Metzli

155 1:05 pm

Joy as a Foundational Ethos of Musical Theatre Training

Justin Brill, MFA in Theatre Arts - Musical Theater (M)**156 1:20 pm**

Theatre for the Public Good: Applied Theatre for Youth - Safa's Story

Wilfred Paloma, M.F.A. Theatre Arts [Musical Theatre] (M)**157 1:35 pm**

Interview With A DJ: An Ethnography on Alternative Music and Culture

Ash Osiris, Anthropology (U)**158 1:50 pm**

Bad Bite: How malocclusion can impede your vocal production

Sarah Salonga, Master of Fine Arts (MFA) Degree in Musical Theatre (M)

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159 2:05 pm

Can a Scream Be Music? The Gothic Modality of Harsh Metal Vocals

Trent Pollett, Musicology (M)

160 2:20 pm

Moms on Broadway: How can we realistically support mothers in the theatre?

Natalie McClure, Musical Theatre (M)

Session C-4

Humanities, History, Literature, Philosophy 4

Friday, March 3, 2023 1:00 pm

Visionary Suite

161 1:05 pm

The Lives and Careers of Amy Beach, Florence B. Price, and Maria Newman

Clare A. Hatter, Violin Performance (M)

162 1:20 pm

Feeling a Little Less Down: The Queer Latina Photography of Laura Aguilar

Renata Orozco, Art History and Graphic Design (U)

163 1:35 pm

“The Feminine Presence”: Gender Discourse in the United Farm Workers’ Newspaper

Kayla Solsbak, History (M)

164 1:50 pm

The Biased Gaze: Orientalist and Primitivist Depictions of the Female Nude

Yena Kim, Applied Design - Furniture and Woodworking (M)

165 2:05 pm

Queer Theory and The Death of Capitalism

Dylan Wells, Masters of Fine Arts, Creative Writing, fiction (M)

Session C-5

Physical and Mathematical Sciences 1

Friday, March 3, 2023 1:00 pm

Aztlan

166 1:05 pm

Structure and Stability of Differentially Rotating Compact Stellar Objects

Delaney Farrell, Computational Science (D)

167 1:20 pm

Precise Age of the AB Doradus Moving Group via Analysis of Binary Star Systems

Victoria Moore, Astronomy (M)

168 1:35 pm

Spectropolarimetric Evolution of Tyle II-Plateau SN2017eaw

Spencer Raines, Astronomy (M)

169 1:50 pm

Semi-Automated Spectral Type Classification of Supernovae, Applied to Hydrogen-Rich Interacting Supernova Spectra

Michael Baer, Astronomy (M)

Session C-6

Engineering and Computer Science 1

Friday, March 3, 2023 1:00 pm

Mata'yuum

170 1:05 pm

Hydro-Mechanical Behavior of Biopolymer-Stabilized Rammed Earth

Nusheen Baradaran, Civil Engineering (U)

171 1:20 pm

Response of antibiotic resistant bacteria during anammox treatment of pretreated municipal wastewater and landfill leachate

Lilith Astete Vasquez, Environmental Engineering (D)

172 1:35 pm

Exploring the Depths: Tethys Data Explorer Aids in Understanding Aquatic Animal Data

David Cardoso, Computer Science (U)

173 1:50 pm

Life Cycle Assessment: Cradle-to-Grave Carbon Dioxide Emissions of BEV and PHEV

Scarlett Alexander, Mechanical Engineering (M)

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Session C-7

Health Nutrition and Clinical Sciences 1

Friday, March 3, 2023 1:00 pm

Legacy Suite

174 1:05 pm

The sexual, reproductive, and infant health care experiences of asylum-seeking women at the Mexico-U.S. border during the COVID-19 pandemic

Isela Martinez SanRoman, MPH Health Promotion/Latin American Studies (M)

175 1:20 pm

Gender-Based Violence among Asylum-seeking Women in Tijuana

Arianna Spata, Public Health-Epidemiology and Latin American Studies (M)

176 1:35 pm

The Association Between Peer Support and Age Among Cisgender Women Diagnosed With HIV

Tobi Pavlas, Master of Social Work (M)

177 1:50 pm

Association Between Living Alone and Physical Activity Among Women Ages 18-64 years, BRFS, 2019

Neeraja Ramesh, MPH (M)

Friday, March 3, 2023 Session D: Oral Presentations

Session D-1

Biological and Agricultural Sciences 5

Friday, March 3, 2023 3:00 pm

Mata'yuum

178 3:05 pm

Developing New CRISPRi Toolkit for Marine Bacteria

Alpher Aspiras, Cell and Molecular Biology (U)

179 3:20 pm

Tracking a lytic toxin and its consequences in the IBD microbiome

Nicole Jacobson, Cellular and Molecular Biology (D)

180 3:35 pm

Flux balance analysis of the ammonia-oxidizing bacterium *Nitrosomonas europaea* ATCC19718 unravels specific metabolic activities while degrading toxic compounds

Georgina Gabriela Canto Encalada, Biology (M)

181 3:50 pm

What Makes a Tubeworm? Understanding The Developmental Building Blocks of *Hydroides elegans*, a Marine Biofouling Tubeworm

Emily Darin, Cell and Molecular Biology (D)

182 4:05 pm

Isolating bacteriophages from a Crohn's Disease patient

Cole Souza, Master's in Microbiology (M)

Session D-2

Humanities, History, Literature, Philosophy 5

Friday, March 3, 2023 3:00 pm

Metzli

183 3:05 pm

"Free Art"

Mariam Ahmed, Masters in Fine Arts, Creative Writing (M)

184 3:20 pm

Restore the U.S. Criminal Justice System through the Healing Power of the Arts

Kristine White, Liberal Arts and Sciences (M)

185 3:35 pm

(Art)ificial Intelligence: The Role of Post-Internet Art in the Digital Humanities

Carson Poole, Liberal Arts and Sciences (M)

186 3:50 pm

Operation Rescue: Technological Adaptions for Historic Conservation and Preservation Practices in San Diego County, California

Natalia Galeana, Historical Archaeology (M)

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Session D-3

Humanities, History, Literature, Philosophy 6

Friday, March 3, 2023 3:00 pm

Visionary Suite

187 3:05 pm

Globalizing Education

Mariel Valle, Philosophy (M)

188 3:20 pm

A New Look at the Cuban Missile Crisis

Amber Orozco-Reese, History (M)

189 3:35 pm

An Analysis of The School to Prison Pipeline

Tavee Binavi, Criminal Justice (U)

190 3:50 pm

#EnvironmentalJustice.Now

Da Quanisha Parks, Creative Arts and Design (U)

191 4:05 pm

WeChat Usage and Emoji Ratings: How usage of the social media platform WeChat influences the ratings of emojis from WeChat

Brianna O'Boyle, Linguistics (M)

Session D-4

Physical and Mathematical Sciences 2

Friday, March 3, 2023 3:00 pm

Aztlan

192 3:05 pm

Kinematics of high resolution VLT/MUSE spectroscopic sample of nearby galaxies through 3-D tilted ring modeling

Rohan Rahatgaonkar, Astronomy (M)

193 3:20 pm

Comparison Of Exoplanet Period-Finding Methods Via Synthetic Data

Samantha Anger, Astronomy (M)

194 3:35 pm

Exploring the Relationship Between Cool Gas Absorption and the Stellar Characteristics of Star-Forming Galaxies: A Study of Sodium Doublet Transition in the Interstellar Medium

Leonardo Barba, Astronomy (M)

195 3:50 pm

Low Rates of Oxygenic Photosynthesis Implies No Animals on the Exoplanet TRAPPIST-1 e

Joseph Soliz, Astronomy (M)

Session D-5

Engineering and Computer Science 2

Friday, March 3, 2023 3:00 pm

Legacy Suite

196 3:05 pm

Fall Prediction Using Human Pose Estimation On An Edge Computing Platform

Shreyas Narasimhiah Ramesh, Electrical Engineering (M)

197 3:20 pm

Spectro-mechanical Characterization of Shock-loaded Polymers

Maryam Ghorbani, Mechanical Engineering (D)

198 3:35 pm

Trust in AI-powered collaborative robots in the construction industry

Newsha Emaminejad, Construction Engineering (M)

199 3:50 pm

Ultrasonic Guided Waves Scattering Spectra by Hybrid Global-Local Modeling for NDE in composites with varying defect features

Mingyue Zhang, Structural Engineering JDP (D)

200 4:05 pm

Measurement of Attenuated LoRa Propagation in Sandy Loam

Soumya Konery Satheeshkumar, Electrical Engineering (M)

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Session D-6

Health Nutrition and Clinical Sciences 2

Friday, March 3, 2023 3:00 pm

Pride Suite

201 3:05 pm

Widening the Lens on Immersive Learning: A Neuroeducation Study Addressing a “Wicked” Empathy Problem through Story Interventions and Multifaceted Measures

Maria Keckler, Education (D)**202 3:20 pm**

“Effects of Patient Aggression on Pediatric Healthcare Workers”

Alexandra Nash, Psychology with an emphasis in Industrial Organizational Psychology (U)**203 3:35 pm**

Why Aren't There Enough Female Asian American Healthcare Professionals? Navigating Gendered and Racialized Discourses of Leadership

Brianna Pham, Communication Studies (M)**204 3:50 pm**

Athletic Trainers' Perceptions of Factors that Should be Included in Medical Disqualification Consideration Following Concussion

Mira Saab, Kinesiology Pre Physical Therapy (U)**205 4:05 pm**

Lower Extremity Kinematics During the Landing Phase of a Lateral Broad Jump in Division I Men's Basketball Athletes

Cassidy Burns, Kinesiology- Fitness Specialist (U)**206 4:20 pm**

Exploring the Effects of Prune Extract on Cellular Models of Bone Cancer

Chelsie Miller, Foods and Nutrition (U)

Friday, March 3, 2023 Session E: Oral Presentations

Session E-1

Dr. Diane K. Smith Memorial Session 1

Friday, March 3, 2023 11:00 am

Templo Mayor

207 11:05 am

Opening Remarks

Dr. Bill Tong, Vice Provost and Distinguished Professor of Chemistry and Biochemistry**208 11:20 am**

Investigating Deep Eutectic Solvents as CE Separation Media

Karen Campos, Chemistry (U)**209 11:35 am**

Diversity of Sperm Morphology Across the Animal Kingdom: A Quantitative Comparative Analysis Using Scanning Electron Microscopy

Ashley Pettit, Microbiology, Emphasis in Clinical Laboratory Sciences (U)**210 11:50 am**

Sensitive Detection of SARS-CoV-2 Biomarkers Using Nonlinear Laser Wave-Mixing Spectroscopy Coupled with Capillary Electrophoresis and Microfluidics

Nini Shatirishvili, Chemistry (D)**211 12:05 pm**

A Novel Method of Standardizing the Handling of Human Feces – A Metabolomics Approach

Candice Gokey, Analytical Chemistry (D)**212 12:20 pm**

Discovery and identification of a non-lethal mechanism for intercolony inhibition (“sibling rivalry”) in *Marinobacter*

Ellen Kuang, Bioanalytical Chemistry (D)

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Session E-2

Dr. Diane K. Smith Memorial Session 1

Friday, March 3, 2023 1:00 pm

Templo Mayor

207 1:05 pm

Student Testimonials

213 1:20 pm

Discovering the Obvious-In-Hindsight with Quinones:
Mystery of the Missing Current, Dianion's Solvent
Attack, and Expanding the 3rd Redox Dimension

Rachel Staley, Analytical Chemistry (D)

214 1:35 pm

Redox-Responsive H- Bonding for
Supramolecular Applications

Laurie Clare, Chemistry (M)

215 1:50 pm

Studies on the Effects of Electron-Donating and
-Withdrawing Groups on Ruthenium Water
Oxidation Catalysts

Miguel Ibanez, Chemistry (D)

216 2:05 pm

DEA-tC

Harrison Pearce, Chemistry (D)

217 2:20 pm

A Voltammetric Investigation of the Electrocatalytic
Cycle Mechanism of Fe(I) and Mn(I) Complexes

Kristine Legaspi, Chemistry (D)

218 2:35 pm

Development of an Electrochemically
Regenerable Hydride Mediator

Dylan Karr, Chemistry (D)

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Student Symposium

Poster Presentations

Friday, March 3, 2023

Sessions E-3 and F-1 to I-9

Poster presenters are required to stand
by their poster during the entire
1-hour and 30 minute discussion period.



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Friday, March 3, 2023

Session E: Poster Presentations

Session E-3

Dr. Diane K. Smith Memorial Session 3
Friday, March 3, 2023 3:00 pm
 Templo Mayor

219 TM 1

Mutating Bacteriophage MS2 to Create Minus-Sense RNA
Sophia Alvarez, Chemistry - Emphasis in Biochemistry (U)

220 TM 2

R132Q IDH1 sensitivity to reducing agents
Nicole Sierra, Biochemistry (U)

221 TM 3

Enzyme kinetics of a mutant IDH1 R132F
Divine Pungi, Chemistry (U)

222 TM 4

Photocatalytic synthesis of Atropisomeric Indoles with an N-C Chiral Axis using CsPbBr₃ Chiral Perovskite Nanocrystals
Dylana Guyon, Interdisciplinary Studies (U)

223 TM 5

Applying antisense oligonucleotide therapy (ASO) for autism spectrum disorder in preclinical models
Mariami Kuljanishvili, Chemistry-Emphasis in Biochemistry (U)

224 TM 6

Mn doped perovskites for spin polarized photocatalysis
Kevin Rubalcaba, Chemistry (U)

225 TM 7

Investigation of PCET-Based Redox-Responsive H-bonding in Simple 2 H-bonding Systems
Liam Seitz, Chemistry (U)

TM 8

Memorial Poster

Friday, March 3, 2023

Session F: Poster Presentations

Session F-1

Behavioral and Social Sciences 5
Friday, March 3, 2023 9:00 am
 Montezuma Hall

226 9:00 am A

Pandemic-Related Disruption in Nonparental Care and Vocabulary in the First Five Years
Matthew McArthur, Psychology (M)

227 9:00 am B

Acquiring Normative Verb Generation Data through Online Behavioral Testing
Mohamed Ali, Speech, Language, and Hearing Sciences (U)

228 9:00 am C

Normalizing Amsterdam: Characterizing the modified Amsterdam Inventory for Auditory Disability
Lydia Abel, Speech, Language, and Hearing Sciences (U)

229 9:00 am D

Otoacoustic Emissions Differences Between Student Musicians and Non-Musicians
Alyssa Hunter, Speech, Language, and Hearing Sciences (U)

230 9:00 am E

Increasing Engagement in Mental Health Care Among Underserved Adults: A Program Evaluation of Therapy For All at Urban Restoration Counseling Center (URCC)
Eamonn Hartmann, Public Health (M)

231 9:00 am F

Needs Assessment of Mental and Emotional Support Available to Adolescent Refugees in School Settings in San Diego County
Antoinette Dunlap, Public Health (M)

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Session F-2

Behavioral and Social Sciences 6

Friday, March 3, 2023 9:00 am

Montezuma Hall

232 9:00 am G

Social Support and Barriers to Care and Community Among Sexual and Gender Minority Youth at Risk for Repeat Suicide Attempts

Shefali Sharma, Psychology (U)

233 9:00 am H

Therapist-reported adaptations to evidence-based practices in mental health treatment

Elizabeth Fenelon, Psychology (U)

234 9:00 am I

Land Occupations in Belo Horizonte, Brazil

Isabele de Lima Vargas Simoes, Sociology (M)

235 9:00 am J

En Ser Mujer: Latin American Women and Digital Media Entrepreneurship

Andrea Berreondo, Mass Communication & Media Studies (M)

236 9:00 am K

Barriers for Hispanic Mother-Daughter Dyads in an Exercise Program

Samantha Muniz, Psychology (U)

237 9:00 am L

Botched this way: An autoethnographic exploration of beauty standards, celebrity, and surgical culture on Instagram

Nichole Gray, Mass Communications (M)

Session F-3

Biological and Agricultural Sciences 6

Friday, March 3, 2023 9:00 am

Montezuma Hall

238 9:00 am M

Re-introduced American bison increase legume cover in restored tallgrass prairies

Mareike Lankhorst, Biology with emphasis in Ecology (U)

239 9:00 am N

Studies to Elucidate Plant-Methanotroph Interactions

Chynna Bowman, Cellular Molecular Biology (M)

240 9:00 am OHistological analysis and experimental crosses for accurate determination of the sexual system in *Cylindropuntia chuckwallensis*

Andrew Lee, Biology (U)

241 9:00 am PSeedbank and seed emergence dynamics of bridal broom (*Genista monosperma*), a potentially invasive non-native shrub

Sam Irwin, Biology (U)

242 9:00 am QAnalysis of tourist and citizen scientist data concerning humpback whales (*Megaptera novaeangliae*) in the Bay of Banderas

Rose Pollard, Biology/Zoology (U)

243 9:00 am RIdentification of drought-tolerant oak populations (*Quercus agrifolia*) using stomatal conductance and mortality index

Ayleen Herrera, Biology (U)

Session F-4

Biological and Agricultural Sciences 7

Friday, March 3, 2023 9:00 am

Montezuma Hall

244 9:00 am S

The generation of an engineered HEK293T cell line bearing mutant NEMO incapable of binding to linear polyubiquitin

Sally Luong, Chemistry and Biochemistry (D)

245 9:00 am T

Engineering MS2 Maturation Protein for Structural Studies

Gabriela Contreras, Chemistry with an emphasis in biochemistry (U)

246 9:00 am UElucidating the protein-protein interactions of *Drosophila* UNC-45 via in vivo and in vitro chemical crosslinking

Jorge Rodriguez, Chemistry (M.S.) (M)

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247 9:00 am V

Investigating the purification and kinetic characteristics of WT and Mutant DNA Polymerase ϵ
Ashfeen Nawar, Chemistry and Biochemistry (M)

248 9:00 am W

Labeling of Membrane Protein RAF Kinase for Single Molecule Studies
Amy Ballesteros, Biochemistry (U)

249 9:00 am X

Kinetic and Structural Characterization of Human Isocitrate Dehydrogenase 1
Elene Albekioni, Chemistry and Biochemistry (D)

250 9:00 am Y

Crystallization and Structural Determination of the SARS-CoV-2 Mpro Proenzyme Form
Jackson Salvestrini, Biochemistry (U)

Session F-5

Engineering and Computer Science 3

Friday, March 3, 2023 9:00 am

Montezuma Hall

251 9:00 am Z

Role of Aortic Tissue Stiffness in LV-LVAD Mechanics
Zachary Conte, Mechanical Engineering with Emphasis in Bioengineering (U)

252 9:00 am AA

Helical flow in the aortic arch during mechanical circulatory support
Britton Mennie, Biomechanical Engineering (U)

253 9:00 am BB

3D-printing anatomically correct human skull surrogates
Ramiro Mantecon, Mechanical Engineering (D)

254 9:00 am CC

Preliminary Virtual Experiments on the Mechanical Performance of 3D Printed Lattice Structures
Brandon Huffman, MS Mechanical Engineering (M)

255 9:00 AM DD

The effect of increasing heart rate on intermittent aortic valve opening during LVAD Support
Chaztyn Pangelina, Mechanical Engineering (M)

Session F-6

Engineering and Computer Science 4

Friday, March 3, 2023 9:00 am

Montezuma Hall

256 9:00 am EE

Mechanical performance of self-healing biopolymer-amended soil
Jhansi Gadhiraaju, Construction Engineering (M)

257 9:00 am FF

FEMA vs ASCE Response Modification Factor Methods
Sergio Calles, Civil Engineering - Structural (M)

258 9:00 am GG

Graphical Neural Network based task scheduling in Robots
Nishee Agrawal, Computational Science with emphasis in Data Science (M)

259 9:00 am HH

Pedestrian and Bicycle Involved Accidents Analysis and Reviewing Safe Routes to School Program Effectiveness in Chula Vista, CA
Bitia Etaati, Big Data Analytics (BDA) (M)

260 9:00 am II

Integrating equity in prioritizing bicycle safety improvement projects with a focus on using Surrogate Safety Measures (SSMs) and crowdsourced data
Amir Reza Sadeghi, Civil Engineering (Transportation Engineering) (M)

261 9:00 am JJ

Proactive safety evaluation with Post Encroachment Time (PET) at a signalized intersection using the computer vision approach
Sina Salehipour, Civil Engineering (Transportation Engineering) (M)

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Session F-7

Physical and Mathematical Sciences 3

Friday, March 3, 2023 9:00 am

Montezuma Hall

262 9:00 am KK

Marine Debris from River Margins: A Field Study
Analysis of Fragmentation and Degradation of
Discarded Plastic

Ella Knight, Civil Engineering [Environmental Engineering] (M)

263 9:00 am LL

Water Quality and Quantity in the Redding
Watershed after the Carr Fire

Evan Kolb, Civil Engineering- Environmental Engineering (M)

264 9:00 am MM

Evaluating the Ecological Health of Alvarado Creek
Tierney Kim, Civil Engineering with an Environmental
Engineering concentration (M)

265 9:00 am NN

Impacts of vegetation and invasive plant species
on fire behavior and burn severity patterns in
Otay Valley Regional Park

Anahi Mendez Lozano, Environmental Engineering (U)

266 9:00 am OO

Utilizing remote sensing products to assess
vegetation conditions after disturbance

Kathryn Tippett, Mechanical Engineering (U)

267 9:00 am PP

Spatial Distribution of Dissolved Ion Concentrations
of the Angelo Coast Range Reserve Watershed

Callie Summerlin, Environmental Sciences (U)

Session F-8

Physical and Mathematical Sciences 4

Friday, March 3, 2023 9:00 am

Montezuma Hall

268 9:00 am QQ

Real-time, portable fluorescence sensors track
sewage inputs in urban rivers

Glorya Escobar, Civil Engineering with a concentration
in Environmental Engineering (M)**269 9:00 am RR**

Spatial distribution of water temperature and
dissolved oxygen in the Eel River Watershed

Joleena De La Fe, Environmental Science (U)

270 9:00 am SS

Nature-based solutions for enhancing soil
hydro-mechanical properties

Nawaf Alneami, Civil Engineering (U)

271 9:00 am TT

Anammox Enrichment with a Low Maintenance
Anaerobic Baffled Reactor

Grace McKenzie, Environmental Engineering (U)

272 9:00 am UU

Investigating the ability of anammox bacteria to
degrade nitrogen-containing chemicals in wastewater

Polina Popova, Environmental Engineering (U)

273 9:00 am VV

LCLUC Impacts of Arctic Oil/Gas Exploration

Avi Martin, Geographic Information Science / Technology (U)

274 9:00 am WW

Thaw depth and water table trends in Utqiagvik,
Alaska during the summer of 2022

Kristine Bernabe, Biology, Emphasis in Cellular and Molecular
Biology, B.S. in Applied Arts and Sciences (U)

Session F-9

Physical and Mathematical Sciences 5

Friday, March 3, 2023 9:00 am

Montezuma Hall

275 9:00 am XX

Examining the Mechanism of CO₂ Reduction on
Silver Nanoparticles via Surface-Enhanced Raman
Spectroscopy

Christopher Turchiano, Chemistry (M)

276 9:00 am YY

How Does Bacteriophage MS2 Selectively Package
its Own RNA in vivo?

Amineh Rastandeh, Chemistry (M)

277 9:00 am ZZ

Using DNA strands to study the RNA clusters
formed during in vitro transcription

Herman Dhaliwal, Physical Virology (D)

(U) = Undergraduate; (M) = Masters; (D) = Doctoral

278 9:00 am AAA

Determining Binding Constants of Ligand-Metal Complexes Through Fluorescence Spectroscopy
Wyatt Mathers, Chemistry (U)

279 9:00 am BBB

Functionalizing MS2 VLPs With DNA Oligonucleotides
Alaina Sekany, Biology (U)

280 9:00 am CCC

Preparation of G β 1-AuNp conjugate
Sierra Murrell, Chemistry (U)

Session F-10

Health Nutrition and Clinical Sciences 3

Friday, March 3, 2023 9:00 am

Montezuma Hall

281 9:00 am DDD

Healthcare Access Among International & Domestic San Diego State University Students
Hadeel Ali, Public Health (U)

282 9:00 am EEE

Do mental health symptoms among nurses vary by their primary department?
Krishnaraj Gohil, Epidemiology (M)

283 9:00 am FFF

Exploring Existing Resources and Neglected Healthcare Barriers of Chronic Diseases Among Refugees Resettled in San Diego
Marleen Odeesho, Kinesiology- Pre-Physical Therapy (U)

284 9:00 am GGG

Exploring Psychometric Properties of a new Oral Behavior Social Support (OHBSS) Scale in English and Spanish
Kenya Benitez, Rhetoric and Writing Studies (U)

285 9:00 am HHH

Understanding of Cardiotoxicity Risk among Limited English Proficient Older Adults with Cancer
Dana Patterson, Public Health, Health Management/Policy (M)

Friday, March 3, 2023

Session G: Poster Presentations

Session G-1

Behavioral and Social Sciences 7

Friday, March 3, 2023 11:00 am

Montezuma Hall

286 11:00 am A

COVID-19 Vaccine Hesitancy in the Imperial Valley
Katherine Ekonomo, Psychology (U)

287 11:00 am B

Alcohol consumption associated with stress due to COVID-19
Caitlyn Brucks, Psychology (U)

288 11:00 am C

Stage at cancer diagnosis and cannabis use among adult cancer survivors in Southern California
Nasim Kasiri, Public Health - Epidemiology (M)

289 11:00 am D

An exploratory analysis of factors that predict a change in depression symptoms pre- vs. post-COVID-19 lockdown among Type-2 Diabetes patients in San Diego County
Nicole Pippard, Epidemiology (D)

290 11:00 am E

Type 2 Diabetes self-management during the COVID-19 Pandemic: A Qualitative Study at a Federally Qualified Health Center in Southern California
Elana Metz, Social Work and Public Health (M)

291 11:00 am F

A Qualitative Study of Patient Perspectives on Best Practices for the Management of Type 2 Diabetes at a Federally Qualified Health Center in Southern California
Denise Marquez, Public Health (M)

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Session G-2

Behavioral and Social Sciences 8

Friday, March 3, 2023 11:00 am

Montezuma Hall

292 11:00 am G

Cheers to us: social support moderates relationship between social network and alcohol consumption in college students

Nancy Huynh, Psychology (U)

293 11:00 am H

Traditional Machismo, Caballerismo, and Illicit Substance use among Young Latinx Sexual Minority Men

Eduardo Hernandez Mozo, Microbiology / Psychology (U)

294 11:00 am I

Perceptions Associated with the Use of Electronic Cigarettes

Katelyn Sasaki, Public Health (U)

295 11:00 am J

College Student Vaper and Non-Vaper Health Perceptions

Alice Xayavong, Public Health - Epidemiology (M)

296 11:00 am K

Association Between Secondhand Vaping Exposure and Vaping Status Among College Students

Rafael Chavez, MPH - Epidemiology (M)

297 11:00 am L

Vicarious Racism and Substance-Use: Assessing the moderating roles of social-connection and ethnic-identity

Isabela Cruz-Vespa, Psychology (U)

Session G-3

Behavioral and Social Sciences 9

Friday, March 3, 2023 11:00 am

Montezuma Hall

298 11:00 am M

The impact of early adolescent polyvictimization on externalizing behavior trajectories and early adult criminal justice involvement

Michelle Gaspar Jimenez, Psychology / Criminal Justice (U)

299 11:00 am N

Supervision of Individuals Convicted of Sexual Offenses: Examining with a Public Health Perspective

Holly Hiatt, Public Health (U)

300 11:00 am O

Understanding Staff Perspectives on Supervision and Community Management of Individuals Who Have Been Convicted of Sexual Offenses

Emily Augustine, Journalism, Advertising emphasis (U)

301 11:00 am P

Risk is Feelings: Support-Giving Increases Risk Perceptions

Alicia Assang, Psychology (M)

302 11:00 am Q

Patient and Provider Perceptions on the Influence of Intimate Partner Violence on Acquiring HIV and Access to HIV Preventative Services

Sandhya Muthuramalingam, Public Health (U)

303 11:00 am R

Annotating unstructured data from medical records to reduce bias in algorithms for geriatric oncology

Hoang Nguyen, Public Health (M)

304 11:00 am S

The Role and Impact of the Athletic Trainer in the Medical Disqualification Process Following Concussion

Mikaela Garcia, Kinesiology, pre-physical therapy (U)

Session G-4

Biological and Agricultural Sciences 8

Friday, March 3, 2023 11:00 am

Montezuma Hall

305 11:00 am T

The Effect of Site Productivity and Disturbance on Microbial Compositions in the Built Environment

Kaelyn Nannini, Biological and Medical Informatics (M)

306 11:00 am U

Environmental source-tracking with metabolomic data

Andrew Levine, Bioinformatics / Medical Informatics (M)

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307 11:00 am V

Characterization of Metagenomes and Pathogen Identification of the Tijuana River

Shayla Shahar, Bioinformatics / Medical Informatics (M)

308 11:00 am W

Soil Bioengineering for Green infrastructure: Understanding soil-waterplant interactions

Aditya Garole, Civil Engineering (M)

309 11:00 am X

Lunar Farming: Mechanism of Plant Growth Promotion in Lunar Regolith by Biopolymer and Urea Fertilizer

Emily Brown, Environmental Engineering (U)

Session G-5

Biological and Agricultural Sciences 9

Friday, March 3, 2023 11:00 am

Montezuma Hall

310 11:00 am Y

Investigation of Endolysosomal and Mitochondrial Dysfunction in Neurodegenerative Diseases

Rhiannon Gilliard- Telefoni, Interdisciplinary: Biology, Chemistry, and Sociology (U)

311 11:00 am Z

The Role of Ephrin Signaling in Neural Patterning in Planarians

Sarah Warner, Molecular Biology, MS (M)

312 11:00 am AA

The Role of the Transcription Factor Barhl2 in Sensory Neuron Regeneration in the Planarian Species *Schmidtea mediterranea*

Megan Daneman, Biology with an emphasis in cellular and molecular biology (U)

313 11:00 am BB

Techniques Utilized with Induced Pluripotent Stem Cells Researching Pediatric Neurological Disease

Christina Jackson, Biology (U)

314 11:00 am CC

Using Human Pluripotent Stem Cells to Study Retinal Development and Photoreceptor Regeneration

Samuel Williams, Biology (U)

Session G-6

Biological and Agricultural Sciences 10

Friday, March 3, 2023 11:00 am

Montezuma Hall

315 11:00 am DD

Role of ABC Transporters in the Planarian species *Schmidtea mediterranea*

Rania Atto, Microbiology (U)

316 11:00 am EE

PPAR d/b role in Nrf2 antioxidant function

Sydney Roman, Biology (U)

317 11:00 am FF

Embryonic development is affected by chemical leachate resulting from tire wear particles (TWP) in the zebrafish, *Danio rerio*

Jenielle Domaol, Biology (U)

318 11:00 am GG

Comparative assessment of the fungicide Boscalid with its primary metabolite M510F01 in zebrafish embryos

Julia Goebel, Public Health / Environmental Health (M)

319 11:00 am HH

Toxic Effects of Mining Practices in Northern Chile on Embryonic Development

Shilpa Mudumbe, Cellular and Molecular Biology (U)

Session G-7

Engineering and Computer Science 5

Friday, March 3, 2023 11:00 am

Montezuma Hall

320 11:00 am II

Ultrasonic Detection and analysis of Ply-Waviness defects in Carbon Fiber Reinforced Polymer laminates

Nathan Machak, Aerospace Structural Mechanics (M)

321 11:00 am JJ

Numerical and Experimental Investigation of Extreme Lunar Conditions on the Physical and Mechanical Properties of Lunar Construction Materials

Aina Narvasa, Civil - Environmental Engineering (M)

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322 11:00 am KK

Ultrasonic Guided Waves Defect Signatures for Damage Characterization of Complex Impact Damages in Composite Aircraft Panels
Kalib Varela, Aerospace Engineering (M)

323 11:00 am LL

The Impact Efficacy of Density-graded Polyurea Foams
Mark Smeets, Mechanical Engineering (D)

324 11:00 am MM

Shock Response of Polyurea Foams
Paul Kauvaka, Chemistry (U)

325 11:00 am NN

3D Printing and Mechanical Characterization of Reinforced Honeycomb Structures
Anil Singh, Mechanical Engineering (M)

Session G-8

Engineering and Computer Science 6

Friday, March 3, 2023 11:00 am

Montezuma Hall

326 11:00 am OO

Water Tunnel Flow Visualization: Endwall Effects on Vortices Over an Airfoil
Charles Duddy, Aerospace Engineering (U)

327 11:00 am PP

Trajectory Learning and Generation Based on Gaussian Mixture Model
Jennifer Hong, Aerospace Engineering (U)

328 11:00 am QQ

Water Table Experiment: Supersonic Nozzle Design and the Hydraulic Analogy
Jason Ruiz, Aerospace Engineering (U)

329 11:00 am RR

Adaptive Vector Fitting for Order Estimation of Transfer Functions from Measured or Simulated Network Parameters
Andria Lemus, Electrical Engineering (M)

330 11:00 am SS

Motor Controls of a CubeSat within an ACDS Test Bed
Jarred Sampayan, Aerospace Engineering (U)

331 11:00 am TT

Multiple Beam Antenna Design using Folded Rotman Lens and U-Slot Loaded Patch Antennas
Gabriel Duran, Electrical Engineering (M)

332 11:00 am UU

Design of a Multiple Beam Wideband Antenna Using 8x8 Butler Matrix Beamformer for 5G NR Bands
Joseph Tallo, Electrical Engineering (M)

Session G-9

Physical and Mathematical Sciences 6

Friday, March 3, 2023 11:00 am

Montezuma Hall

333 11:00 am VV

Modeling the Spatiotemporal Distribution of HIV in the Brain
Audrey Oliver, Computational Science (M)

334 11:00 am WW

Functional data analysis of lung CT histograms to characterize COPD severity
Maggie Zhai, Statistics (M)

335 11:00 am XX

The Effect of Human Mobility on the Time-Dependent Reproductive Number of COVID-19
Samantha Hall, Biostatistics (M)

336 11:00 am YY

Physics Informed Neural Networks for Ultrasonic Guided Wave propagation in solid media
Thomas Stone, Computational Science (M)

337 11:00 am ZZ

Visualization and Analysis Using R for Imperial Valley Traffic Incidents Data
Felix Santillanes, Mathematics (U)

338 11:00 am AAA

Modeling the Risk of SARS-CoV-2 Infection Causing COVID-19
Sai Karthik Pulagam, Applied Mathematics (U)

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Session G-10

Physical and Mathematical Sciences 7

Friday, March 3, 2023 11:00 am

Montezuma Hall

339 11:00 am BBB

Potential Candidate for the First High Inclination Circumbinary Planet

Christopher Martin, Astronomy (M)**340 11:00 am CCC**

A Search for Circumbinary Planets in Short-Period Binary Stars Using Kepler Mission Data

Margo Thornton, Astronomy (M)**341 11:00 am DDD**

Precise Age for the Binary HD 21278 in the Young Alpha Persei Cluster

Christopher Danner, Physics (M)**342 11:00 am EEE**

A Search for Circumbinary Planets Using Eclipse Time Variations

Benjamin Pieczynski, Astronomy (M)**343 11:00 am FFF**

Sensitivity analysis of shell-model interactions

Vladimir Bautista, Astronomy (U)**344 11:00 am GGG**

Robust Redetermination of the Andromeda Galaxy Nova Rate

Will Burris, Physics (U)**345 11:00 am HHH**

Mass-Radius Relation of Supermassive White Dwarfs

Alejandro Rivera, Physics (U)

Friday, March 3, 2023 Session H: Poster Presentations

Session H-1

Behavioral and Social Sciences 10

Friday, March 3, 2023 1:00 pm

Montezuma Hall

346 1:00 pm A

"Minimizing the Number of Barriers": how agencies pivoted to address food insecurity in San Diego County during the COVID-19 pandemic

Courtney Smith, Exercise Physiology / Nutritional Sciences (M)**347 1:00 pm B**

No Safe Place to Go: Perceptions of Safety in Public Restrooms in Downtown San Diego

Lahiru Kodituwakku, Public Health: Health Promotion and BEHs (M)**348 1:00 pm C**

The Urban Sustainability, Livability, and Equity Commuter Mapping Project

Arman Ogandzhanyan, Urban Studies, Urban Planning, Design, and Management (U)**349 1:00 pm D**

Exploring the association between public restroom discrimination and demographics among San Diegans experiencing homelessness

Rafael Chavez, MPH - Epidemiology (M)**350 1:00 pm E**

Understanding the Everyday Lives of the Houseless Through Cognitive Maps: A Human-Centered Analysis of Their Home Territories and Needs

Aidan Skillingstad, Urban Studies (U)**351 1:00 pm F**

Fear Mapping: How people view senses of safety around the SDSU campus differently

Jaqueline Appleyard, Public Administration (U)

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Session H-2

Behavioral and Social Sciences 11

Friday, March 3, 2023 1:00 pm

Montezuma Hall

352 1:00 pm G

Decreasing Grabbing Behaviors: How Preparing a Student's Environment Prior to Instruction Can Affect Their Behavior

Claire Dietrich, Master's in Education, Special Education: Autism (M)**353 1:00 pm H**

Investigating the Influence of Lab Communications on Student Science Identity and Belonging

Chelsea Malicdem, Psychology (U)**354 1:00 pm I**

The Role of Faculty Recruitment Preferences in Students' Scientific Identity

Charlie Gallegos, Psychology (U)**355 1:00 pm J**

The role of faculty research lab websites on students' motivation to pursue STEM

Sofija Markovic, Psychology with an Emphasis in Industrial/Organizational Psychology (U)**356 1:00 pm K**

COVID-19: The Learning Environment and its Impact on SDSU Students' Stress and Well-being

Muna Farah, Public Health (U)**357 1:00 pm L**

Not All Classrooms Have Four Walls:

The Impact of Traveling Abroad on Intercultural Communication Competence

Andy Huizar, Health Communication (U)**358 1:00 pm M**

Making The Grade: Examining The Racial-Ethnic Differences In ADHD's Impact on Academic Performance

Avery Cardosi, Sociology (M)

Session H-3

Behavioral and Social Sciences 12

Friday, March 3, 2023 1:00 pm

Montezuma Hall

359 1:00 pm N

Developing a Sentence Comprehension Task: A Pilot Study

Kaitlan Nguyen, Speech, Language, and Hearing Sciences (U)**360 1:00 pm O**

The relationship between attention and sentence comprehension in aphasia

Olivia Lorentz, Speech, Language, and Hearing Sciences (U)**361 1:00 pm P**

Cross-Linguistic Interactions during Word Retrieval in Bilinguals with Aphasia: An Eye-Tracking Study

Chris Rodriguez, Speech, Language, and Hearing Sciences (U)**362 1:00 pm Q**

Linguistic and Non-Linguistic Visual Processing in Aphasia

Marlene Chavez Corona, Speech, Language, and Hearing Sciences (U)**363 1:00 pm R**

Informed consent: research studies and people with aphasia

Jesse Di Carlo-Wagner, Speech, Language, and Hearing Sciences (M)

Session H-4

Biological and Agricultural Sciences 11

Friday, March 3, 2023 1:00 pm

Montezuma Hall

364 1:00 pm S

Bench to Bedside Phage Therapy for Severe Pneumonia in Cystic Fibrosis

Tiffany Luong, Cell and Molecular Biology (D)**365 1:00 pm T**

IBD Project: Isolating and Characterizing Phages from the Gut Virome

Mariel Rosales, Microbiology (U)

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366 1:00 pm UPhage therapy for pan-resistant *Achromobacter* infections in cystic fibrosis patients

Hamza Hajama, Cell and Molecular Biology (D)

367 1:00 pm V

Phage-host dynamics under hypoxic conditions

Jorge Villanueva, Biology Cell and Molecular (U)

368 1:00 pm W

Improving Shelf Life of Bacteriophage Pharmaceuticals

Viktoria Voragen, Biology (U)

369 1:00 pm X

The dynamics of phage infection and disruption of microfluidic biofilms

Jennifer Melendez, Biology-Emphasis Cellular and Molecular Biology (U)

Session H-5

Biological and Agricultural Sciences 12

Friday, March 3, 2023 1:00 pm

Montezuma Hall

370 1:00 pm Y

The Effect of Pro-Inflammatory Stimulus on Chromatin Accessibility and Gene Expression in iPSC-derived Cardiac Progenitor Cells

Nneka Bandele, Child and Family Development (U)

371 1:00 pm Z

Studying the effect of Small Molecule Drug on Alagille Syndrome Patient's Cells Derived Spheroid and Organoids

Aya Aljaber, Biology (U)

372 1:00 pm AA

Aerobic Activity is Impaired by Vaping

Sama Mikhail, Microbiology (U)

373 1:00 pm BB

Modeling Defects in Extravillous Trophoblast Differentiation in the setting of Trisomy 21

Sydney Olfus, Biology (U)

374 1:00 pm CC

Upregulation of CFTR by Combinatorial Inhibition of miRNA and NMD

Jackson Kubal, Cell/ Molecular Biology (U)

375 1:00 pm DD

Wnt and RSPO effects on Human Induced Pluripotent Stem Cells to identify the effects of chromosomal instability

Sakshi Pradhan, Bioinformatics (M)

376 1:00 pm EE

Derivation of human induced trophoblast stem cells from umbilical cord-derived mesenchymal stem cells from patients with preeclampsia

Geronimo Salcedo, Biology with an emphasis in Cellular and Molecular Biology (U)

Session H-6

Biological and Agricultural Sciences 13

Friday, March 3, 2023 1:00 pm

Montezuma Hall

377 1:00 pm FF

Utilizing CRISPRi interrogation of host-microbe interactions to identify stimulants of animal development

Morgan Farrell, Cell and Molecular Biology (D)

378 1:00 pm GG

The effect of the reproductive axis on the gut microbiome

Laura Sisk-Hackworth, Cell and Molecular Biology (D)

379 1:00 pm HH β -Glucuronidase Activity in the Gut Microbiome: Relationship to Sex and HPG Axis

Shawn Ogden, Cell and Molecular Biology (M)

380 1:00 pm IICommensal Bacterial Adherence to the Intestinal Epithelium of *C. elegans*

Kayla Poirier, Microbiology (U)

381 1:00 pm JJInvestigating Infection Resistance against the bacteria *Bordetella atropi* among wild strains of nematodes through Genetic Mapping

Sandra Lee, Biology (U)

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Session H-7

Physical and Mathematical Sciences 8

Friday, March 3, 2023 1:00 pm

Montezuma Hall

382 1:00 pm KK

Deconstructing Constructivism: Modeling Causal Relationships Among Constructivist Learning Environment Factors and Student Outcomes in Introductory Chemistry

Haley Palm, Chemistry (M)**383 1:00 pm LL**

Hydrogen evolution activity differences of chiral molecules intercalated molybdenum disulfide

Jackie Johnson, Chemistry (M)**384 1:00 pm MM**

TD-DFT Studies of Monofluorinated Sterically Optimized Fluorescent Nucleoside Analogues

Vayle Vera Cruz, Chemistry (U)**385 1:00 pm NN**

High throughput experimentation exploring the Chan-Lam reaction

Rachael Read, Chemistry (U)**386 1:00 pm OO**

Using Electrochemistry to Study the Effects of Electron Donor and Withdrawing groups on Ruthenium Water Oxidation Catalysts

Carlamarina Osuna, Chemistry (U)**387 1:00 pm PP**

Controlling Defect Concentration in Graphitic Carbon Nitride for Improved HER Efficiency

Melanie Weed, Chemistry (U)

Session H-8

Health Nutrition and Clinical Sciences 4

Friday, March 3, 2023 1:00 pm

Montezuma Hall

388 1:00 pm QQ

Effects of using the Step2Bed on forces, muscle activity, joint angles, and transfer time in older adults

Jacqueline Erdkamp, Kinesiology Pre-Physical Therapy (U)**389 1:00 pm RR**

Cigarette smoke exposure effects on diaphragms susceptibility for ventilator-induced diaphragm dysfunction

Simon Pierce, Kinesiology - Exercise Science Generalist (U)**390 1:00 pm SS**

Effects of smoking on locomotor muscle adaptations to chronic electrical stimulation

Lloyd Marshall, Kinesiology (Exercise Science Generalist) (U)**391 1:00 pm TT**

Movement Strategies for Tactile Detection in the Little Finger

Wylianne Pangan, Kinesiology (Pre-Physical Therapy) (U)**392 1:00 pm UU**

Validation Of Augmented K-Tape With 3d-Printed Strain Sensors For Measuring Low Back Movement And Muscle Activity

Audrey Lee, Bioengineering, Biomechanics Specialization (M)**393 1:00 pm VV**

Oral Health and Hygiene Behaviors and Oral Cancer Knowledge, Attitudes, and Perceptions: A Scoping Review

Alana Lopez, Health Behavior (D)

Session H-9

Health Nutrition and Clinical Sciences 5

Friday, March 3, 2023 1:00 pm

Montezuma Hall

394 1:00 pm WW

The Cancer Health Equity Collaborative: Does it effectively support cancer related stakeholders in the San Diego region?

Leanne Locano, Public Health (U)**395 1:00 pm XX**

How Do Latine Parents Interpret and Respond to the U.S. Household Food Security Survey Module? A Qualitative Cognitive Interviewing Study

Edgar Doolan, Exercise Physiology/Nutritional Sciences (M)

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396 1:00 pm YY

Legacy Speakers Project: Improving the bilingual workforce for Equity in Clinical Trials and Care Delivery
Alexis Abundis, Master of Public Health, Health Management and Policy (M)

397 1:00 pm ZZ

Impact of Health Disparities and Prostate Cancer Among African American Men
Kendal Ruffin, Psychology (U)

398 1:00 pm AAA

Biodegradable Whey Protein Films Loaded with Biosynthesized ZnO Nanoparticles
Jessica Davis, Nutritional Sciences (U)

399 1:00 pm BBB

The Impact of Consuming Two Cups of Fruit Daily on Body Composition and Cardiovascular Biomarkers
Sarah AlHenaidi, Food and Nutrition (U)

Friday, March 3, 2023

Session I: Poster Presentations

Session I-1

Behavioral and Social Sciences 13

Friday, March 3, 2023 3:00 pm

Montezuma Hall

400 3:00 pm A

Investigating canonical and noncanonical sentence comprehension cross-linguistically: Does a universal subject relative processing advantage exist?

Preeti Rishi, School of Speech, Language, and Hearing Sciences (D)

401 3:00 pm B

Accuracy and Productivity of Articles in Spanish with Spanish-English Bilingual Children

Karina Galvan-Rodriguez, Speech, Language and Hearing Sciences (U)

402 3:00 pm C

The Effects of an Immersion Experience on Children's Bilingual Language Abilities

Beth A Woll, Speech, Language, and Hearing Sciences (U)

403 3:00 pm D

Spanish-English Bilingual Children's Accuracy and Productivity of Verbs in Spanish

Emillie Cuevas, Speech, Language & Hearing Sciences (U)

404 3:00 pm E

Does cognate status affect performance in a Spanish semantic assessment in bilingual children?

Hannah Lim, Speech Language and Hearing Science (U)

405 3:00 pm F

The ERP response to semantic classification in an object recognition megastudy

Sofia E. Ortega, Psychology (U)

406 3:00 pm G

Alterations in Olfactory Network Connectivity During Odor Identification are Related to CSF t-Tau Levels

Conner Frank, Clinical Psychology (D)

Session I-2

Behavioral and Social Sciences 14

Friday, March 3, 2023 3:00 pm

Montezuma Hall

407 3:00 pm H

The Association Between Resting Blood Pressure and Sensitivity to Social Pain: a Preliminary Study

Nicole Abaya, Psychology (M)

408 3:00 pm I

Innocuous warm stimuli affect subjective experience and neural response to emotional images

Maritza Garcia, Psychology with emphasis in Neuroscience (U)

409 3:00 pm J

Early brain connectivity patterns predict later language skills in preschoolers with autism spectrum disorder

Judy Mahmalji, MA in Psychology (M)

410 3:00 pm K

The Influence of Race and Gender on Perceptions of Police Officers and Officer Involved Homicides

Elizabeth Delp, Sociology (U)

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411 3:00 pm L

Can Latinos be Racist? Examining Anti-Blackness Among Latinos

Ulises Magallon Estrada, Sociology (M)

412 3:00 pm M

Does County-Level Social Dominance Orientation Mediate or Moderate the Relationship between How Multiethnic Counties Are and the Implicit Pro-White Bias?

Mira Torf, Psychology (U)

413 3:00 pm N

Examining County-Level Right-Wing Authoritarianism as a Mediating and Moderating Variable in the Relationship Between Minority Representation and the Implicit White = American Effect

Renee Owens, Psychology (U)

Session I-3

Behavioral and Social Sciences 15

Friday, March 3, 2023 3:00 pm

Montezuma Hall

414 3:00 pm O

Effects of Exercise and Choline Supplementation in an Animal Model of Fetal Alcohol Spectrum Disorders

Dylan Keane, Psychology (U)

415 3:00 pm P

Childhood Adversity as a Moderator for Irritability-Related Reward Processing

Hailey Adney, Psychology (U)

416 3:00 pm Q

How ACEs and Anxiety Affect One's Social Integrative Needs: A Social Media analysis

Valentina Marr, Psychology (U)

417 3:00 pm R

ACEs and Academic Engagement among College Students

Kerris Woods, Psychology (U)

418 3:00 pm S

Effects of Developmental Alcohol Exposure and Choline Supplementation on Sleep

Jaclyn Hanson, Psychology (M)

419 3:00 pm T

Effects of Prenatal Vapor Exposure to THC and Nicotine on Anxiety-Related Behaviors in Adolescent Rats

Liana Manriquez, Psychology (M)

420 3:00 pm U

Interventions for Fetal Alcohol Spectrum Disorders: The Effects of Exercise and Choline Supplementation

Isabel Leon, Psychology (M)

Session I-4

Biological and Agricultural Sciences 14

Friday, March 3, 2023 3:00 pm

Montezuma Hall

421 3:00 pm V

Dissecting mechanism for cell-cell boundary crossing by the intracellular bacterial pathogen *Bordetella atropi*

Makaela Levine, Biology (U)

422 3:00 pm W

Dissecting the roles of type III secretion system in *Bordetella atropi* infection of a nematode host

Meenakshi Nair, Microbiology (U)

423 3:00 pm X

Characterizing the protein composition of *Bacteroides* contractile injection systems

Josefa Rivera Alfaro, Molecular Biology (M)

424 3:00 pm Y

Identifying the Activities of a Bacterial Effector Protein That Stimulates Tubeworm Metamorphosis

Carl Westin, Microbiology (M)

425 3:00 pm Z

"Using Alphaproteobacteria to Uncover Novel Stimulants of Tubeworm Metamorphosis"

Cierra Chevalier, Biology (U)

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426 3:00 pm AA

Integration of Cancer Genomics to Optimize Treatment Options for Lung Cancer Patients
Meriam Esif, Cellular and Molecular Biology (U)

427 3:00 pm BB

HCC organoid model in the Latino population
Valentina Rodriguez, Cell and Molecular Biology (U)

Session I-5

Biological and Agricultural Sciences 15

Friday, March 3, 2023 3:00 pm

Montezuma Hall

428 3:00 pm CC

Role of Macrophages in the Development of Ovarian Cancer Stem-Like Cells
Steffy Mathew, Biology (U)

429 3:00 pm DD

IDH1 Mutations in Glioma Cells Show Lipid Perturbations
Grace Chao, Cell and Molecular Biology (D)

430 3:00 pm EE

The Role of Nuclear Factor κ B-inducing Kinase (NIK) in Ovarian Cancer Relapse
Cassidy Lucht, Cell and Molecular Biology (M)

431 3:00 pm FF

Creation and validation of inducible ShRNA ovarian cancer lines to study the role of NF- κ B in adhesion and metastasis

Katelyn Shelby, Biology - Emphasis in Cellular and Molecular Biology (U)

432 3:00 pm GG

Kinetic characterization of wild-type DNA polymerase epsilon (POLE) and cancer-associated mutations
Brittany Bermoy, Chemistry (D)

433 3:00 pm HH

Synthesis and Evaluation of AdSS Bisubstrate Inhibitors
Madison Cho, Chemistry/Biochemistry (M)

Session I-6

Business Economics and Public Administration/
Education 1

Friday, March 3, 2023 3:00 pm

Montezuma Hall

434 3:00 pm II

Examining Research on the Relationship Between Student Attitudes and Performance in Chemistry Courses

Erica Sisouphanthong, Biochemistry (U)

435 3:00 pm JJ

The Relationship between One's First Language and Second Language Writing

Natacha Garbe, Liberal Studies with an Emphasis in Elementary Education Major (U)

436 3:00 pm KK

College Adjustment Among Latiné Students

Marianna Amato, Child and Family Development (M)

437 3:00 pm LL

Spanish Letter Name and Sound Knowledge in Bilingual Preschoolers in Head Start

Sandra Vasquez, Speech Language and Hearing Sciences (U)

438 3:00 pm MM

Indigenous women leadership and political participation addressing gendered violence in Oaxaca
Jazmin Luna, Public Administration and Latin American Studies (M)

439 3:00 pm NN

Brownfields Assessment Grant Recipients: Examining Funding Allocation, Utilization, and Outcomes

Rachel Ostiguy, Environmental Sciences (U)

Session I-7

Physical and Mathematical Sciences 9

Friday, March 3, 2023 3:00 pm

Montezuma Hall

440 3:00 pm OO

Measuring the Intermediate States of MS2 Viral Capsid Self-assembly Using Interferometric Scattering (iSCAT) and Cryogenic Electron Microscopies (CryoEM)

Nino Makasarashvili, Chemistry (M)

(U) = Undergraduate; (M) = Masters; (D) = Doctoral

441 3:00 pm PP

Use of 3D Chaos Game Representation to Quantify DNA Sequence Similarity

Stephanie Young, Computational Science (D)

442 3:00 pm QQ

Lewis base catalyst synthesis for the development of regioselective electrophilic trifluoromethylation methodologies

Nicholas Tabares, Chemistry (Emphasis in Biochemistry) (U)

443 3:00 pm RR

Utilizing Deep Eutectic Solvents for the Colorimetric Analysis of Nicotine from Thirdhand Smoke

Danielle Beerfas, Chemistry / emphasis in Biochemistry (U)

444 3:00 pm SS

Synthesis of Alkenyl Trifluoroborates with Alcohols and Amines

Benjamin Blacker, Chemistry / Emphasis in Biology (U)

Session I-8

Health Nutrition and Clinical Sciences 6

Friday, March 3, 2023 3:00 pm

Montezuma Hall

445 3:00 pm TT

The Effect of Demographic and Xenobiotic Factors on the Breast Milk Microbiome

Chloe Hull, Public Health; Environmental Health (M)

446 3:00 pm UU

Effects of Blackberry Consumption on Satiety, Postprandial Glucose, Anxiety, and Skin Health

Sarah Kinsey, Foods and Nutrition (U)

447 3:00 pm VV

Food-related cues in a video game increase food cravings but not the intake, among adults overweight and obese

Marissa Fritch, Foods and Nutrition (U)

448 3:00 pm WW

Evening sleep chronotypes (late sleepers) perceive food odors to be more intense and report greater cravings compared to morning sleep chronotypes (early sleepers)

Paige Sullivan, Foods and Nutrition (U)

449 3:00 pm XX

Noise-Induced Hearing Loss in Student Musicians

Emma Holley, Speech, Language, and Hearing Sciences (U)

450 3:00 pm YY

Noise Perception: Differences Between Student Musicians and Non-Musicians

Sophie Kaminsky, Speech Language and Hearing Sciences (U)

Session I-9

Health Nutrition and Clinical Sciences 7

Friday, March 3, 2023 3:00 pm

Montezuma Hall

451 3:00 pm ZZ

An Analysis of Hearing Factors Among Arizona-Mexico Border Farmworkers

Eliana Marvizon, Audiology (D)

452 3:00 pm AAA

Lexical Access Differences And Cognate Effects During Eye-Tracking In Bilingual Adults With And Without A History Of Developmental Language Disorder

Alaa Shahan, Speech, Language, and Hearing Sciences (U)

453 3:00 pm BBB

Factors that determine self-perception of language proficiency in Spanish-English bilingual heritage speakers

Alexia Aranda, Speech Language Pathology (M)

454 3:00 pm CCC

Analyzing Regional Dialect Variation in Children's Language: Implications for Clinical Practice

Natalie King-Shaw, Psychology and Speech, Language and Hearing Sciences (U)

455 3:00 pm DDD

Dysarthria in Adolescents with Cerebral Palsy

Cody Harris, Kinesiology (U)

456 3:00 pm EEE

Parents' Sensitivity to their Children's Language Difficulties and Children's Sensitivity to their own Language Difficulties

Artah Yamin, Speech-language, and Hearing Science (U)

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SDSU

Student Symposium

Visual Arts Presentations

Friday, March 3, 2023

Sessions J

Exhibitors are required to stand by their presentations during the entire 1-hour and 30 minute discussion period.

SDSU | San Diego State
University

(U) = Undergraduate; (M) = Masters; (D) = Doctoral

Friday, March 3, 2023

Session J: Visual Arts

Presentations

Session J-1

Creative Arts and Design / Visual or
Performing Art 1

Friday, March 3, 2023 1:00 pm

Montezuma Hall

457 1:00 pm Exhibitor 1

My Brain and it's Eyes: Disability, Access, and
Competent Care during Viral Times

**Emily Teaze, Interdisciplinary Studies in Three Departments
(English, Women's Studies, and Art - Illustration and
Drawing) (U)**

458 1:00 pm Exhibitor 2

Gemstone Apothecary

**Hana Foo, Applied Design - Emphasis in Jewelry
and Metals (U)**

459 1:00 pm Exhibitor 3

Breakdown | Right Thing to Do!

Nanzi Muro, MFA (M)

460 1:00 pm Exhibitor 4

Considerations for Sharing Resources With Small
Theaters and Drama Programs

Cynthia Bloodgood, Theater Design and Technology (M)

(U) = Undergraduate; (M) = Masters; (D) = Doctoral



Student Symposium

Oral Presentations

Saturday, March 4, 2023

Sessions K

Each oral presentation is allotted 10 minutes followed by a 5-minute question and answer period. Participants and guests are asked to enter or leave the rooms only between presentations.



(U) = Undergraduate; (M) = Masters; (D) = Doctoral

Saturday, March 4, 2023

Session K: Oral Presentations

Session K-1

Behavioral and Social Sciences 16

Saturday, March 4, 2023 9:00 am

Park Boulevard

461 9:05 am

Cognitive Advantages Associated with Musical Experience during Development

Hilda Parra, Language and Communicative Disorders (D)

462 9:20 am

White matter pathways supporting semantic interference in language production

Yusheng Wang, Language & Communication Disorders (D)

463 9:35 am

Defining "progress": Integrating clinical and caregiver measures in speech sound intervention

Abigail John, Language and Communicative Disorders (D)

464 9:50 am

The Influence of Heritage Speakers' Language Experiences on the Word Learning Facilitation Effect

Cristy Guerrero, Language and Communicative Disorders (D)

465 10:05 am

Attentional blink in aphasia: Using pupillometry to explore processing effort for linguistic and non-linguistic stimuli

Christina Sen, Joint Doctoral Program in Language & Communicative Disorders (D)

466 10:20 am

Brain Dynamics of Cross-Linguistic Interference Resolution in Spanish-English Bilinguals With and Without Aphasia

Katherine Andrade, JDP Language and Communicative Disorders (D)

Session K-2

Behavioral and Social Sciences 17

Saturday, March 4, 2023 9:00 am

Visionary Suite

467 9:05 am

Healthy Food Promotion on Instagram: The role of different #Hashtags

Qin Zeng, Psychology (U)

468 9:20 am

The Privacy Paradox Online: Exploring How Users Process Privacy Policies and the Impact On Information Sharing

Bridget Cole, Media Studies / Mass Communication (M)

469 9:35 am

Influencers and Instagram: Using Advice Response Theory to understand health information on social media

Raquel Vega, Communication (M)

470 9:50 am

To Scroll or Not To Scroll

Ian Strate, Communication Studies (M)

Session K-3

Behavioral and Social Sciences 18

Saturday, March 4, 2023 9:00 am

Legacy Suite

471 9:05 am

Postnatal Choline Supplementation as a Treatment for Prenatal THC Exposure on Spatial Learning and Memory in Rats

Karen Thomas, Psychology (M)

472 9:20 am

Investigating Neurobehavioral Indices Of Cognitive Control Dysregulation As A Function Of Binge Drinking History And Biological Sex

Ryan Shriver, Psychology (M)

473 9:35 am

Explaining Cross-Cultural Patterns of Female Substance Use: A Systematic Ethnographic Study

Drake Rinks, Anthropology (M)

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474 9:50 am

Examining Associations of Borderline Personality Disorder Symptoms and Eating Disorder Diagnoses
Rebecca Mendoza, Psychology (U)

475 10:05 am

Have You Ever Done This Before?: Sexual Disclosure and Self Confidence in Emerging Adults and Relationships
Caroline Mahoney, Communication (M)

476 10:20 am

Occupational stigma and sexual health outcomes: Findings from a community-based cohort of women sex workers in Metro Vancouver, Canada (2014-2022)
Kirstin Kielhold, Public Health (D)

Session K-4

Biological and Agricultural Sciences 16

Saturday, March 4, 2023 9:00 am

Mata'yuum

477 9:05 am

Bigger and brighter: floral dimorphism in rare cactus
Niveditha Ramadoss, Evolutionary biology (D)

478 9:20 am

Morphology of a Rare and Endemic Barrel Cactus (*Ferocactus gracilis* subsp. *gatesii*) in Baja California
Yazmin Lommel, Biology (M)

479 9:35 am

The Colors of Attraction: Sexual Dichromatism influence on Pollinators' Flower Choice in Rare Endemic Cacti
Scarlet Steele, Cell and Molecular Biology & Philosophy (U)

480 9:50 am

Possible Cloning in Native Succulent Population
Camille Movafagian, Biology (U)

481 10:05 am

Dispersal and Vicariance in *Xylococcus bicolor*
Jordan Waits, M.S. Evolutionary Biology (M)

Session K-5

Physical and Mathematical Sciences 10

Saturday, March 4, 2023 9:00 am

Pride Suite

482 9:05 am

Detection of Oil Slicks Using Hydrocarbon Remote Sensing
Faith Poutoa, Physics (U)

483 9:20 am

Modeling Spatio-Temporal Distribution of HIV Particles on Cervicovaginal Mucus and Nanoparticle-based Preventive Therapy
Anuradha Agarwal, Computational Science (M)

484 9:35 am

Simulated leaching and photodegradation of tire tread particle-derived compounds in natural water
Kelly Hollman, Civil Engineering (M)

485 9:50 am

Single-Particle Studies of the Disassembly of Hepatitis B Virus Capsids in GuHCl
Daniel Villarreal, Ph.D. in Biochemistry (D)

Session K-6

Business Economics and Public Administration/ Education 2

Saturday, March 4, 2023 9:00 am

Aztlan

486 9:05 am

Integrating art and science as a tool to build science-specific disciplinary knowledge and skills.
Maraliz Fischler-Barraza, MSED Joint Doctoral Program (D)

487 9:20 am

Promoting Representation and Inclusion: Archaeology, Education, and the Nathan Harrison Historical Archaeology Project
Caeli Gibbs, Anthropology (M)

488 9:35 am

Exploring Expert and Novice Understanding of Organismal Relatedness
Tina Marcroft, Math and Science Education (D)

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489 9:50 am

The Psychological Needs of an Undergraduate Computer Scientist: Three Case Studies
Kristin Tenney, Math and Science Education (D)

490 10:05 am

Near-Peer Mentors: The Assets of Relationships in Mathematics Classrooms
Brinley Stringer, Mathematics and Science Education (D)

491 10:20 am

Corporate Disclosure of Climate Change Risk - A Pilot Study
David Hampton, Economics, Specialization in Quantitative Analysis (U)

Session K-7

Business Economics and Public Administration/
 Education 3

Saturday, March 4, 2023 9:00 am

Metzli

492 9:05 am

The impact of Covid-19 and sociopolitical unrest on Anti-racism in Education
Tamika Lovelace, Liberal Studies Elementary Education/ Psychology emphasis in Neuroscience (U)

493 9:20 am

In the Shadow of the Colossus: The Value of Student Leadership at Satellite Campuses
Alan Castro, Psychology (U)

494 9:35 am

Climate of the San Diego State University (SDSU)'s Campus from the Perspective of Students of Color
Arwa Alkhwaja, Education (D)

495 9:50 am

Institutional Agent Perspectives: The Role of Latinx Servings at HSIs
Griselda Paredes, Education (M)

496 10:05 am

The Impact of HSIs and Community College-University Partnerships in Creating Experiential Learning Experiences
Elizabeth Vazquez, Masters of Arts in Postsecondary Educational Leadership with a specialization in Student Affairs (M)

497 10:20 am

Funding For All The Effect of State Micro Grant Programs for Entrepreneurs in the Inland Empire: Utilizing Study Results from Caravanserai Projects' California Dream Fund Grant Program (2022)
Graciela Moran Moran, Public Administration (M)

SDSU

Student
Symposium

Abstracts of Presentations

Session A

SDSU | San Diego State
University

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Session A-1

Oral Behavioral and Social Sciences 1

Friday, March 3, 2023 9:00 am

Park Boulevard

100 9:05 am

The Perfect Student

Jorge Vazquez, Criminal Justice (U)

The importance of extracurriculars and academic excellence leads to a reinforced socioeconomic system. Previous contemporary research shows that extracurriculars have a positive impact on college enrollment. Extracurriculars also encourage social interaction with “advantageous students” which also has a positive correlation with college enrollment. I want to focus on the students that don’t have time for extracurriculars and work jobs or have family matters. Working outside of school would lead students to have a very short college application, and in turn be at a disadvantage when applying to colleges. This would reinforce a socioeconomic system, where students that come from low-income families would have less of a chance to enter higher education. I would gather my research by surveying high school teens in the Sweetwater Union High School District. This would give me a rough idea of how much time students devote to work, house/ family duties, and then extracurriculars, and how that would correlate to whether they are in a low-income family or not. I predict to see a positive correlation between higher-income families, and hours spent on extracurriculars.

101 9:20 am

Quality of Professor-Student Interactions

Amaya Wingfield, Health Communication (U)

The question being asked in this paper is “Does the higher perceived quality of interactions among college students increase student’s willingness to follow the professor’s advice?” There have been a number of studies involving the quality of interactions that have allowed for further insight on communicative competence within educational settings (Cegala, 1981). Advice response theory heavily influences the research conducted in this survey. This theory serves as a predictor of how people who have been given advice will receive and respond to the advice given. In the following research, advice response theory is used to predict how students specifically respond to advice being given by professors. Answering and analyzing these questions will allow professors to modify and adjust their teaching practices to increase participation and involvement of college students. This increase of participation and involvement will allow for students to have more successful class grades and thorough understandings of subject material. To obtain data about perceived quality of interaction and willingness to accept advice, a cross-sectional survey was designed and administered through SONA. Students from the college of Professional Studies and Fine Arts at San Diego State

University completed this survey online. After the survey was administered, it was found through a Pearson’s r correlation test that there is a moderately positive relationship between professors’ perceived quality of interactions and college students’ willingness to accept advice. In the future, this correlation between perceived quality of interaction and willingness to accept advice will allow for a better understanding in academia related to professor and student involvement.

102 9:35 am

Classroom Leadership: Comparing Professor Leadership Styles and Their Affect on Student Engagement

Eric MacPherson, Communication and Psychology (Double major) (U)

Academic achievement is an important outcome for undergraduate students. A key component of academic achievement, and predictor of student success, is student engagement. College professors are influential to the levels of student engagement observed in the classroom. The current study adopts the view of professors as leaders in the classroom and recognizes how leadership styles affect follower behavior. Previous literature has identified the transformational leadership style as the most effective for professors to use in the classroom. Prior research, however, has not compared the effectiveness of the transformational leadership style with other leadership styles. The current study fills this gap in the literature by directly comparing how transformational, servant, and authentic leadership styles influence student engagement. A sample of 251 participants were surveyed. The survey asked participants to answer questions about the last professor they had class with to ensure a variety of classes. The survey data was analyzed using a stepwise regression to yield a model that would help identify the most influential predictors of student engagement. The stepwise regression revealed that the transformational leadership style affected student engagement the most, followed by the openness personality trait, the conscientiousness personality trait, and the servant leadership style. These findings align with those found in previous literature and affirm that the transformational leadership style is the most effective in the classroom. Future research can direct focus to the transformational leadership model and identify which aspects of it are most engaging to students, as well as the professor behaviors that communicate the transformational leadership style.

103 9:50 am

Examining the Effects of Instructor Immediacy on Student Mental Health Disclosure

Amairany Nabi, Communication Studies (M)

Using communication privacy management theory as a guide, this study examines students’ perceptions of instructor immediacy and the effects on their mental health disclosures to their instructors. Results from a survey of 235 college undergraduates found that students were more likely to disclose

(U)=Undergraduate; (M)=Masters; (D)=Doctoral

their mental health to their instructors if their instructors exhibited verbal and nonverbal immediacy in their classrooms. Findings have implications for student disclosure of mental health to their instructors and the impact of the COVID-19 pandemic on perceptions of instructor nonverbal immediacy.

Keywords: Instructor immediacy, disclosure, communication privacy management theory, mental health, survey, instructional communication

104 10:05 am

Smile, you are in the classroom:
The role of instructor non-verbal immediacy on academic self-esteem

Devanie Ottalagano, Communication (M)

Using Affection Exchange Theory as a guide, this paper examined students' academic self-esteem in the classroom. Results from a survey with 281 college undergraduates found that teacher nonverbal immediacy significantly and positively predicted student academic self-esteem. Findings have implications for how we can best motivate college students in the classroom. Affection Exchange Theory may be useful within research for instructional communication.

105 10:20 am

Building skills in primate conservation education:
Assessing the impact of a one-day workshop

Jadyn Skipper, Anthropology (U)

Conservation education outreach is recognized as an important tool for expanding people's knowledge about threats to biodiversity and the ways they can help advance conservation. Although the moor macaque (*Macaca maura*) is classified as Endangered by the IUCN, there is little conservation education outreach regarding this unique primate, which is found only on the island of Sulawesi, Indonesia. In an effort to equip students and nature conservation staff in Sulawesi with skills to create conservation education outreach on the moor macaque, a one-day workshop on methods in primate conservation education was held in July 2022 at Hasanuddin University, Makassar, Sulawesi, Indonesia. The workshop began with ice breaker activities, followed by mini-lectures, discussion, and small-group activities, which enabled participants to interact with one another. Workshop participants completed a pre- and post-workshop questionnaire comprising 8 questions, regarding their knowledge of and experience in methods in primate conservation education and confidence in building programs. Our objective was to analyze the pre- and post-workshop data to evaluate the impact of the workshop on attendees' knowledge of and confidence in building primate conservation programs. Prior to the workshop, in response to "How deep is your understanding of the steps to develop primate conservation education?" on a scale of 1(low)-5(high), the majority of participants (n=13/18) chose a score of 3 or higher. In the post survey, participants reported a score of 4 or higher. The majority of participants (96%) found the

information extremely useful and the same majority (96%) also reported an increase in knowledge about conservation. The post-survey included an open-ended response question where all participants (n=18/18) wrote positive qualitative feedback. Overall, these results indicate that a one-day workshop can be impactful in building capacity. Future work could involve yearly workshops with re-current participants to strengthen the message and engagement of participants in conservation education. Making the workshops longer in duration can provide a space for each participant to develop a conservation education program alongside academic peers and mentors. A future survey of the participants can assess the effectiveness of the workshop in driving action in conservation education.

Session A-2

Oral Behavioral and Social Sciences 2

Friday, March 3, 2023 9:00 am

Mata'yuum

106 9:05 am

Examining Community Perspectives on Equitable Public Restroom Access and Quality in San Diego

Jonathen Vazquez Ramirez, Public Health (U)

Project Overview and Goals: The Project for Sanitation Justice (PSJ) aims to address and prevent health inequities that people experiencing homelessness face every day due to reliance on public restrooms and other sanitation-related resources (e.g., showers) to meet. PSJ is conducting research to communicate with those most opposed to increasing public restrooms and sanitation-related resources in the region, as well as how to garner and sustain support from those in favor of increasing access.

Methods: Concept mapping involves several steps, each of which build on the prior step to understand the problem at hand. Concept mapping is driven by a key "focal question" that shapes the direction and purpose of the inquiry. We worked closely with our community partners, including Think Dignity, to identify the following focal question: "What is one reason, for or against, having more and better public restrooms in San Diego?". We have recruited participants across San Diego to brainstorm responses (n~75 participants, n~174 responses). Next, we will invite our participants to sort and rate the salience and level of priority for each brainstormed response/concept. Data will be used to create multidimensional scaling and cluster analysis to map the relationship between sorted and rated concepts. We will collaborate with our community partners to interpret the findings and identify opportunities for action using our results.

Preliminary Findings: Our preliminary analysis of the brainstormed responses to the focal question suggest that out of approximately 174 responses from the sample population, a majority of participants wanted better access to public bathrooms (n = 38) and better sanitation (n = 36). The analysis thus far indicates that public bathrooms are lacking in quality,

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quantity, and resources; further needing better city planning to encourage better sanitation and access for the public.

Conclusion: Our study is focused on gathering community perspectives to understand both support and resistance to public restroom access in San Diego. By understanding these divergent viewpoints, PSJ can overcome opposition and rally communities in support of public restrooms as an imperative public health issue.

107 9:20 am

Development and deployment of a comprehensive social survey to understand public restroom access and related health concerns among San Diegans experiencing homelessness

Giovanna Zampa, Social Work (U)

Access to hygiene supplies, clean water, and public restrooms is vital for individual and community health, especially for communities experiencing homelessness, who are more vulnerable to infectious disease outbreaks and health crises. The goal of the Project for Sanitation Justice is to promote community and individual well-being by visualizing the hygiene crisis, especially when it comes to a lack of much-needed public restrooms in San Diego. We do so in partnership with a San Diego non-profit organization, Think Dignity, who has advocated for sanitation justice, especially for people experiencing homelessness, for over 16 years. In this presentation, I will describe the creation and implementation of a social survey created to better understand the hygiene needs and experiences of unhoused San Diegans, including PSJ's process of doing community-partnered research. This survey explored individuals' access, needs, and health outcomes related to safe hygiene and restroom access. In creating this survey, our team consulted a variety of sources, including external surveys related to homelessness, hygiene, and public restroom infrastructure, as well as consulting with Think Dignity staff to ensure that our research was accessible and relevant. In doing this, we were conscious of tailoring the survey specifically to San Diegans experiencing homelessness, to accurately and fully capture their needs and experiences. Over a four month period, the social survey research team collected responses from 117 individuals experiencing homelessness regarding their restroom-related needs and related health issues. By asking both open and closed ended questions, we were able to collect qualitative and quantitative data on individual experiences of homelessness, as well as large-scale trends within the San Diego community. We were able to see both the need for public hygiene infrastructure, with 70% of surveyed respondents using a public restroom on a typical day, as well as the consequences of minimal access, with 44.4% of participants stating that they practice open defecation. This further proves the need for accessible and high quality public restrooms in our San Diego community. Without safe access to such hygiene services, our most vulnerable residents are at constant risk for individual health issues and community-wide outbreaks.

108 9:35 am

Creating a Scorecard for Public Restrooms in San Diego County to Address Accessibility, Cleanliness, and Safety

Sara Rodrigue, Public Health (U)

Access to basic sanitation and our consistent lack of investment in public restrooms disproportionately affects populations experiencing homelessness. To address this issue in San Diego, an interdisciplinary team of faculty and students in the Schools of Public Affairs and Public Health at SDSU have mobilized to launch an action research project on sanitation access. Over the past two years, the research team has mapped all public restrooms Countywide (n=753), assessed about 20% of them using a restroom infrastructure field assessment tool revealing the existing facilities are low quality, and surveyed people experiencing homelessness about their restroom access and restroom-related needs (n=117). The current project extends these efforts by developing a scorecard to assign restrooms a grade, using categories from the field assessment tool, such as hours of operation, basic features (e.g., toilets, urinals, and sinks), health and hygiene resources (e.g., soap, paper towels, menstrual products), and external features (e.g., lighting, security cameras, security guard and/or attendant). Through a literature review, we will develop additional criteria and how to weight criteria to develop an index for the scorecard. Once the scorecard is completed, we will use existing and new data to pilot the scorecard. The scorecard will be worth 100 points, and points will be deducted for every violation. There will be two types of violations: major and minor. Major violations will receive a higher point deduction, and minor violations will receive a lower point deduction. The ultimate result will be developing a letter grade for each restroom based on their score, 90-100 is an A, 80-89 is a B, 70-79 is a C, and anything below 70 will be a D. An A reflects an excellent score, while a D represents a failing score. A detailed guide will be created to reflect how restrooms are graded, and scores are determined to ensure each restroom is assessed accurately and consistently. The scorecard could be used to highlight which restrooms in San Diego are working well and which restrooms need improvement to increase restroom accessibility, cleanliness, safety, and compliance with government regulations.

109 9:50 am

Study of the relationship between face mask use and face touching frequency in public areas: Naturalistic Study Design

Sydney Niesen, Public Health (U)

Throughout the COVID-19 pandemic in the United States, a major public health goal has been reducing the spread of the virus, with particular emphasis on reducing transmission from person to person. Frequent face touching can transmit viral particles from one infected person and subsequently infect others in a public area. This raises an important concern about the use of face masks and their relationship with face touching behaviors. One concern discussed during the pandemic is that

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wearing a mask could increase face touching because it is required to remove the mask to smoke, drink, eat, etc.

The purpose of this study was to assess if mask wearing was associated with increased facial touching. Public webcam videos from four different cities in New York, New Jersey, Louisiana and Florida were used to collect data. We selected 490 individuals from August to November 2020 who met the study criteria. Facial touches were recorded as pedestrians passed under the webcam. Adult pedestrians wearing masks were compared to those not wearing masks. Quantitative measures of frequency, duration, site of touch and oral activities were recorded. Linear regression analysis was used to assess the association between mask use and face touching.

Of the observed 490 subjects, 241 were wearing a mask and 249 were not. In the mask wearing group, 49.1% were wearing it properly and 33.7% wearing it improperly, covering the mouth only. Of those who touched their face, 61.1% of people were not wearing a mask. The most common site of facial touching was the perioral region in both groups. Both the masked and unmasked group had a frequency of face touching for 0.03 touches/second. Oral activities such as eating or smoking, increased facial touching in the unmasked group.

Contrary to expectations, non-mask wearing subjects touched their face more frequently than those who were wearing a mask. This is significant because those wearing a face mask were not associated with more face touching and are thus less likely to be spreading and ingesting viral particles.

110 10:05 am

The Urban Sustainability, Livability, and Equity Commuter Project

Christopher Ritter, Public Administration (U)

Under the direction of Dr. Bruce Appleyard of San Diego State University, the Urban Sustainability, Livability, and Equity (SLE) research team, supported by the Faculty Student Mentorship Program (FSMP) conducted a study with individuals in southern areas of San Diego. The approach taken to study these dynamics involved conducting cognitive/image mapping exercises with individuals, based on principles set forth by Kevin Lynch's "Image of the City" (Lynch, 1960).

This research uniquely captures the experiences of different individuals. Principally, we were able to learn about how those that use various forms of transportation perceive the environment of their daily lives. Specifically, to conduct our research we went out into the field to ask individuals to draw maps of their surroundings on their daily routes, which were marked with symbols to identify landmarks. From our review of the maps, we found that those who take public transportation are often more aware of their surroundings. They take note of their peculiarity, size, distance, familiarity, and usually have a specific "like" or "dislike" per sighting.

This work can ultimately help promote a better quality of life for the average person by using the tacit knowledge of their environment in order to improve the real world we live in. Through increased access to transportation services and a greater universal urban landscape, we create better ways

to meet the average person's most critical needs, the home territories and lives of all can be improved.

111 10:20 am

Commuting as a Student

Kiersten Aviles, International Economics (U)

Starting in pre-school, students and their families are obligated to find their own transportation to get to school. However, many face obstacles of simply getting to school on time and safely. Traditionally, students attend their designated school within their zone. But Chula Vista Learning Community Charter High School (CVLCC) allows anyone to attend their school, no matter how far the student lives.

During the study, the high school students were asked to freely draw their commute from home to school with no references. They sketched their route, highlighted parts that stick out to them, labeled areas they do not like, and more. The students provided a brief summary of their method of travel and how long the commute takes. They were also asked to draw their commute on a printed map for more accuracy.

This study revealed the strenuous measures students take to get to school. A common pattern that many of the maps shared was traveling on the freeway because they live outside of city limits.

The work done in this study exemplifies the importance of safe and efficient transportation options to people, specifically students. Investigating more on this issue can reveal the insidious effects of poor transportation options and city planning.

Session A-3

Oral Biological and Agricultural Sciences 1

Friday, March 3, 2023 9:00 am

Pride Suite

112 9:05 am

Structural and kinetics analysis of the catalytic mechanism of human IDH1

Marissa Balagtas, Biochemistry (U)

Isocitrate dehydrogenase I (IDH1) is a cytosolic enzyme that catalyzes the NADP⁺-dependent conversion of isocitrate cofactor to oxidize the metabolic intermediate isocitrate to alpha-ketoglutarate (KG) and carbon dioxide. The purpose of IDH1 is to regulate of a cellular redox status and provide important cellular metabolites. Though IDH1 catalysis has been well studied in bacteria, details are less clear for human IDH1. Our objective is to understand the mechanisms of IDH1 catalysis by creating and measuring the kinetic features of IDH1 mutants designed to probe mechanisms of catalysis. By studying the structure of human wild type IDH1, I identified residues likely critical for metal binding and catalytic regulation. I hypothesize that mutation of the aspartic acid at residue 275 to glutamic acid (D275E) will lead to altered metal binding affinity and decrease catalytic efficiency. Specifically, we seek to determine if D275 supports magnesium ion binding to facilitate

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Y139 and K212 to behave as general base and acid catalysis in the active site. Here we will measure the catalytic efficiency of mutant IDH1 by performing kinetic assays. First, I designed, expressed and purified the IDH1 wild -type IDH1 to the mutated version using site-directed mutagenesis and heterologous protein expression and purification. Then steady-state kinetic experiments allow us to compare the catalytic efficiency of the IDH1 wild-type and the mutated IDH1. This work will allow us to determine the role of D275 in the catalytic mechanism.

113 9:20 am

Role of macrophages in the development of ovarian cancer stem-like cells

Luisjesus Cruz, Joint Doctoral Program in Cell and Molecular Biology (D)

Ovarian cancer is a poorly understood disease that has a 75% death rate when found after metastasis. Drug resistance and tumor recurrence are likely due to cancer stem-like cells (CSCs), unlike bulk tumor cells, can evade chemotherapy and induce relapse. However, it is still unclear on how CSCs facilitate disease relapse and what role the tumor microenvironment (TME) plays in this process. Preliminary data shows that secreted TWEAK and its receptor Fn14 are overexpressed in ovarian tumors which increases in the presence of chemotherapy, TWEAK is a strong inducer of stem cell activity, and TWEAK enhances survival of CSCs. Publicly available clinical data from human ovarian tumor found that TWEAK mRNA was primarily observed in a subset of infiltrating immune cells known as tumor associated macrophages (TAMs). Since TAMs seem to be the main source of soluble TWEAK and the fact that cytotoxic chemotherapy can enrich for different TAM populations, we propose that TAMs might be responsible for production of TWEAK following chemotherapy, and that it supports CSC populations and relapse potential. Preliminary targeting of TWEAK with a small molecule inhibitor showed prolonged remission in mouse models of ovarian cancer. Therefore, we will knockout Fn14 on ovarian cancer cells to see if CSCs are dependent on TWEAK-Fn14 signaling for relapse and we will investigate the role of TAMs in supporting CSCs while identifying the specific TAM population responsible for TWEAK production.

114 9:35 am

The Color Stability of Various Genetically Mutated Samples of C-Phycocyanin

Jesse Baker, Masters of Nutritional Science (M)

Stable natural blue colorants are becoming increasingly popular among consumers. However, natural blue dyes are rare and unstable in foods. C-phycocyanin is a blue-colored protein derived from *Spirulina*. Unfortunately, its color is not very stable under thermal treatments and low pH conditions. As a result, their use in the food industry is lacking. The goal of this study was to develop a stable C-phycocyanin through genetic engineering. Specifically, the color stability of 48 native

(control) and genetically mutated samples of C-phycocyanin produced using *E. coli* were analyzed. The color stability of the C-phycocyanin samples were monitored using absorbance at 620 nm and fluorescence under various thermal treatments and pH conditions. To measure thermal stability, all samples were heated in a water bath for five minutes at 70 and 90°C. Color stability against pH changes were measured by dispersing the samples in pH 3 and 5 buffers for up to five days. For all tests, samples were compared to positive and negative controls. Results from this study show that various genetically modified samples of C-phycocyanin have better color stability as compared to the control samples. Stability of all C-phycocyanin samples decreased as the temperature increased from 70 to 90°C. The samples with a six-histidine tag on the N-terminal of the alpha subunit were most stable under thermal treatment conditions regardless of additional amino acid substitutions. Samples tended to be more stable over time at pH 3 compared to at pH 5. Samples with a six-histidine tag on the N-terminal of the alpha subunit and a six-histidine tag on the C-terminal of the alpha subunit were more stable than other mutations at this pH level. Results from this study show that specific mutations of C-Phycocyanin have better color stability as compared to the positive controls. This indicates that certain modified samples of C-phycocyanin could be of use as a potential natural blue colorant in the food industry.

115 9:50 am

In Vitro Characterization of RIG-I Knockout Cell Lines to Determine the Mechanisms of Action of the Oncolytic Immunotherapy VAX014

Amanda Parikh, Biology (U)

Over 80,000 individuals in the U.S. are diagnosed with bladder cancer yearly. Tumors use mechanisms to avoid the body's immune responses, also known as immune escape. Immune escape is achieved in many ways, including disrupting interferon (IFN) production. Type I interferons are vital in adaptive antitumor immunity and their production can be induced by multiple pathways, like RIG-I and STING. Recent studies show that VAX014, an oncolytic agent, might activate RIG-I and STING in the MB49 mouse model of bladder cancer, leading to the production of Type I IFN. As VAX014 leads to a 65% survival rate in MB49 in in vivo studies (vs. 0% w/ saline), further explorations of the mechanisms are warranted. The purpose of this study was to remove the RIG-I gene from MB49 wild-type (WT) cells to understand its role in the tumors' response to VAX014. The knockout was achieved using the CRISPR/Cas9 dual plasmid transfection system. Transfection of both plasmids was visually confirmed using fluorescence microscopy (for RFP) and a puromycin sensitivity assay to select for knockout candidates. Cells that were RFP positive and puromycin resistant were properly transfected. Once RIG-I expression loss was confirmed, a Cre excision was performed to remove the RFP and puromycin resistance genes. This was necessary as RFP and puromycin resistance might have their own immunogenic qualities that could affect the response to VAX014. The selected RIG-I knockout cells were transfected

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with the Cre plasmid, and removal of these genes was visually confirmed by a lack of RFP expression and restored puromycin sensitivity. The resulting RIG-I knockout MB49 lines were used in further assays compared to the MB49 WT, including an interferon alpha/beta receptor stain, lactate dehydrogenase assay, and a VAX014 cell killing potency assay. A Western blot will confirm the cells continue to no longer express RIG-I. Once in vitro characterization is complete, the MB49 RIG-I^{-/-} cell lines will be moved in vivo to determine if there are significant differences in the tumor activity in response to VAX014, compared to the MB49 WT. This work was supported by a contract to SDSU with Vaxiion Therapeutics.

116 10:05 am

Establishing R132Q IDH1 sensitivity to reducing agents

Rachel Khoury, Chemistry, Emphasis in Biochemistry (U)

The metabolic enzyme isocitrate dehydrogenase 1 (IDH1) catalyzes the reversible NADP⁺-dependent conversion of isocitrate to α -ketoglutarate (α KG). Mutations in IDH1, which primarily affect residue R132, can cause a neomorphic reaction where α KG is converted to D-2-hydroxyglutarate (D2HG). The catalytic efficiencies of D2HG production can vary greatly among IDH1 mutants, with mutant R132Q producing the highest levels of D2HG. Unlike other mutants, R132Q IDH1 also maintains wild type activity. Due to this distinctive feature, we sought to obtain a crystal structure of R132Q IDH1 bound to substrates isocitrate and NADP⁺ in reducing conditions. Surprisingly, we observed that the reducing agent TCEP formed an adduct with NADP⁺. We hypothesized that the NADP⁺-dependent normal reaction will be inhibited because of the unavailability of the NADP⁺ substrate. Through steady-state kinetic analysis under varying concentrations and types of reducing agent, we showed that the TCEP adduct decreased the catalytic efficiency of isocitrate oxidation by R132Q IDH1. By demonstrating the effects of reducing agent adduct formation, we gain a better understanding of the molecular mechanisms of catalysis and can inform effective IDH1 enzymatic assay conditions.

117 10:20 am

Does choline increase exercise-induced neurogenesis following developmental alcohol exposure?

Stanley Liang, Psychology (M)

Fetal Alcohol Spectrum Disorders (FASD) constitute the most commonly known preventable form of cognitive disability. Caused by the exposure of alcohol during fetal development, FASD affects an estimated 2-5% of children in the U.S. Alcohol can negatively affect the sensitive fetal environment, leading to neurotoxicity and a myriad of different cognitive deficits. The hippocampus, a brain area important for learning and memory, is particularly vulnerable to developmental alcohol. The hippocampus is one of the few structures where adult neurogenesis (generation of new neurons) occurs, and it has

been suggested that reduced neurogenesis may contribute to some of the cognitive deficits associated with prenatal alcohol exposure. Choline, an essential nutrient, has been shown in both preclinical and clinical studies to improve neuro behavioral and cognitive function in FASD. Choline may enhance neural plasticity, including adult neurogenesis. Thus, we hypothesized that postnatal choline supplementation may improve cognitive functioning by enhancing adult neurogenesis in our FASD animal model. Sprague Dawley rats were exposed to ethanol (EtOH) from postnatal day (PD) 4-9 (5.25 g/kg EtOH/day) via oral gavage; controls were given sham intubations. From PD 10-30, subjects were treated with choline chloride (100 mg/kg s.c.) or saline vehicle. To induce cell proliferation, subjects underwent a forced running paradigm from PD 26-35. Brain tissue was stained with Ki67, a cell proliferation marker, and profile counts were performed in the dentate gyrus (DG) of the hippocampus. Preliminary results suggest that neither developmental EtOH exposure nor choline supplementation impacts the number of proliferating cells in the DG. However, exercise-induced cell proliferation was highest among EtOH-exposed subjects, suggesting that the FASD population may be more sensitive to the benefits of aerobic exercise. Surprisingly, choline did not increase cell proliferation. Our present data suggests that exercise may be a viable intervention for FASD, although the survival of new cells will need to be evaluated to determine its effects on neurogenesis. This study was supported by NIH-funded grant AA012446.

Session A-4

Oral Biological and Agricultural Sciences 2

Friday, March 3, 2023 9:00 am

Aztlan

118 9:05 am

Geographic barriers and climate change threaten a rare perennial herb

Meredith Yokoyama, Biology (U)

Penstemon californicus is a rare, binationally distributed perennial herb located in the mountainous regions of Southern California, USA and Baja California, Mexico. Due to its location in the sky island chain, different populations of P. californicus are separated by vast stretches of desert acting as geographic barriers potentially preventing gene flow. The suspected pollinators are bees and hummingbirds; since hummingbirds are able to travel longer distances than bees, they are expected to be the main pollinators transporting genetic material to between different populations. As a result of climate change the desert habitats are expanding higher up the mountain, shrinking the pinyon and juniper woodlands and chaparral habitats where P. californicus resides. The populations of this already rare plant are becoming smaller as a result of this, putting them at a higher risk of inbreeding which could lead to recessive gene disorders. Since P. californicus is such a rare plant, very few genetic studies have been done on it. Our goal is to establish the level of genetic differentiation, genetic structure between different populations and the level of genetic diversity among

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the populations as a way to assess speciation and extinction risk. In order to achieve this, all three separate populations of *P. californicus* were chosen: the San Bernardino Mountains of California, the Sierra Juarez Mountains of Baja California, and the Sierra San Pedro Martir Mountains of Baja California. Through the use of genetic testing, three genetically distinct populations were identified. Our data also confirmed that while there is little to no gene flow occurring between the populations of San Bernardino and San Pedro Martir, there is some gene flow occurring between the populations of San Bernardino and Sierra Juarez and the most occurring between the populations of San Pedro Martir and Sierra Juarez. Our data also showed that the Sierra Juarez population has the most inbreeding and the San Pedro Martir has the least. The data concluded that there is high genetic differentiation between these populations confirming that this species is at risk of speciation and possibly extinction. This research will hopefully contribute to conservation decisions regarding this rare plant species.

119 9:20 am

Resilient Restoration: Drought Resilience Amongst Southern California *Quercus agrifolia* Populations on Tribal Lands

Alexandra Hoff, Evolutionary Biology (M)

The Coast Live Oak (*Quercus agrifolia*) is a keystone species, providing invaluable ecosystem services and cultural significance. With a large distribution throughout coastal California and northern Baja California, this species provides shelter and food sources for many animals, restores and improves watersheds and mycorrhizal activity through its root system. It is also culturally important to many Tribal communities, providing abundant harvests of acorns to their families. Unfortunately, this species is facing decline due to increased vulnerability to pests, disease, intense drought and high temperatures, exacerbated by climate change and increased urban development. As such, *Q. agrifolia*'s resilience in the face of rapidly changing climate is integral to successful conservation and adaptation efforts. We are investigating whether drought tolerance varies between and within southern California *Q. agrifolia* populations, which populations are more resilient. To achieve our goals, we collaborated with local tribes, the Climate Science Alliance and UC Riverside as part of the larger conservation project on 'Resilient Restoration'. We sampled *Q. agrifolia* acorns from eight populations across southern California, including local tribal lands. To assess the drought tolerance of the eight populations, a greenhouse experiment was performed. Our end goals are to see what populations or individuals have drought tolerance and to rematriate the surviving plants to their Tribal lands for further growth and expansion. Half of each population were subjected to severe drought conditions, while the rest received a normal watering schedule. Throughout the greenhouse drought experiment, we measured several drought tolerance indicators such as germination, mortality, height, and stomatal conductance. The drought tolerant measurements were compared between populations using an ANOVA test. Our results showed statistically significant differences in mortality

and height (growth) among populations. With some populations having high levels of mortality. Currently, resilient trees identified in our experiment are being sent to the tribal reservation for planting. In addition, we are conducting genomic analysis, to investigate genetic diversity within and between populations, as a potential additional measure of resilience. These findings, along with traditional ecological knowledge and cultural practices, will be used to inform conservation efforts on the tribal lands these oaks came from.

120 9:35 am

Rice bran protein isolation and heavy metal content **Carlos Noriega, Foods and Nutrition (U)**

The world population is predicted to reach 9.8 billion by 2050, increasing demand for sustainable, high-quality dietary proteins. Rice bran, a byproduct of rice milling, contains a higher amount of protein (13-15%) than white rice (6-7%). Rice bran protein is also hypoallergenic and gluten-free, making it suitable for applications including infant formula and gluten-free products. One concern with rice bran products is that the heavy metals content in rice bran is typically significantly higher than that in white or brown rice, posing a potential risk if consumed in large quantities. In this study, we aim to examine how the protein extraction process influences the heavy metal content in the protein isolate. We hypothesize that as we isolate and purify the protein, the heavy metal content would be significantly reduced to be compliant with the FDA regulations. In our study, protein was extracted using the alkaline extraction isoelectric-point precipitation method and ultrasonication from defatted rice bran, produced by milling medium grain brown rice followed by fat removal using hexane. Proximate compositions (protein, ash, moisture, and fat) and heavy metals (arsenic, cadmium, lead, and mercury) were analyzed during various steps of the process. Protein content in rice bran increased from 13% to 63% after extraction. Following protein extraction, As increased from 681.5 ± 2.1 ppm to 1833.3 ± 235.0 ppm; Cd increased from 20.8 ± 0.1 ppm to 244.5 ± 88.5 ppm; Pb increased from 13.2 ± 1.1 ppm to 291.0 ± 141.7 ppm; Hg increased from 5.9 ± 0.5 ppm to 30.4 ± 5.6 ppm. Similar patterns were seen in white and brown rice proteins. To our knowledge, this is the first study to examine heavy metal content during protein extraction of rice bran.

121 9:50 am

Can species adapt fast enough to climate change? A resurrection experiment of the scarlet monkeyflower in California

Ashley Regan, Environmental Science (U)

Climate change has led to California experiencing heat waves, intense droughts, fires, among other stressors. Evolutionary adaptation is one key way that plant populations can persist in the face of climate change. However, one question is whether species can adapt fast enough to the environmental changes associated with climate change. Populations across a species range can vary in the magnitude of their evolutionary responses

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due to differences in the rate of environmental change (e.g. southern populations may be better equipped for drought periods), standing genetic variation, among others. One key trait that should influence populations' abilities to adapt to harsh climatic conditions such as severe drought and heat is the timing of key life history events such as germination. For example, germinating sooner to cope with an earlier onset of the growing season could be beneficial to populations to escape the drought and high temperatures of later seasons. Here, we use a resurrection approach to evaluate whether populations of scarlet monkeyflower have evolved earlier germination times in response to recent drought in western North America, and whether populations vary in the magnitude of their evolutionary responses. We hypothesized that a) if populations have adapted to recent drought conditions, they should have evolved earlier germination times from ancestors to descendants and b) that populations experiencing the greatest magnitude of drought relative to historical conditions should show the greatest evolutionary responses. We test these hypotheses by planting seeds from 2010 ancestors and 2017 descendants of scarlet monkeyflower originating from 2 northern-edge, 2 central, and 2 southern-edge populations. We will score germination time for each of ~8,000 seeds on a weekly basis in the SDSU greenhouse. We will analyze our data by modeling germination time as a function of population, year, and their interaction. These results will help us determine how fast a species can adapt to climate change when selection is strong, e.g. strong droughts, and have important implications for our understanding on the potential survival of plant populations.

122 10:05 am

Exploring the Genomics of Hops: Insights into Domestication, Genetic Markers, and Cultivation Strategies

Mohammad Ali Shah, Biology - Cellular and Molecular Biology (U)

Humulus lupulus, also known as hops, is a plant species that is widely cultivated for its use in brewing beer. Recent advances in genomic sequencing technologies have allowed for new insights into the domestication history of commercial hops and the identification of genetic markers for unknown strains. In this presentation, we will discuss the use of genotyping by sequencing to isolate genetic markers and determine the phylogenetic placement of global hop variants. We will also discuss the genome-wide annotation of functional variants and the use of statistical methods to estimate the recent evolutionary history of hops in the United States. Additionally, we will explore the impact of soil nutrient availability and plant growth on hops production and investigate optimal fertilization strategies that maximize production while minimizing over-fertilization. We will also conduct surveys of potential arthropod predators and assess their efficacy as biocontrol agents. Finally, we will examine hops-virus interactions by assessing the epidemiology of viral infection, identifying

viral strains through genome sequencing, quantifying viral loads per plant or plant tissue, and assessing the population genetics of hop viral pathogens/isolates. In summary, this meta-genomics research study of *Humulus lupulus* aimed to gain new insights into the domestication history of commercial hops, the identification of genetic markers for unknown strains and investigate the impact of soil nutrient availability, plant nutrient concentrations, plant growth, arthropod predators and hop-virus interactions on hop cultivation and brewing.

123 10:20 am

Hybridization might confer protection against psyllid-induced defoliation in Eucalypts

Rosalinda Diaz, Bioinformatics and Medical Informatics (M)

Eucalyptus moluccana, also known as the Grey Box tree, is a species of tree native to eastern Australia. This species hybridizes extensively with other close relatives. In recent years, this particular species has been infested with a type of psyllid species known as *Cardispina*. Psyllids are insects that suck the sap out of the leaves, starving the tree of its nutrients and ultimately resulting in its death. Our first goal is to determine if other closely related species of *Eucalyptus* are also being infested with this insect or if it is specific to just *E. moluccana* and whether hybridization might reduce the psyllid susceptibility. If *E. moluccana* has high psyllid specificity we will expect that hybrids to have less psyllid infestation (e.g., visits and eggs on leaves). A common garden was set up in a heavily psyllid-infested forest. Juvenile trees from *E. moluccana*, its four subspecies and close relatives were planted to assess psyllid preference. Psyllid visits and egg oviposition were counted for each seedling. To determine whether hybridization might reduce psyllid susceptibility, DNA samples were extracted from the individual trees of *E. moluccana* and closely related species that they can hybridize with. The DNA was extracted and the samples were sent for sequencing. This study will be using single nucleotide polymorphisms (SNPs) data. We will use DAPC and fastSTRUCTURE analysis to determine whether individuals are pure *E. moluccana* or hybrids. We will use statistical analysis to test for differences on these two categories (pure individuals vs hybrids) and the psyllid susceptibility. There was a high psyllid specificity with *E. moluccana* having the higher infestation rates and only few eggs were found in other close relatives. There was psyllid-susceptibility variation among the subspecies of *E. moluccana* with northern populations having the higher infestation percentages. Efforts are underway to analyze the genomic data to assess whether there is an association with psyllid susceptibility in *E. moluccana*. We predict that there may be a particular trait associated with the psyllids' preference to the trees of *E. moluccana* as opposed to other species.

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Abstracts of Presentations

Session B

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Session B-1

Oral Behavioral and Social Sciences 3

Friday, March 3, 2023 11:00 am

Mata'yuum

124 11:05 am

The Impact of Abuse and Incarceration on Coparenting

Nicolé Mendoza, Sociology (M)

The increase in nonmarital births and cohabitation in recent decades, results in more parents having to grapple with complex coparenting relationships. These family changes have occurred alongside a dramatic rise in incarceration of young men, who are also disproportionately fathers. Traditionally, scholarship has documented the impact of various factors, such as intimate partner violence (IPV) on coparenting, and increasingly, the challenges of paternal incarceration on coparenting. However, these streams are entirely separate. This project welds the two separate literatures by looking at the combination of both IPV and paternal incarceration's impact on coparenting.

I anticipated that experiencing both IPV and partner incarceration would be the most detrimental, followed by experiencing each one separately, relative to neither. Using the Fragile Families and Child Well Being study (n= 1,990) I estimate a series of Ordinary Least Squares regression models to examine the impact that abuse and incarceration have on the ability to successfully co parent. I find that by adding the mediator of income, mothers with higher income had 0.092 better coparenting than mothers with lower income. Additionally, when examining relationships and coparenting, mothers who were married to new partners had -2.52 worse coparenting with the bio father, compared to unpartnered mothers. There is very little research which looks at incarceration and intimate partner violence and their holistic impact on the ability to successfully co parent. Thus, my research will actively work to bridge this gap, and work to analyze the relationship between the two and the impact that they have on the ability to coparent.

125 11:20 am

Parents' Readiness to Change in Childhood Obesity Prevention Programs

Sydney Domingue, English (U)

Background: Parental motivation and readiness to change parenting practices related to their child's health can determine outcomes for family-based childhood obesity prevention and control programs. For example, the particular readiness stage a parent is in when they join a family-based program can heavily impact their participation in the program and ultimately influence their behavior changes. This study aimed to evaluate what factors influence parents' readiness to change their health-related parenting behaviors.

Methods: Factors that influenced parents' readiness to change their health-related parenting practices were evaluated through a cross-sectional survey study. Parents completed a self-report survey at the start of a childhood obesity prevention program conducted in Imperial County, California, called the California-CORD project ("CA-CORD") or Our Choice/Nuestra Opcion. Parents' motivation to change was measured by computing the average of ten survey items designed to assess this construct. Parents could respond to each of these items on a scale ranging from 1 "strongly disagree" to 5 "strongly agree," giving an estimate of their readiness to change overall. Additionally, hypothesized factors that would influence a parent's readiness to change (e.g., child age, parent depression, socio-demographic characteristics) were reported.

Results: Participants included 128 caregivers who were predominantly mothers and who identified as Hispanic/Latinx. Bivariate correlations found that the sole variable correlated with parents' readiness or motivation to change their health-related parenting behaviors is the perceived relevance of the CA-CORD intervention. There was a positive correlation between perceived relevance and parents' readiness to change ($r = .212, p < .01$). The more relevant a family thought the CA-CORD intervention was signified the more ready they were to change. No other factors were significantly related to parents' readiness to change.

Conclusion: Perceived relevance of the intervention is a factor that can be changed. To improve parents' readiness to change in family-based childhood obesity prevention programs, researchers and practitioners should consider including an informative and motivational speech at the beginning of the intervention that would increase a family's perceived relevance of the intervention.

Keywords: Parents' readiness to change; Childhood obesity prevention; Family-based intervention

126 11:35 am

Parenting Beliefs and Child Guidance Practices in the African American Community

Shanice Swan, Child and Family Development (M)

African American parents exhibit varying styles of parenting and child guidance practices across different cultural groups and ethnicities (Baumrind, 1971; Patton, 2017). Many studies have focused on differences in parenting styles in comparison with other cultures to explain why

African American parenting and child guidance practices should be changed. Several studies on parenting in the Black Community have only focused on Black communities with a low SES as compared to other racial/cultural communities (Querido et al., 2002; Silveria et al., 2020); the

perceived widespread acceptance of corporal punishment practices among Black parents (Simonset et al., 2012; Taylor et al., 2011). However, much of this research has been conducted by researchers outside these communities, resulting in a deficit-framed discourse on Black parenting and child guidance practices. The proposed qualitative case study seeks to disrupt

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this corpus of work on the exploration of African American parents' beliefs about parenting and how these beliefs impact their child guidance practices. The researcher will gather information on the lived experiences of these parents to center the participants' stories and disrupt the deficit views that continue to exist around parenting in the Black Diaspora in America. Critical Race Theory (CRT) will be used as an epistemological and analytical tool to examine the experiences of the study participants regarding their current parenting beliefs and guidance practices. Sharing stories of parenting wisdom can counter the deficit narratives that currently circulate around the experiences of African American parents (Daftary, 2018; Quaynor & Lintner, 2014). This study, though not generalizable, has the potential to highlight salient stories within the African American community on parenting beliefs and practices. It can also provide an opportunity to understand further what impacts African American parenting and help to decrease negative associations. This can then extend to schools and educational institutions that train childcare and family professionals. Training educators regarding the exploratory findings of the study may help bring an understanding of the behaviors of the children they serve. This study may produce similar findings to a previous study that revealed black parents embodied resilience and resistance (Rubin & Hines, 2022).

127 11:50 am

Attitudes surrounding having children shifting among millennials and Gen-z; Birth Rate Declining Olivia Moran, Business Marketing (U)

Individuals are becoming more aware of societal hardships early on as well as increased financial distress. There has been a shift in the culture surrounding women in the workforce as well as an increase of women in the workforce. We conducted research to understand how millennials and gen-z feel about having children, and what that could mean for the future birth rate.

First, we conducted secondary research to understand what the birth rate is and the factors that may contribute to one's decision to have children. Next, we conducted primary research using convenience sampling among 89 respondents, all 18 to -25 years old. We used Qualtrics to obtain the data, and SPSS to analyze the data.

Overall, we found that neither gender or age were significant factors in explaining the decline in birth rate. However, respondents' yearly household income did show up to be an accurate predictor of people's desire to have children or not. This could suggest that respondents feel that their yearly household income is out of their control and therefore this impacts their decision of whether or not to have children. Individuals' responses to "I am worried about my physical and/or mental genetics being passed off to my children" and "I feel that having children inhibits my personal freedom" were accurate predictors for their desire to have children or not. With that in mind, many individuals might choose not to reproduce as they are worried that their offspring will suffer the same

downfalls as them. Additionally people may choose to not have children because they are afraid to lose their sense of self and no longer have personal freedom that children may restrict.

128 12:05 pm

Lived Experiences of Young-Adult Spanish-English Bilinguals with and without a history of Developmental Language Disorder

Halie Doan, Speech Language Hearing Sciences (U)

Developmental Language Disorder (DLD) is the most common child language disorder (~7% prevalence; Norbury et al., 2016; Tomblin et al., 1992). Limited research in monolinguals (Bishop., 2010; McGregor., 2020) has revealed long-term differences to peers without DLD in social, academic, and vocational success (Clegg et al., 2005; Conti-Ramsden et al., 2018), and no current work is available in bilinguals. The purpose of this study is to reexamine themes in lived communication experiences of 18-21 y/o Spanish-English bilinguals in non-academic, academic, and vocational contexts through phenomenological interviewing.

We HYPOTHESIZED that participants with a history of DLD would report fewer distinct language contexts than their peers and that qualitative themes would emerge from interviews on context-dependent communication experiences.

Seven 18-21 y/o students (NoDLD=3, HxDLD=4) completed two PHENOMENOLOGICAL INTERVIEWS discussing experiences communicating in different contexts. Data were analyzed qualitatively through a grounded theory approach (Qureshi & Unlu, 2020) and coded with a quantitative component combining experiences shared across participants. Participants' language environments were counted and coded into three categories (1) Single-language contexts, (2) Dual-language contexts, and (3) dense code-switching contexts (Green & Abutalebi, 2013), and inner (i.e., family, friends) and outer (i.e., academic, professional) social communication circles were considered (Bronfenbrenner, 1979).

FINDINGS revealed a large effect size (Cohen's $d = 3.84$) showing that participants with NoDLD engaged in more dual-language contexts (Mean=2.66) than their peers with HxDLD (Mean=0.25). Descriptively a total of 3 out of 4 participants with HxDLD (75%) and 2 out of 3 participants with NoDLD (67%) reported experiencing communication difficulties and/or challenges in their inner social circles (i.e., family, friends). However, a total of 4/4 participants with a HxDLD (100%) and only 1 participant with NoDLD (25%) reported experiencing communication difficulties and/or challenges in their outer circles (i.e., academically, professionally). Other themes that emerged from the phenomenological interviews were more evenly distributed across participants.

We CONCLUDE from these preliminary findings that bilinguals with and without a HxDLD show some similarities and differences in their bilingual experiences across communication settings. Additional data are needed to confirm these findings.

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129 12:20 pm

Evaluating Current Measures of Cognitive Processing for Use with Multilingual Children

Sophie Levi, Language and Communicative Disorders (D)

Background: Both monolingual and bilingual children with developmental language disorder (DLD) demonstrate subtle deficits in areas of cognitive processing, such as: sustained selective attention, working memory and processing speed. Measuring the presence of cognitive processing deficits in the nonlinguistic domain may offer an opportunity for less-biased assessment within linguistically diverse populations. The purpose of the present review is to provide a basis for understanding how cognitive processing skills may be assessed. Method: Currently available assessments measuring sustained selective attention, working memory and processing speed in children (ages 3-10) were identified. The strengths and weaknesses of each tool for assessment in bilingual populations were considered. Results: Sustained selective attention can be measured in tasks that ask the child to monitor a stream of stimuli and respond to targets. One currently available measure, the Test of Variables of Attention, Version 9 (T.O.V.A. 9; Greenberg; 2011), develops a score for sustained attention, whereas the Conners Continuous Performance Test Third Edition (Conners CPT 3; Conners, 2014) embeds assessment of attention into more complex cognitive areas such as inhibition. Working memory is commonly assessed linguistically by remembering a series of words while performing some mental operation. Assessments in the nonlinguistic domain are less common, but can involve replicating a series of pictures previously seen. Measures of children's processing speed, such as subscales of common neuropsychological assessments (e.g., NEPSY-II; Korkman et al., 2007; Wechsler Intelligence Scale for Children-5th edition, WISC-V; Wechsler, 2014) frequently infer processing speed from language-based tasks or more complex visuomotor tasks. Conclusions: Cognitive processing skills may be important to consider in language assessments. However, pure measures of each skill are rare and the linguistic nature of the majority of the assessments may deem them ill-suited for use with bilingual children. Future work is needed to develop nonlinguistic assessments of cognitive processing skills that can help identify language disorders across both bilingual and monolingual children.

Session B-2

Oral Biological and Agricultural Sciences 3

Friday, March 3, 2023 11:00 am

Pride Suite

130 11:05 am

Investigating the Role of Pyroptosis in Trichomonas vaginalis Pathogenesis

Brayden Young, Microbiology (U)

Although *Trichomonas vaginalis* causes the most prevalent, non-viral sexually transmitted infection in humans, little is known about its pathogenesis. Previous research has shown that pyroptosis, an inflammatory cell death, is an innate immune response activated in macrophages upon *T. vaginalis* infection. We hypothesize that pyroptosis of ectocervical (Ect-1) and placental (JEG-3) cells contribute to *T. vaginalis*- associated comorbidities. Pyroptosis is executed via inflammatory caspase cleavage of the gasdermin D protein. To begin investigating the involvement of caspase-1 in mediating host-cell death after *T. vaginalis* infection, we assayed for the loss of membrane integrity leading to release of cytosolic lactate dehydrogenase (LDH). Ect-1 cells were infected with *T. vaginalis* in the presence of the caspase-1 peptide inhibitor, Ac-YVAD-cmk, or vehicle control and the activity of LDH released into cell supernatants was assayed. We found a statistically significant decrease in Ect-1 host cell killing by the parasite upon caspase-1 inhibition compared to vehicle control. Next, to test if gasdermin D is cleaved in Ect-1 cells during *T. vaginalis* infection, we performed western blot analysis of whole cell lysates collected from Ect-1 cells co-incubated with *T. vaginalis* and uninfected controls. We found that Ect-1 cells express the full length gasdermin D protein (53 kDa). Additionally, immunoprecipitation and subsequent western blot analysis also revealed the presence of the gasdermin D N-terminal cleavage fragment (31 kDa) upon Ect-1 cell infection with *T. vaginalis*. Furthermore, western blot analysis of JEG-3 cells co-incubated with *T. vaginalis* revealed a novel upregulation of GSDMD expression, up to a 3.6-fold increase at a 2:1 multiplicity of infection (MOI). We also observed that the N-terminal cleavage fragment is released upon *T. vaginalis* infection of JEG-3 cells and we detected a striking 23-fold greater release upon an 2:1 MOI compared to an 0.25:1 MOI. Altogether, our results provide evidence of gasdermin D processing indicative of pyroptotic host cell death being activated in epithelial cells during *T. vaginalis* infection. Understanding this mechanism of flagellated protist-induced pyroptosis as a cytopathic and pathogenic inflammatory response is crucial for development of anti-inflammatory targeted therapies.

(U) = Undergraduate; (M) = Masters; (D) = Doctoral

131 11:20 am

SoxB1-2 Mediated Chromatin Remodeling During Stem-Cell-Based Tissue Regeneration

Mallory Cathell, Cell and Molecular Biology (D)

SoxB1-2 Mediated Chromatin Remodeling During Stem-Cell-Based Tissue Regeneration: Our lab uses the freshwater planarian, *Schmidtea mediterranea*, to elucidate the mechanism by which SoxB1 genes regulate stem cell-based tissue regeneration and maintain tissue homeostasis. *S. mediterranea* possesses an adult pluripotent stem cell population that confers the ability to regenerate entire animals from tiny tissue fragments. Our lab discovered that RNAi knockdown of a SoxB1 gene, *soxB1-2* (*soxB1* hereon), leads to a striking phenotype with animals exhibiting seizure-like behaviors and loss of a mechanosensation modality. In addition, in situ hybridization experiments revealed an array of epidermal and neuronal genes downregulated in response to *soxB1* RNAi. Functional analysis demonstrated that *soxB1* is essential for the differentiation of ciliated epidermal and neuronal cells, but the mechanism by which this occurs is unknown. I hypothesize that SoxB1 acts as a pioneer transcription factor, binding directly to otherwise inaccessible chromatin and “priming” cells for ectodermal fates through chromatin remodeling. To test my hypothesis, I have performed ATAC-seq on *S. mediterranea* tissue obtained from control and *soxB1* RNAi-treated animals. The experiments generated a set of differentially open chromatin peaks between control and *soxB1* RNAi animals, and mapped peaks to the *S. mediterranea* genome, to generate a list of potential genetic targets associated with these open areas. I have also performed ATAC-seq on *soxB1* RNAi and control regenerative (blastema) tissue to gain insight into chromatin changes in stem cells and progenitors. As a complementary approach to elucidate changes in the chromatin landscape, I will also perform CUT&RUN experiments for Histone modifications H3K4me3, which has been shown to mark transcription start sites and provide a marker for open chromatin. By combining this chromatin data with our RNA-Seq dataset [1], I will generate a chromatin- based model for how SoxB1 drives stem cell programming towards epidermal and neuronal fates and maintenance of neuronal cell identity in vivo. Identifying target genes in a differentiated and regenerative context will allow me to target specific genes for RNAi to determine their role in the SoxB1 regulatory pathway and tease apart their spatiotemporal expression and how they are involved sensory neuron fate specification.

132 11:35 am

Investigating the Role of Pyroptosis in *Trichomonas vaginalis* Pathogenesis

Michiko Adams, Biology (Cell and Molecular) (U)

The protozoan parasite *T. vaginalis* causes Trichomoniasis, the most common non-viral, sexually transmitted infection (STI) in the world. *T. vaginalis* infections have been found to induce pyroptosis, a pro-inflammatory cell death in human macrophages. However the molecular mechanisms of infection of female reproductive tract (FRT) cells is poorly understood.

We hypothesize that *T. vaginalis* induces pyroptotic cell death in epithelial cells of the female reproductive tract. Pyroptosis is executed by gasdermin D (GSDMD) cleavage by an inflammatory caspase protease. To begin to investigate if pyroptosis is activated upon infection of female reproductive tract epithelial cells, we co-incubated *T. vaginalis* with ectocervical (Ect-1) or vaginal (VK2) epithelial cells during a 2, 4 and 6 hrs infection time series. At each time point we collected whole cell lysates (WCL) and performed western blot analysis utilizing an anti-GSDMD antibody. We detected the presence of full-length GSDMD (~53 kDa) in Ect-1 and VK2 cell lines under uninfected and infected conditions. Upon *T. vaginalis* infection, we also detected the presence of the N-terminal GSDMD cleavage fragment (~31 kDa). Furthermore, as the multiplicity of infection (MOI) ratio of *T. vaginalis*: host cell was increased, an increased amount of the GSDMD N-terminal cleavage fragment was also detected, with densitometric analysis revealing that the GSDMD cleavage fragment was present at 3-fold higher levels in the 5:1 MOI compared to the 1:1 ratio. To further test the specificity of the detected GSDMD cleavage product, we performed an immunoprecipitation of WCLs collected from VK2 cells exposed to *T. vaginalis* and an update on these results will be presented. Our results have identified expression of GSDMD in Ect-1 and VK2 cells and novel GSDMD cleavage during infection of Ect-1 cells with *T. vaginalis*. Detection of the GSDMD N-terminal cleavage fragment during *T. vaginalis* and Ect-1 co-incubation may implicate pyroptosis as a potential mechanism for cell death in ectocervical epithelium. Together, the results of our work investigating the molecular mechanisms contributing to *T. vaginalis* pathogenesis will contribute to an increased understanding of trichomoniasis and may aid in development of new pharmacological treatments, a growing necessity as strains acquire antibiotic resistance.

133 11:50 am

Investigating the role of motility in *Trichomonas vaginalis* pathogenesis

Bryn Baxter, Microbiology (M)

Trichomonas vaginalis is a protozoan parasite responsible for the most common nonviral sexually transmitted infection, trichomoniasis. Although this infection affects nearly 200 million people each year, little is known about the molecular mechanism utilized by the parasite to cause disease. We hypothesize that *T. vaginalis* motility driven by the parasite's five flagella plays a key role in mediating infection. In order to investigate this, we will perform the first characterization of kinesin-II proteins in *T. vaginalis*. Kinesin-II proteins are motor proteins that mediate anterograde intraflagellar transport that is necessary for flagellar assembly and function of this organelle. To identify candidate flagellar-localized kinesin-II proteins, we searched the *T. vaginalis* genome (TrichDB) for genes annotated as putative kinesin-II proteins. Afterwards, we performed bioinformatic analysis of these proteins, using programs including NCBI Blastp, Uniprot, and Clustal Omega in order to test for homology with other flagellar kinesin-II proteins and perform multiple sequence alignments. We identified three kinesin-II genes with similarity to putative kinesins found in

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the flagella of other single cell eukaryotic protozoan parasites. Additionally, Interpro and Clustal Omega analysis revealed that all three *T. vaginalis* putative kinesin-II proteins contain a highly conserved kinesin motor domain. Interestingly, this predicted protein feature has homology to the domains of other putative kinesin-II proteins in protozoan parasites such as *Toxoplasma gondii*. We also tested for the predicted protein structure and folding using Phyre2 and found that all three genes have predicted tertiary protein structures similar to kinesin-II proteins. We are in the process of cloning these candidate genes to express them with two C-terminal HA tags in *T. vaginalis* to test if they indeed localize at the *T. vaginalis* flagella. If so, we plan to knock them out in order to generate the first *T. vaginalis* motility mutants. An update on this research will be presented. These findings will generate novel knowledge about the cellular biology of *T. vaginalis* flagella and the role of motility in *T. vaginalis* pathogenesis.

Session B-3

Oral Humanities, History, Literature, Philosophy 1
Friday, March 3, 2023 11:00 am
 Metzli

134 11:05 am

“It’s Possible!” Disney and Diversity

**Zakk Mannella, Master of Fine Arts in Theatre Arts
 Musical Theatre (M)**

Throughout the 20th and 21st centuries, the Walt Disney Company has had a tumultuous relationship with embracing diversity and inclusion. From early and racially prejudiced films to newer and more culturally accurate films, Disney has made large strides in the depictions of historically and ethnically accurate representation. On stage, the Disney Theatrical Group has been a leading standard for diversity and inclusion within the Broadway community since its conception in 1993, paving a clearer way for inclusive casting. The Disney Corporation is one of the largest and leading entertainment companies in the world, with its outreach targeting the minds of young children and adults alike. Diversity and inclusion within the creative arts is lacking, and large efforts must be made to accurately portray the diverse world around us. My research was conducted to study the trajectory of the Disney Company’s commitment to diversity and inclusion. By studying the beginning of the company’s conception, to present day practices, I researched what systems are in place in the employment process, casting process, and accuracy in the portrayals of different cultures and ethnicities. Using information from websites, books, television specials, and films I found a clear acceleration within the company’s effort towards practices of diversity and inclusion. Disney is one of the largest entertainment companies in the world, and the practices that they hold themselves to should be universally accepted, so that the art that is created more accurately represents the diverse world around us. Disney is committed to being leaders of diversity and inclusion within the arts, and is actively putting effort into pushing the boundaries

of traditional casting by utilizing color-conscious casting. Under constant fire for positive and negative approaches, they strive to learn from and correct mistakes, acknowledge that material they created has caused harm to underrepresented communities, and enact changes that positively reflect the diverse world around us.

135 11:20 am

Name It, Claim it: Antiracism in Music Directing
Van Angelo (Baum), Theatre Arts: Musical Theatre (M)

The musical theatre rehearsal space is one that is not immune to systemic racism. By taking an in depth look at the history, and some of the systemic issues, in the rehearsal space we can begin to name and claim how to lead rehearsals from a space of antiracism. The job of the music director is to craft the sound and musical integrity of a piece. As many black shows and narratives in the musical theatre canon are not written by black people the antiracism work must be done in the rehearsal space to ensure equity and safety for all performers. Through research and application this article lays out history of the black musical theatre sound, systemic issues that arise in the music rehearsal, and concludes with practical pedagogical tools for music directors on how to combat racism in the music rehearsal.

136 11:35 am

“There’s This Disruption Happening Before Your Eyes”: Strategies for Decolonizing a White Landscape

Jill Holslin, Art & Design MFA (M)

The legacy of the 19th century Hudson River School of landscape painting and its complementary tradition of landscape photography of the US West shaped an “American experience” of landscape, place, and belonging based on expansion and settler colonialism. Such landscape painting traditions offered few strategies that might contest the processes that turned land into private property, erased Indigenous people and their knowledge, and disrupted their relationships to land. For visual artists today, traditional strategies of US landscape art make it difficult to see and conceptualize alternative ways of being in and making claims on the land.

My research-based art practice draws upon photographic archives and decolonial and postcolonial theory to redefine the problem of land, landscape, and belonging, to suggest new artistic strategies that complicate traditional ways of depicting landscape. My work focuses on the Midwest landscapes of my childhood and explores the ways displacement is turning landscapes like these into a site of struggle. A key concept in my art practice is Homi Bhabha’s notion of an “in-between” or “interstitial” space, a third space that breaks away from rigid, fixed identities and opens up the possibility of cultural hybridity (1). In this paper, I present and visually analyze my own work, which uses photo weaving to complicate traditional understandings of landscape imagery. Photo weaving is a collage technique in which the artist cuts photographs into

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strips and reassembles them, juxtaposing distinct visual signs to produce new, unexpected meanings. I argue that landscape and identity are never fixed, stable, or pure, but rather, by recognizing and visualizing displacement through my work, I situate myself in an in-between landscape, that can make visible erased histories. It is through the gathering and reassembly of artifacts, media, and memory images—fragments of multiple pasts—that I work within the terms of my own displacement and imagine new forms of emplacement.

1. Homi Bhabha, *The Location of Culture* (New York: Routledge, 1994), 4.

137 11:50 am

Autistic Musicality: Viewed Through the Lens of the Neurodiversity Model of Autism

Isadora Flores, Master of Music Composition (M)

Autism is a neurological difference that is widely misunderstood, even in academic research. The purpose of this study is to examine how autistic traits in autistic adults contribute to their musicality, their musical abilities, and expression. I am taking the neurodiversity approach to this research. This research may assist with breaking the stereotypes surrounding autism, observe autism as a part of natural human variation, and highlight these individuals' strengths to further autism acceptance in our society. This research is also needed because autistic people need to be the ones leading research on autism, not just non-autistic people. Data was collected by interviewing three autistic adults with academic and professional music backgrounds and experiences. The sample is as follows: Aurora is a 21-year-old woman, Beth is a 35-year-old trans woman, and Calvin is a 58-year-old man. Findings indicate that the following autistic traits help these musicians refine their musical craft: sensory preferences, attention to detail and hyperfocus, and their emotional connection and profound understanding of musical stimuli.

138 12:05 pm

Large, In Charge: Get Used to It

Lindsey Grant, MFA Theatre Arts: Musical Theatre (M)

How has Broadway been influenced by a belief that you must look a certain way to be the romantic lead in a musical? Have we been conditioned to believe that only a certain "look" can be the love interest? Through my research, I discovered that society has dictated what the stereotypical "right look" is when casting romantic leads in a musical. Women seemed to be cast only if they were very thin and "waif-like", while plus-size women were considered lazy. This is exemplified when examining the Disney Princess, and Mattel's Barbie Doll. They represented "the ideal perfect look", yet their appearances were unrealistic and unattainable. This "perfect look" put toxic thoughts in young girls' minds, and this led to many having emotional and psychological issues.

The body positivity movement has helped change these stereotypes. It opened up the discussion of body inclusivity and the importance of embracing different body types. This in-

turn has given a green light to casting agents and directors on Broadway.

Director Marcia Dodge's 2021 production of *Beauty and the Beast* at the Olney Theatre defies "the normal" casting of romantic leads and challenges society's expectations of what the "perfect look" for romantic leads are. I had the opportunity to interview Dodge regarding her vision and casting approach in her production. I then compare it with the casting of the 1991 film version of *Beauty and the Beast* and the 1994 original Broadway production. Have stereotypes and expectations changed (or not)?

Society has come a long way in accepting body inclusivity on the Broadway stage, but there is still a long way to go. Directors must walk a fine line between bringing body inclusivity to stage while creating a successful, profitable musical. With help from directors like Dodge, adding body inclusivity, especially in the romantic leading roles, will hopefully become more commonplace, and that will give directors confidence their shows will succeed financially. "The more people of all sizes see themselves represented on stage, the less stigma is attached to size. Let's just make casting real body types the norm."

Session B-4

Oral Humanities, History, Literature, Philosophy 2

Friday, March 3, 2023 11:00 am

Visionary Suite

139 11:05 am

Photography and Abolitionism: A Visual Dialogue

Briana Betschart, History (M)

According to Aristotle, "the soul never thinks without a picture." Imagery plays a fundamental role in how humans process and engage with the world around them. This innate tendency for image creation is reflected in the early nineteenth-century invention of the daguerreotype, the forerunner of modern photography. In a world dominated by white supremacy, this emergent technology profoundly affected how black abolitionists advocated for themselves.

My presentation argues that black abolitionists gained agency by utilizing emergent print and photographic technologies. They used this visual medium as a tool to further establish their identity and political goals. In doing so, they created the equivalent of early media campaigns that profoundly impacted how the viewer related to black abolitionism. Abolitionist portraiture constituted a visual rhetoric that targeted white America. The cultural impacts had transformative implications for the nineteenth century and beyond.

Historians and academics have long favored the written text in analyzing the past, and photography's development provides a rich visual narrative worthy of exploring with the same tenacity. Abolitionists, such as Frederick Douglass and Sojourner Truth, used imagery and often their own portraiture to advocate for their rightful place in the United States society. The portraits, images, and art they produced became a critical

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tool in achieving political goals, conveying their humanity, and in influencing social cognition. For African Americans living in the nineteenth century, in a country dominated by white supremacy, these were powerful images that they used to benefit themselves and their communities. Viewing a Carte de Visite of an admired abolitionist wasn't just a welcome respite from the racist imagery that dominated the American nineteenth century, it was the start of representation and activism—a place where black individuals could control their own reflection.

140 11:20 am

An Introduction to Archaeology of Childhood with Artifacts of the Whaley House

Savannah Castleman, Anthropology (U)

The notorious Whaley House! Known for the horrific incidents, hauntings, and dark history in Old San Diego but the Whaley House is much more than a tourist site for ghost hunters. The Whaley house, located in Old Town San Diego, was built by Thomas Whaley in 1857. A year after construction, the second child of Thomas and Anna Eloise Whaley, Anna Amelia, was born in the home, and by 1864, three more children were born and living in the Whaley house, George Hay Ringgold, Violet Eloise, and Corrine Lillian. While Thomas Whaley attended business away from home, the children were being raised by their mother in the home. The children grew up, started lives, and got married in the home, and even lives were lost with the suicide of Violet Eloise in 1887. Although the Whaley house is rich in grim history, the artifacts of the house tell a beautiful story of childhood, parenting values, and children thriving in the home. During the 2007- 2012 archaeological field seasons at the Whaley House, numerous artifacts displaying child manipulation, play purposes, or are just simply toys were found in the yard of the house where it was thought the children played. Because the Whaley House is a site known to have children, artifacts found in the yard can be used to determine how normal household objects can be manipulated for play use by children, how the parents use toys to teach children necessary skills that will come along in the future, as well as how archaeologists can use toys and child manipulated objects to determine what's important to a society based on the skills and toys parents provide for their child. By analyzing childhood in a site, archaeologists get a more raw insight into what drives a certain culture. The goal of this research is to use the Whaley House artifacts to introduce the perspective of childhood archeology and the impact that children have on a site that can add depth and change the overall analysis of a site.

141 11:35 am

Carmen Argote At The San Diego Museum Of Contemporary Art

Isis Exum, Studio Arts & Art History (U)

This essay analyzes an exhibition by Los Angeles based Latina artist Carmen Argote at the San Diego Museum of Contemporary Art held from summer to fall 2022. It analyzes one work in the show titled Cosmic Backpack Mono Arana/ Spider Monkey and how it is displayed within the museum. It also addresses issues around the representation of marginalized artists and cultures in the visual arts. Although Argote's culture may influence her works, her art is not defined by her heritage. The museum's exhibition presented Argote's works in a way that accurately aligned with her practices instead of exploiting her heritage. The significance in doing so helps provide contemporary artists with genuinely inclusive spaces to express their works, widen representation within artistic spaces, and exposes audiences to a wider variety of artists. Although representation for underrepresented groups is steadily progressing, contemporary artworks that are created by marginalized members of society can often be flattened by solely attributing an artist's race or one singular aspect of their identity to their art. Given that one's identity will be influential or significant to one's work, it is still important to be conscious and respectful in how works are presented to audiences. Through art criticism and visual analysis of Argote's work, I ultimately argue that artists from marginalized communities, like Argote, have been historically reduced to singular aspects of their identity or cultural heritage. As a result, the multidimensionality of these creators' practices is often overlooked and misinterpreted. Instead, art institutions should provide spaces where marginalized people are able to present their work in a way that is respectful and genuinely representative of the artist's own unique experiences.

142 11:50 am

#CancelLatinidad: Power Relations and Media Representations in Contemporary Reggaetón and Latine Culture

Eva Gomez, Women's Studies (M)

The hashtag #CancelLatinidad has been used in recent years as a form to call out anti-Blackness and anti-indigeneity in Latine spaces and communities that often erase and ignore the existence of Black and indigenous Latines in these communities. Anti-Blackness and anti-indigeneity are so heavily ingrained in Latine culture, that it is not uncommon for these negative images to be seen in contemporary media representations of Latinidad. Although these negative representations seem to still be a large part of latinidad, there are also representations in media that are more inclusive and revolutionary that provide a source of hope for Latine youth. In the genre of reggaetón music, we can see both negative and positive representations of latinidad through artists like J.Balvin and Bad Bunny. Balvin has been constantly critiqued

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for his anti-Blackness and misogynoir in several instances. On the other hand, Bad Bunny has been praised for his inclusivity and feminist rhetoric. In my thesis, I hope to explore the ways in which latinidad is constructed through media and popular culture, specifically through the current popularization of latinidad as an aesthetic through reggaetón music. I also hope to look at the ways in which anti-Blackness is ingrained in Latine culture and explore how latinidad is changing through reggaetón and what all these representations mean for Latine culture, youth and future.

143 12:05 pm

Crafting Palatable Citizens: Indigenous Dietary Americanization

Cassandra Onstad, History (M)

In recent years, interest in food sovereignty has renewed attention within indigenous communities to reconnect to their traditional foodways, cultural recipes and overall ancestral diets. However, at the turn of the 20th century, boarding schools became one of the main sources of dietary Americanization through the dining table and specific vocational training. While scholarship on indigenous history has only begun to delve into the experiences of boarding school attendees, this paper draws from letters, memoirs, autobiographies, photos, and government documents, to explore the complicated relationship that native children had with their diet, vocational education, and identity within the context of their memories of boarding school life. Furthermore, to bring indigenous voices to the forefront this work utilizes visual, sensory, and textual analysis. While boarding schools attempted to retrain Indigenous children to eat a certain way, the schools largely failed to meet the standard of diet intended. Despite these failures, schools pushed a dietary narrative that negatively characterized the Indigenous diet through descriptions of smell, taste, and moral corruption. Accordingly, students resisted or adapted the dietary rhetoric in which they were educated in, in order to blend into the “modern” world and protect their indigenous traditions.

144 12:20 pm

Lucid Philosophy

Carlos Melendrez, Philosophy (U)

A common goal of philosophy is to observe true reality, including our nocturnal activities. Contemplative traditions have uncovered direct insights gained from achieving lucidity in dreams or sleep. Modern medicine is now testing for the potential benefits of lucid dreaming. I explore lucid dreaming and how it's necessary to help progress philosophy. I will present Buddhist and Advaita-Vedanta insights on dreams and sleep, using psychology and neuroscience to contextualize lucid dreams. I discuss how lucid dreaming is a deeply moving phenomenon that has the power to make philosophy and our quality of life more enriching.

SDSU

Student
Symposium

Abstracts of Presentations

Session C

SDSU | San Diego State
University

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Session C-1

Oral Behavioral and Social Sciences 4

Friday, March 3, 2023 1:00 pm

Park Boulevard

145 1:05 pm

Financial Toxicity Among Underserved Breast Cancer Survivors

Andrea Van Bebber, Psychology (U)

Background: Breast cancer is the most common cancer diagnosed in the United States, and 1 in 5 breast cancer survivors reported experiencing financial burden. Cancer survivors develop a financial burden due to the high cost of cancer treatment, co-payments, medications, traveling expenses, and the change in the quality of life. About 30% to 42% of cancer survivors reported employment status changes because of cancer and spent 20% of their annual income on medical care. The accumulation of these economic burdens that distresses cancer survivors is defined as Financial Toxicity. In low-income populations, about 14.8% to 78.8% of cancer survivors experienced Financial Toxicity.

Aims: The purpose of this study is to explore the scope and extent of financial challenges and contributing factors to financial toxicity.

Methods: We interviewed 25 breast cancer survivors, including Hispanic and non-Hispanic Whites recruited from the local non-profit cancer organization in rural Central California. Individual interviews were conducted either in English or Spanish by the trained staff members from the organizations. The interview lasted about 50 minutes to an hour. Each interview was recorded, transcribed, and translated from Spanish to English.

Results: Data were analyzed using thematic analysis. Financial challenges include 1) food insecurity; 2) paying bills; and 3) difficulty to pay for medical costs. Factors contributing to financial toxicity include 1) employment disruption; 2) family's illness; 3) out-of-pocket costs (e.g., co-pay); 4) travel costs.

Discussion/Conclusion: The results suggest the main issues contributing to the financial hardship directly affecting breast cancer survivors. Healthcare providers need to implement screening for financial toxicity and refer/link the breast cancer survivor to appropriate resources (e.g., financial navigation program). In addition, information about financial resources, services, and non-profit organizations need to be available in the oncology clinics.

146 1:20 pm

We All Count, El Cajon. A Survey on the Middle-Eastern Community in El Cajon City

Nasser Mohieddin, Big Data Analytics (M)

The racial and ethnic categorization has always been a point of controversy in the United States. Lack of data on certain ethnic and racial groups undermines efforts to address disparities.

This is particularly true for the middle-eastern population, as the current U.S census categorizes people of middle eastern descent as white. Recent studies have pointed out this issue, and recommended changes to the current U.S census to better understand the population's demographics. One example of this is "Lack of Arab or Middle Eastern and North African Health Data Undermines Assessment of Health Disparities" by Germine H. Awad. There are various federal programs as well as non-profits in the United States that support refugees in their resettlement. However, today, America's refugee resettlement program remains underdeveloped and underfunded, putting the future of refugees at serious risk (Hanna 2011). The purpose of this research is to perform a survey on the middle-eastern community in EL Cajon to better understand the demographics of the population. The We All Count, El Cajon @ SDSU survey monitors data on how refugees of middle-eastern descent cope with the transition to the United States. The current scientific survey aims to provide a better understanding of how people of middle-eastern descent that move to the United States cope with the transition. The data will provide a better understanding of the socio-economic challenges faced, financial burden, and social programs utilized by the middle-eastern community when migrating to the US. Data will be used to evaluate which programs are successful and being utilized or underutilized by refugees, and the impact of the racial classification on the accessibility to those resources.

147 1:35 pm

Health-Related Quality of Life in Hispanic-American Adults: Associations between Demographic Factors and Cancer Fatalism

Megan Korhummel, Psychology (U)

Cancer fatalism (CF) is the specific belief that a cancer diagnosis will lead to death. Past studies have linked higher CF to lower rates of cancer screening behaviors in Hispanic Americans (HAs), but limited research has explored sociodemographic correlates of CF or the association between CF and health-related quality of life (HRQoL) in HAs. This study aimed to describe CF in HA adults, explore variations in CF levels by sociodemographic factors, and examine the relation between CF and HRQoL. A community-based sample of 436 HA adults completed the Powe Fatalism Inventory and WHOQOL-BREF in their preferred language (English or Spanish). One-way ANOVAs were conducted to assess group differences in CF by gender, language, education, marital status, religion, and history of cancer. Correlational analysis was used to examine the association between age and CF. Multiple linear regression models were used to evaluate the association between CF and HRQoL, with age as a covariate and gender, language, and family history of cancer tested as direct effects and as moderators. CF levels significantly differed by education [$F(1,405) = 11.68, p = .001$] and marital status [$F(1,408) = 4.13, p = .043$]. HA adults with a high school degree or lower and people who were not married had significantly higher levels of CF than their counterparts. Age was positively associated with CF ($r = .11, p = .029$). Regression analyses revealed that the

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interaction between gender and CF was a significant predictor of physical HRQoL ($\beta = .15, p = .007$). A simple slopes follow-up test showed the association between CF and physical HRQoL was significant only for men ($\beta = -.12, p = .002$). Language was the only significant predictor of psychological HRQoL ($\beta = -1.10, p = .001$). HA adults who were older, had lower education levels, or were not married reported stronger beliefs in CF than their counterparts. CF was associated with poorer physical HRQoL, but only for men. Increased understanding of CF in HAs, with attention to potential within-group sociocultural variations, can allow for better care of patients who hold high fatalistic beliefs, as well as improve patient-provider communication.

148 1:50 pm

Her Turn to Learn: Expanding Girls' Education in Afghanistan

Sandrien Mekany, Political Science (U)

A significant number of girls under the age of eighteen are out of educational institutions relative to their male counterparts in the country of Afghanistan. Many factors such as poverty, violence, harmful gender norms, the normalcy of child marriages and exploitation are keeping girls out of school. If current restrictions fueled by these factors as well as the Taliban's abuse of power continue to hinder girls' access to a fair and equitable education, a substantial number of girls will be unable to foster the skills necessary to contribute to their livelihood as individuals as well as the socio-economic and political future of the country.

Based on a thorough analysis of interviews with refugee girls from Afghanistan, peer-reviewed research and matrix analyses, I recommend the establishment of community-based educational programs through international organizations. While many other alternatives would likely reduce the number of girls out of school; time and financial support were significantly important in the diagnosis. The cost-effectiveness, quick turnaround time, quality of education and implementation of safety that is evident in past models of community-based educational programs were dominant tradeoffs that informed this recommendation. Restricting girls' educational access not only impacts them but the future of Afghanistan and its stability as an entirety. Without an education, girls' roles and values in society continue to be undermined across various economic, social, and political spheres.

149 2:05 pm

No Person Shall Willfully Resist, Delay, or Obstruct: The Criminalization of Activists and Organizers Resisting Homeless Encampment Sweeps

Nicolas Gutierrez III, Criminal Justice and Criminology (M)

In Los Angeles, nearly 70% of the City's homeless population is staying in places not meant for sleeping like vehicles and tents (LAHSA, 2022). City officials have long invisibilized homelessness through punitive measures like anti-camping ordinances and encampment sweeps that displace unsheltered individuals and destroy their property. Research indicates these

practices often result in physical loss, psychological harm, and social consequences (Herring et al., 2020; Welsh Carroll et al., 2022). In an effort to resist these effects, community members—housed and unhoused—regularly organize sweep defenses to minimize displacement and destruction, and survival supplies distributions to replenish confiscated items. In addition to penalizing noncompliant encampments, a recent LAMC 41.18 amendment criminalizes resistance and institutes penalties for willfully resisting, delaying, or obstructing City employees.

While existing research illustrates the harms of criminalizing homelessness, we know little about how activists and organizers resist harmful city practices while navigating their own criminalization. Drawing from semi-structured interviews with activists, organizers, and encampment residents (current $n = 12$) in Los Angeles, this paper will center and theorize the lived experiences of those directly affected by the penalization of resistance. Specifically, this paper will examine how variations in the enforcement of anti-resistance ordinances influence organizers' decision-making and mobilization strategies. Preliminary data analyses indicate that some organizers perceive this subsection of LAMC 41.18 as a tool of intimidation weaponized by police to discourage mutual aid; others describe it as a pretext to target organizers of color. Consequently, some activists recount their inability to volunteer due to ongoing trials; others describe adapting to this targeted enforcement by ensuring white male activists engage with police on behalf of the encampment community. While these increasingly punitive elements are not limited to Los Angeles, the City represents a microcosm of our nation's homelessness crisis and responses. Therefore, this paper aims to capture effective strategies for resisting harmful governmental actions and enhancing grassroots efforts that address the rights, well-being, and other needs of encampment residents across the nation. This presentation will frame comprehensive findings and their implications in the context of current conversations about homelessness, criminalization, and police reform and abolition.

Session C-2

Oral Biological and Agricultural Sciences 4

Friday, March 3, 2023 1:00 pm

Pride Suite

150 1:05 pm

Modulation of marine tubeworm metamorphosis through a sigma factor-like regulator

Andy Fedoriouk, Cell and Molecular Biology (D)

The vast majority of characterized bacterial-animal interactions tend to focus on bacterial pathogenesis. In contrast, comparatively little is known about beneficial host-microbe interactions. An outstanding example of a beneficial bacterial-animal interaction is the interaction between a marine bacterium *Pseudoalteromonas luteoviolacea* (*P. luteo*) producing Metamorphosis Associated Contractile structures (MACs)

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which, upon binding and injecting effector proteins, induce the metamorphosis of the marine tubeworm *Hydroides elegans*. Studying this beneficial host-microbe interaction has relevance for pest control, naval surface fouling and bacterial interactions with the human gut endothelium. Recently, we identified an upstream regulator protein (MacR) in *P. luteo* that influences the rate of metamorphosis and potentially controls the rate of formation and/or release of the MACs. The dual goals of this project are to understand the molecular mechanisms underpinning the control of the MAC operon by MacR by performing loss and gain of function studies to manipulate the efficiency of MAC production. Previous experiments have shown that 2.5% of *P. luteo* in culture lyse in order to release MACs, in a manner analogous to lytic phage release. In the present study, we show that a genetic deletion of *macR* in *P. luteo* results in an 80% reduction in *Hydroides* metamorphosis. When MAC structural promoter induction is measured in the *macR* mutant, we observed an almost 1000-fold reduction in MAC sheath promoter activity. We hypothesize that a RNA-Seq experiment comparing the *macR* deletion mutant to control *P. luteo* will demonstrate differential regulation of MACs genes: some genes such as the sheath promoter, will demonstrate strong dynamic regulation dependent upon the presence of MacR, while others such as the MACs baseplate structural gene will demonstrate static levels. Due to their ability to bind eukaryotic epitopes, MACs and similar phage-tail like injection systems are gaining increasing attention as next-generation biologics. Deployment of these novel medicinal platforms are often hampered by difficulty in isolating and customizing the injected payloads of the systems. By elucidating upstream genetic regulators of MACs production, we work towards efficient and viable manufacturing of protein injection biologics.

151 1:20 pm

Genome-scale metabolic model of the microalgae *Dunaliella salina* – From CO₂ and light to pigments and antioxidants

Jenna Armstrong, Bioinformatics and Medical Informatics (M)

The microalgae *Dunaliella salina* has been widely recognized as a promising candidate for sustainable pigments production due to its ability to achieve high-biomass productivities under light environments. It provides a good marketable source for natural beta-carotene and other carotenoids. Development of bioinformatics tools such as genome-scale metabolic models constructed from genome sequences will enable quantitative insight into the metabolism of compounds within this organism. These metabolic models have long been utilized to generate optimized design strategies for an improved production process. Manual curation of the metabolic network will be used to accurately predict phenotypes under various growth conditions. This project aims to reconstruct, validate, and apply the metabolic model for *Dunaliella salina*. The objective of reconstruction will be to complete a genome-scale model from CO₂ and light to pigments and antioxidants. With 2300 reactions and 1770 metabolites, *D. salina* will be the most comprehensive model for any eukaryotic photosynthetic organism to date.

152 1:35 pm

Population Genomics of the Invasive Pink Rice Borer Moth, *Sesemia inferens*

Scott Monahan, Biology (U)

The Pink Rice Borer (PRB), *Sesemia inferens*, is an invasive pest to graminaceous food crops causing significant agricultural damage to rice production throughout China. PRB eggs are laid under host-crop leaves, with each adult moth capable of laying 120 - 348 eggs in its life. After a week of development, the eggs hatch and the larva bores into the host plant's stem where it will feed until pupation 23 - 39 days later. PRB's polyphagous capabilities, large clutch size, and short generation time amount to a generalist pest capable of reducing crop yields by an estimated 25.7% - 78.9% across a variety of crops. Here we analyze genome-wide Single Nucleotide Polymorphisms (SNPs) generated from hundreds of invasive moths collected from across China. We examine PRB's population structure, demographic history, and adaptive evolutionary pressures to inform control efforts of possible routes of further expansion. As part of a collaborative effort with Nanjing Agricultural University, a high-quality reference genome was assembled to 31 chromosomes. A reconstructed phylogeny indicated recent speciation (50 MYA) of PRB, characterized by significant gene loss. Preliminary findings on PRB population structure support a model with differentiated populations in Northern China, Central China, and Southern China. Estimates of historic population size using the Pairwise Sequentially Markovian Coalescent (PSMC) method indicates a significant increase in population growth over the past 10,000 years within the southern population, a recent spike in population growth within the northern population, and a significant population decline in the central population.

153 1:50 pm

Understanding the Metabolism of Recently Isolated Infectious Bacterium, *Bordatella atropi*

Ila Peeler, Cellular and Molecular Biology M.S. (M)

Our team recently isolated the intracellular bacterium *Bordatella atropi*, which is capable of infecting eukaryotic cells using a novel mechanism of cell-to-cell spreading via filamentation. Infection of the eukaryotic nematode, *Oscheius tipulae*, reduces both host lifespan and fecundity. It is known that UDP-glucose biosynthesis is needed for filamentation of the bacterium, but the specific carbon source requirements are unknown. Development of a genome-scale metabolic model using full genome sequences will enable further insight into the metabolic pathways required for this novel mode of infection. In this project we show the manual curation, validation, and application of a genome-scale metabolic model, including 1,877 metabolites and 2,712 reactions, for *B. atropi*. Systems biology approaches have been useful to understand cell-cell interactions at metabolic level. We applied this framework to understand *B. atropi* metabolism during infection.

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154 2:05 pm

Pharmacological suppression of the sweet receptor T1R3 impacts pancreatic islet development and gene expression in the zebrafish, *Danio rerio*

Christine Cho, Environmental Health Sciences (M)

“Artificial,” or Non-Nutritive Sweeteners (NNS) are ubiquitous not only in the modern human diet, but also in the environment. In this project, we examined the sweet receptor (SR) as a potential biological mechanism for NNS affecting development of pancreatic islets.

Sweet receptors are a class of G-protein coupled receptors that bind ‘sweet’ compounds such as sugars and NNS to stimulate intracellular processes, and SR in the pancreas have been associated with insulin secretion. We hypothesized that NNS while nutritionally inert itself, could activate SR of the pancreas and induce changes on a transcriptional and ultimately morphological level. These changes would be most apparent during development, when the pancreas is most sensitive to the environment. We tested if SR is necessary for the adaptive development of the pancreas by blocking SR and observing if that is sufficient to disrupt the development of pancreatic islets.

Transgenic Tg(insulin:GFP) zebrafish (*Danio rerio*) embryos that allow for direct visualization of beta cells were exposed to (0mM, 0.1 mM) Lactisole, an inhibitor of SR, along with (0 mM, 1 mM) glucose along with feed from 4-9 days post fertilization (dpf). Larval growth, as well as islet size, morphology, and count were assessed 9 dpf. In addition, RNA-sequencing was conducted to identify differentially expressed genes and pathways.

Suppressing SR with Lactisole suppressed secondary islet quantity and quality, and hindered overall growth. Interestingly, Lactisole and glucose in combination resulted in larger primary islets, fewer secondary islets, and increased ectopic beta cells. This may be compensatory primary islet expansion due to deficient development of secondary islets. KEGG pathways for metabolism were less upregulated upon inhibition of SR by Lactisole, and beta cell pancreatic cell differentiation was significantly unenriched in the Lactisole group compared to control. Overall, the data show Lactisole and glucose have an interactive effect, and that SR may be more significant for beta cell differentiation compared to beta cell proliferation. If SR is part of the cell fate and differentiation pathway for beta cells, activation of SR with NNS during development may result in morphologies and phenotypes linked to metabolic dysregulation.

Session C-3

Oral Humanities, History, Literature, Philosophy 3

Friday, March 3, 2023 1:00 pm

Metzli

155 1:05 pm

Joy as a Foundational Ethos of Musical Theatre Training

Justin Brill, MFA in Theatre Arts - Musical Theater (M)

The fostering of a joyous environment in higher education training programs is vital for the next generation of Musical Theater artists to passionately pursue their craft. My research has shown that a sustainable foundation of belonging in the musical theater training experience is rooted in the practice of joy. If a greater experience of belonging is manifested by a commitment to practices of anti-racism, then we have set the foundation for joy to flourish. Re-imagining oppressive systems and processes that have historically been prioritized in training models that are often rooted in white supremacy culture is a key reflection point in calibrating toward an ethos of anti-racism in theater training. Musical theater training rigor without cultural competency and an active commitment to the practices of anti-racist theater holds the possibility for harm and the foundation for joy is reduced or eliminated all together. Community agreements to prevent and mitigate harm, active self-reflection to interrupt bias and remain flexible, accountability practice to honestly address harm, and student centered practices that are rooted in cultural competency are foundational steps to activating the training space through an anti-racist theater lens. They allow us to lead with humanity. When we lead with humanity, a greater sense of belonging is possible and an atmosphere of joy becomes foundational. Our mindset can begin with a joyous exploration toward growth because we come from a place of honoring our present selves fully. Our growth can be sustainable because it is not reflected from a position of scarcity, but from abundance. Creating a truer sense of belonging establishes an environment where joy can be accessed through committing to anti-racist theater practices.

156 1:20 pm

Theatre for the Public Good: Applied Theatre for Youth - Safa's Story

Wilfred Paloma, M.F.A. Theatre Arts [Musical Theatre] (M)

This presentation focuses on how applied theatre is activated for the public good specifically toward the aims of youth advocacy and anti-racism. The article explores Safa's Story, an original Forum Theatre play developed out of Brazilian theatre practitioner Augusto Boal's framework: Theatre of the Oppressed. Safa's Story was created by Catherine Hanna Schrock and tours San Diego, California K-12 schools with particular emphasis on elementary and middle schools. The

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tour is part of the broader reaching social and emotional learning program entitled Play! which was created by applied theatre company Imagine; founders are Catherine Hanna Schrock and Peter Schrock. More specifically, Safa's Story incorporates heightened theatricality along with typical Forum Theatre conventions aimed at augmenting participation: synthesis and integration of music, song, Spoken Word, and additional performance conventions created through a devised theatre process.

Wilfred Paloma is a part of the Imagine collective. He is a long time collaborator with Catherine Hanna Schrock and serves in several capacities within the applied theatre sphere: teaching artist, program facilitator, classroom experience specialist, actor, artistic director, choreographer. He is a teaching artist for the Play! program and has been a part of the Safa's Story artistic team since its inception. Wilfred has played multiple roles in several Forum Theatre plays, and is trained to be a Joker—a unique type of facilitation specific to Augusto Boal's framework.

157 1:35 pm

Interview With A DJ: An Ethnography on Alternative Music and Culture

Ash Osiris, Anthropology (U)

The alternative music scene and the music broadcasting world both are integral parts of San Diego State University's history due to the presence of the KCR Radio Station. Following its founding in 1969, KCR has bridged the gap between listeners and musicians in the alternative genre, and its various alumni disc jockeys (DJs) have experienced many important moments in American history at local, national, and global levels. These significant moments in history have had a marked impact upon the alternative genre, and KCR has served as a living record of these changes. Through observations and semi-structured interviews, this ethnographic study examines the relationship between alternative music and the evolution of cultural values from the perspective of numerous DJs working for KCR between 1970 and 2022. Following the specialization of alternative as an umbrella genre and the technological shift from radio to streaming, alternative music has established itself as a mouthpiece for counterculture in the light of various cultural phenomena. This study contributes to broader conversations within ethnomusicology pertaining to the evolution of music genres and the relationship between culture, technology, and music creation and consumption.

158 1:50 pm

Bad Bite: How malocclusion can impede your vocal production

Sarah Salonga, Master of Fine Arts Degree in Musical Theatre (M)

This article examines Class II (overbite) and Class III (underbite) malocclusion and how it can affect vocal production. Occlusion is when the upper and lower teeth bite down. Malocclusion is when there is a lack of overall ideal alignment in the bite. As

an actor, voice educator and dental hygienist, I have found that malocclusion has not been a forefront topic in vocal pedagogy and vocal production techniques. Scientific data was gathered and analyzed from medical, dental, physiology, and voice studies. The information was used to create a set of guidelines with considerations and exercises for vocal educators and professional voice users. My analysis indicates those with both Class II and Class III malocclusion encounter body misalignment. Class II malocclusion will have more space within the mouth to resonate, but it can impede the vertical opening of the mouth due to the position and smaller size of the mandible connected to the temporomandibular joint. Class III malocclusion has less space for amplification of sound to resonate in the mouth and often produces distorted consonant sounds, particularly /t/ and /k/. It is important to consider the relationship of the upper and lower teeth in vocal pedagogy and vocal technique, because malocclusion affects vocal production. Recommendations include a set of guidelines of: (1) how to detect potential cases of malocclusion, (2) body alignment exercises, and (3) vocal considerations. Voice educators and professional voice users can use this information as a baseline and are encouraged to further research various cases of malocclusion and to refer to medical and dental professionals.

159 2:05 pm

Can a Scream Be Music? The Gothic Modality of Harsh Metal Vocals

Trent Pollett, Musicology (M)

My research in musicology focuses on the phenomenological, psychological, and sociological tendencies of metal music and its subgenres. Recently, I have been investigating the harsh vocalization prominent in many styles of metal to better understand its aesthetic function and its value as social commentary. Noting similarities between metal and Gothic literature, I coined the term "Sonic Gothic" to identify elements of Gothic modality as represented through musical elements as well as lyrical content. Harsh vocal qualities of extreme metal music subvert traditional practices of Western popular, classical, and jazz singing, and contribute to the genre's ability to critique society and undermine power hierarchies.

To emphasize the visceral impact of the aggressive vocal style, I conducted a poll that asked college students majoring in music to respond to a subset of harsh metal music vocals known as "growling." A better understanding of how these vocals are received and perceived can give insight into their current, and perhaps future, role in the musical landscape. Additionally, we can learn under what musical and lyrical conditions harsh vocals are more accepted. I created a survey using a five-point Likert scale, which featured audio and video samples of three vocal performances—growling, standard (or clean), and a combination of the two—to gather information about how students respond and the extent to which they found the vocal qualities suitable for the accompanying music. After providing the participants with the lyrics to a previously heard sample, the data showed that an understanding of the lyrical content

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had a positive effect on perception of the growl as a musical device. Furthermore, despite many participants having a slightly negative reaction to the growling, they noted that the style fit well within the accompaniment. The results of this poll lead me to believe that metal's role as a legitimate means of pushing contemporary vocal techniques and critically examining societal norms is overlooked. I aim to conduct a larger research project investigating the intersection between sonic Gothic in metal and the phenomenology of screaming in music and how it relates to current vocal education.

160 2:20 pm

Moms on Broadway: How can we realistically support mothers in the theatre?

Natalie McClure, Musical Theatre (M)

While other countries in the world see parental leave as a basic human right and provide paid leave for working parents, paid maternity leave is not available for mothers/families in the United States. In the theatre industry where available actors outnumber available roles, women struggle to maintain their careers while Actors' Equity (the actor's union) and theatre producers currently provide no additional support via maternity leave or childcare. This article examines the struggles and successes of mothers who are working or trying to work on Broadway and begs the question: is there a place for mothers in the theatre? Currently there is an Actors' Equity campaign called "It's About Time Broadway" that is in negotiations with The Broadway League to provide better working conditions for actors but at the time of the finalization of this article, no agreement has been made. If this agreement can improve working conditions for mothers to include more humane hours, childcare, maternity leave, and adequate coverage (in the form of role-sharing or understudies), Broadway could be a more viable career option for working mothers.

Session C-4

Oral Humanities, History, Literature, Philosophy 4

Friday, March 3, 2023 1:00 pm

Visionary Suite

161 1:05 pm

The Lives and Careers of Amy Beach, Florence B. Price, and Maria Newman

Clare A. Hatter, Violin Performance (M)

This paper seeks to compare the lives and careers of three female composers through three case studies of Amy Beach (1867-1944), Florence B. Price (1887-1953), and Maria Newman (1962). Beach and Price were both American female composers who broke gender barriers during their lifetimes. By researching their lives and careers, I discovered what was similar, what was different, and compared it to living American, female composer, Maria Newman. Newman is a musician and composer whose compositions cover a range of genres. I did two interviews with

Newman for this study. I found that Beach, Price, and Newman all demonstrated musical talent and intelligence from a young age. Despite being a child prodigy, Beach had the least amount of freedom in her career while her parents and husband were alive. Price's career was held back by her abusive first husband, but she found the support and freedom to divorce him after moving to Chicago during the Black Chicago Renaissance. Newman's success and career opportunities are possible because of the trailblazing of Beach, Price, and other female musicians and composers. However, Newman has had to contend with subtle sexism that aims to tear down women's confidence and self-esteem. Their very existence is a fight and proof against all the prejudices and biases female composers face.

162 1:20 pm

Feeling a Little Less Down: The Queer Latina Photography of Laura Aguilar

Renata Orozco, Art History and Graphic Design (U)

This paper analyzes a series of photographs by the queer Latina artist Laura Aguilar (1959-2018) titled *Plush Pony* (1992). These images comprise of black and white portraits of Latina lesbians in East Los Angeles gay bar called "The Plush Pony." In them, Aguilar encouraged the women depicted to have agency over how they were represented, resulting in a wide variety of poses and actions. In my analysis of several works in the series, I consider the effect of being a queer brown person in normative society and the healing that occurs within queer spaces like gay bars. To accomplish this, I explore these works through the lens of queer theorist Jose Esteban Muñoz's concept of "feeling brown," which he describes as a certain ethics of the self, deployed by people of color and other minoritarian subjects who do not feel quite right within the protocols of normative affect and comportment[1]. By engaging Muñoz's ideas, I show how "brown feelings" are processed and what the outcome of them within queer community can be. Queerness is often seen as an identity that has taken a defensive stance to survive, and within which, joy is often forgotten. As such, it is imperative to begin understanding queer joy as much as we come to learn about queer pain. Ultimately, I argue that these photographs present how "brown feelings," including queer pain and joy, are resolved within spaces in which queer minorities are no longer considered "other."

[1] Jose Esteban Muñoz, "Feeling Brown, Feeling Down: Latina Affect, the Performativity of Race, and the Depressive Position," *Signs* 31, no. 3 (Spring 2006): 676. <https://doi.org/10.1086/499080>

163 1:35 pm

"The Feminine Presence": Gender Discourse in the United Farm Workers' Newspaper

Kayla Solsbak, History (M)

The United Farm Workers (UFW) union is commonly upheld as a representative example of the progressive civil rights movements of the 1960s and 70s. The Cesar Chavez-led

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movement advocated not only for fair wages and working conditions for abused farmworkers, but an end to pervasive stereotypes of Mexican Americans as lazy, promiscuous and otherwise immoral. However; in combating these perceptions, Chavez and union leaders projected a narrow vision for the ideal farmworker family—a patriarchal construction based on bifurcated gender norms positioning men as protectors and leaders and women as inextricably bound to caregiving and domesticity. The union communicated these values throughout the height of the union through its unofficial-turned-official newspaper, *El Malcriado*. This proposed presentation analyzes the movement’s consistent privileging of patriarchal expressions of gender, arguing that its public portrayal of women often did not align with women’s diverse and plentiful contributions within the movement. As the union and *El Malcriado*’s priorities shifted toward urban, Anglo supporters, gendered rhetoric grew slightly more egalitarian, though the newspaper remained grounded in patriarchal philosophy, thus offering a limited vision for women’s participation in the movement.

This study expands on the scant body of scholarship on gender in the UFW to make novel connections between *El Malcriado*’s management history, union priorities at various stages in the movement and the dichotomies between public and private gender roles for farmworkers and volunteers in the context of a contemporary feminist discourse. Close analysis of gender discourse within the UFW is vital to understanding the actions and experiences of participants in the movement, as well as its rhetorical, visual and organizational influence on the larger Chicano Movement, which still affects Chicana identity and scholarship today.

164 1:50 pm

The Biased Gaze: Orientalist and Primitivist Depictions of the Female Nude

Yena Kim, Applied Design - Furniture and Woodworking (M)

This art history research paper examines depictions of the female body in two distinct periods of European painting – Neoclassicism (18th-19th century) and Modernism (late 19th-early 20th century). Specifically, it considers how the female body was objectified by the male gaze and how depictions of racial “Otherness” influenced artists in their sexualization of the racialized female body. This paper focuses on a subgenre of Neoclassicism called “Orientalism,” stereotyped and romanticized European depictions of people from North Africa and the Middle East, and compares it to modernist “Primitivism,” which appropriates stylistic distortions based on non-Western tribal art to move toward abstraction. It also presents the stereotype that non-Western people are more sexual and closer to nature than the so-called “civilized” people of Europe. Both movements portray racialized female nudes that are presented as overly sexualized for an assumed male gaze.

I use visual and historical analysis to compare and contrast Orientalist paintings of Turkish “Odalisques” by the French Neoclassical painter Jean-Auguste-Dominique Ingres

(1780-1867) with “Primitivist” images of nude non-Western women by the Fauvist French painter Henri Matisse (1869-1954) and by the Cubist painter Pablo Picasso (1881-1973). While the female nude was illustrated as an idealized and beautiful goddess in the language of Neoclassicism, modernist “Primitivist” painters depicted the female nude as a monstrous character. My comparisons demonstrate that 20th-century modernist Primitivism actually built on previous stereotypes in 18th-century European Neoclassicism, thus explaining that Ingres, a naturalistic painter, impacted the two avant-garde painters who pioneered abstraction—Matisse, and Picasso. It also shows the ways in which both movements depicted non-Western females as imaginary fantastical figures who are either vulnerable or extremely exotic. Ultimately, I argue that Orientalist and Primitivist depictions both ignore the realities of non-Western cultures and instead disrespectfully reference those cultures to achieve their artistic goals. Ingres satisfies the erotic desires specifically of the Western male audience by painting a non-Western female nude with white skin. The modernists, Matisse and Picasso startle the audience by creating wild female creatures with exaggerated facial features that look like horrible racist stereotypes and unusual muscular body features.

165 2:05 pm

Queer Theory and The Death of Capitalism

Dylan Wells, Masters of Fine Arts, Creative Writing, Fiction (M)

In the MFA for fiction, I am writing my thesis as a conclusion to my own research in both literature and gender studies, as well as my personal experience and praxis in activism and community building. The plot: a teenage punk rocker comes to understand their own transness through the sudden arrival of their identical double in the form of a radical woman. Mikey, abandoned by the older generation, lives alone inside of a condemned, out-of-business shopping mall that has become a fashionable, locals-only suicide location, and so serves during his teen years as crypt keeper while waiting for something to rescue him. In this novel, I seek to weave together the literary tradition of Dostoevsky’s “The Double” and the queer theory in Jack Halberstam’s “Queer Art of Failure,” with a modern mixed bag of Satanic antifa transgender outsider characters all trying to eke out a meaningful life experience while struggling through poverty and witnessing the deterioration of their environment right beneath their feet. In an unprofitable gray zone between the front lines of gentrification and the front lines of yet another wildfire, the novel is located inside of a bankrupt “dead mall” in disrepair, in which the townspeople have two options: die, or fight back through radical queer community building. This work navigates alternative forms of relationship and family building, addiction and spirituality, and anti-capitalist resistance when you have nothing to lose but your chains.

With my BA in English and extensive study of classic and modern literature, I seek to locate this artwork in a time and place to be the most meaningful to young millennials and gen z readers. Additionally, with my graduate certificate in LGBTQ+ studies and my extensive research in gender and women’s studies, particularly Halberstam’s theories on failure

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and the wild, these characters aim to be representations of a new generation of queer people who have been systematically denied access to queer community and language. The conclusion of the research is the novel itself as a totem/artifact and linguistic manual for resistance and self-understanding.

Session C-5

Oral Physical and Mathematical Sciences 1

Friday, March 3, 2023 1:00 pm

Aztlán

166 1:05 pm

Structure and Stability of Differentially Rotating Compact Stellar Objects

Delaney Farrell, Computational Science (D)

When two neutron stars collide in space, referred to as a binary neutron star merger, the collision may result in a compact object experiencing a unique type of rotation called differential rotation. Differential rotation occurs when the ultra-dense regions of a star that are adjacent at one point in time do not maintain that configuration, so rotational frequency depends on the latitude and depth of the star. Differentially rotating stars can sustain a total mass considerably higher than that of a uniformly rotating (rigid body) star, giving rise to “hypermassive” objects like hypermassive neutron stars (HMNS). These stars are likely to exhibit extreme structural deformation along the radial axis due to their high masses. Both the increased mass and structural deformation supported by differential rotation allow the compact remnant to remain stable in otherwise unstable configurations on short, dynamical timescales. In this work, we numerically simulate differentially rotating neutron stars in the framework of Einstein’s theory of general relativity. Simulations are carried out for three relativistic mean field equation of state models, which describe the pressure-density relation for the superdense matter within the star. Calculated results explore an increase in mass and structural deformation and are used to predict outcomes for recent gravitational wave observations of binary neutron star mergers.

167 1:20 pm

Precise Age of the AB Doradus Moving Group via Analysis of Binary Star Systems

Victoria Moore, Astronomy (M)

The AB Doradus Moving Group is a loosely bound system of approximately 30 stars that share common characteristics such as composition, motion, and age. The age of this moving group has been widely debated with estimates ranging from 50 to 150 million years. I present my analysis of three binary star systems within the AB Doradus Moving Group: AB Doradus A/C, HD160934, and GJ2060. For each binary system, the parameters that define the orbit, such as mass, were found using a genetic algorithm. From this analysis, an age can be determined for the moving group by comparing the binary

systems’ characteristics (luminosity and temperature) to those of stellar evolution models of different ages. Because all stars in a moving group are the same age, this work is useful for determining the initial mass of the white dwarf, GD 50, which is a member of the AB Doradus Moving Group.

168 1:35 pm

Spectropolarimetric Evolution of Type II-Plateau SN2017eaw

Spencer Raines, Astronomy (M)

The most common type of core-collapse supernovae is the Type II-Plateau (II-P), which demonstrably arise from red supergiant (RSG) progenitor stars [1]. Although traditionally assumed to explode in a spherically symmetric manner, evidence continues to mount that this most common type of core-collapse explosion is inherently asymmetric, and the most direct probe of this early-time geometry is the polarization of the supernova’s light. Here we present 12 epochs of spectropolarimetry of the Type II-P supernova, SN 2017eaw, obtained as part of the Supernova Spectropolarimetry (SNSPOL) Project (Williams 2018) during the photospheric phase of its development. The observations were taken over the course of several months using the CCD Imaging/ Spectropolarimeter (SPOL) on the 61” Kuiper, 6.5 m MMT, and 90” Bok telescopes. Here we present an analysis of the evolution of the spectropolarimetry of SN 2017eaw, which adds to the growing database of SNe II-P examined in such a manner. This work was supported by the NSF grants AST-1210311 and AST-2010001, under which a portion of this research was achieved. [1] Smartt, Stephen J., 2009. Progenitors of Core- Collapse Supernovae. *Annual Review of Astronomy Astrophysics*, vol. 47, Issue 1, pp.63- 106. [2]Williams, George G., Leonard, D., Smith, N., Smith, P., Milne, P., Hoffman, J. L., Bilinski, C., 2018. The Supernova Spectropolarimetry (SNSPOL) Project; Probing the Geometry of Supernova Explosions. *American Astronomical Society, AAS Meeting 231*. © 2023 The Author(s)

169 1:50 pm

Semi-Automated Spectral Type Classification of Supernovae, Applied to Hydrogen-Rich Interacting Supernova Spectra

Michael Baer, Astronomy (M)

Supernovae (SNe) have a variety of type classifications based on their spectra. Classifying a new SN is often subject to a researcher’s subjective interpretations of a fitting algorithm’s output. In 2018, Dr. Robert M. Quimby et al. devised a method of semi-automated spectral type classification for SNe in order to spectrally distinguish hydrogen-deficient superluminous SNe (SLSNe-I) from other types. Type IIn SNe (SNe IIn) are a very heterogeneous subclass of SNe resulting from the outward ejecta interacting with a hydrogen-rich circumstellar material (CSM), producing narrow lines. Spectral classification of these objects has proven especially difficult. In this report, I discuss a translation I wrote of Quimby et al. 2018’s methods, and the results of using

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this method on SNe II to investigate whether or not we can distinguish these from impostor types using this method.

Session C-6

Oral Engineering and Computer Science 1

Friday, March 3, 2023 1:00 pm

Mata'yuum

170 1:05 pm

Hydro-Mechanical Behavior of
Biopolymer-Stabilized Rammed Earth

Nusheen Baradaran, Civil Engineering (U)

Earthen structures more specifically rammed earth, are structural units manufactured from soil and are often viewed as sustainable construction forms due to their low carbon footprint. However, most modern earthen materials rely on chemical, cement-based stabilizers to improve their mechanical and durability properties. Despite the proven benefits of biopolymers (natural polymers produced by the cells of living organisms) to engineering properties of natural soils, their use as a potential environmentally benign, cement-less stabilizer in earthen construction has been slow to none. This might be partially due to the poorly understood hydro-mechanical response of biopolymer-stabilized unsaturated earthen materials to applied loads. Thus, the main objective of this study was to gain knowledge about green geotechnics and the effects of biopolymers on the hydro-mechanical behavior of earthen material for structural applications, specifically rammed earth walls. The effect of the soil strength enhancement was experimentally determined by carrying out uniaxial compression and shear tests. All experiments were performed on walls with different amendment types and curing periods. Three different amendment types were investigated in this study: plain rammed earth, biopolymer, and cement. The extensive experimental results indicated that the plain rammed earthen walls were the weakest of the three mix designs. However, it was shown that the rammed earth wall strength does not considerably change after a certain amendment type and curing time. The addition of ten percent cement and one percent biopolymer to the rammed earth mixture was deemed to be comparable. However, these results benefit engineers in better understanding green geotechnical engineering and the strength properties of biopolymer-enhanced mixed design to reduce the amount of cement used in everyday construction which causes a severe increase in global warming.

171 1:20 pm

Response of antibiotic resistant bacteria during
anammox treatment of pretreated municipal
wastewater and landfill leachate

Lilith Astete Vasquez, Environmental Engineering (D)

This study investigated the reduction of antibiotic resistant bacteria (ARB) concentrations during anaerobic ammonium

oxidation (anammox) treatment of wastewater in Belo Horizonte, BR. Anammox, an emerging cost-efficient solution for the removal of nitrogen from wastewater, shows promise for use in decentralized settings as it reduces the economic burden and overall required footprint for water treatment. The full scope of capabilities of anammox reactors, including their ability to reduce the environmental proliferation of "superbugs," has yet to be conclusively studied. This study hypothesized that anammox treatment contributes to ARB removal from wastewater, supporting the use of anammox reactors as appropriate treatment alternatives.

Samples of influent and treated effluent were taken from three reactors treating various types of wastewater, including 1) 2L continuous flow fixed bed reactor (CFR), and 2) 2L sequencing batch reactor (SBR), both receiving anaerobically pre-treated domestic wastewater from a decentralized anaerobic treatment plant and 3) 10L SBR receiving landfill leachate diluted with the anaerobically pretreated wastewater. The samples were introduced to petri dishes, each containing antibiotics or anti-microbial substances, including: amoxicillin, azithromycin, cephalexin, meropenem, triazole (trimethoprim + sulfamethoxazole), and Microban-24, at their minimum inhibitory concentrations, with one set of unamended plates as a control. Bacterial colonies demonstrating resistance to the various substances were counted after 2 days of incubation at 37°C. The resulting removal of ARB was compared between the three reactors, and correlated with their operation conditions during the experiment, including: pH, temperature, ammonia removal efficiency.

Preliminary findings of this study show that the greatest overall ARB reductions of 0.87 ± 0.64 -log removal were observed in the 2L CFR, followed by the 2L SBR, and lastly, the 10L SBR. Low reduction of 0.55 ± 0.31 -log removal in the 10L SBR may be attributed to additional toxic substances found in landfill leachate. Additionally, bacteria resistant to meropenem demonstrated the least reduction and lowest consistency over the study period. Overall, this study demonstrated that ARB reduction occurred within all three reactors and in response to exposure to all inhibitory substances.

172 1:35 pm

Exploring the Depths: Tethys Data Explorer Aids in
Understanding Aquatic Animal Data

David Cardoso, Computer Science (U)

Tethys is a data exploration tool that presents a comprehensive visualization of information stored in Tethys, an acoustic workbench designed to store information related to sound in the ocean, such as noise levels, sounds produced by aquatic animals, and where they were produced. Tethys is used by multiple universities and government organizations such as the National Oceanographic and Atmospheric Administration, and warehouses long-term data sets. The Data Explorer is designed to assist scientists and regulators in better understanding patterns and trends in the data along with having a better visualization and comparison of the data. The features we have incorporated in the tool are aimed at aiding scientists and regulators when reviewing and analyzing aquatic animal data.

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We have introduced the ability to provide overlays of environmental data to help researchers recognize the potential for interactions. The overlays provided include sun presence and lunar illumination overlays to identify behavioral trends such as crepuscular activity or responses to lunar cycles. The addition of the overlays will aid scientists and researchers in pointing out patterns in data that may have initially been missed when observing the raw data. Additionally, the Tethys Data Explorer provides the ability to produce many plots broken down by criteria such as species with the ability to zoom into any one of them.

Overall, Data Explorer is designed to provide scientists and regulators with a powerful and user-friendly way to analyze and understand large data sets of aquatic animal detections. The implementation of these features will enable scientists and policymakers to notice patterns and make better-informed decisions based on the data. With this tool, we hope to contribute to the conservation and protection of these magnificent creatures.

173 1:50 pm

Life Cycle Assessment: Cradle-to-Grave Carbon Dioxide Emissions of BEV and PHEV

Scarlett Alexander, Mechanical Engineering (M)

The environmental impact of plug-in hybrid electric vehicles (PHEV) and battery electric vehicles (BEV) is examined in this study by conducting full life cycle assessments (LCA) of both types of vehicles. A Tesla Model 3 BEV and a Ford Escape PHEV are selected for the assessment. The LCAs account for the carbon dioxide (CO₂) emissions from material extraction, material transportation, material processing, component manufacturing, vehicle assembly, vehicle transportation to showrooms, vehicle operation, vehicle disposal and recycling. A city drive-cycle, a highway drive-cycle, and a combined drive-cycle are considered for vehicle operation. The CO₂ emissions are estimated through the life cycle assessment study to understand the true cradle-to-grave environmental impact of transitioning from PHEV to BEV. The results are compared assuming different sources of electricity for charging the battery during operation: solar, wind, natural gas, and coal. It is shown that the source of electricity and the drive cycles have a significant impact on the conclusions. For example, considering 300,000 km of operation and 30% recovered regenerative braking energy, the CO₂ emissions for operation of the PHEV is about 20% higher than that of the BEV for city driving. The 20% difference is attributed to differences in vehicle weight and drag coefficient. This conclusion is independent of the source of electricity. In the case of highway driving, however, the differences vary dramatically based on the source of electricity. When the source of electricity is solar, the PHEV CO₂ emissions are about a factor of 7 greater for operation, but when the source of electricity is coal, the CO₂ emissions are greater by only about 20%. This life cycle assessment study shows that the PHEV can emit between approximately 5,600 to 62,400 kg of CO₂ emissions, whereas the BEV can

emit between 9,700 to 57,000 kg of CO₂ emissions. This suggests that the impact of increasing electrification of vehicles on the environment is dependent on the part of the country where these vehicles are used and their modes of operation. Maximum benefits from electrification of vehicles can only be realized when the source of electricity is renewables.

Session C-7

Oral Health Nutrition and Clinical Sciences 1

Friday, March 3, 2023 1:00 pm

Legacy Suite

174 1:05 pm

The sexual, reproductive, and infant health care experiences of asylum-seeking women at the Mexico-U.S. border during the COVID-19 pandemic

Isela Martinez SanRoman, MPH Health Promotion/Latin American Studies (M)

Introduction: Thousands of migrant women of reproductive age and their children have been stranded or had asylum proceedings delayed at the San Ysidro U.S. port of entry under the confluence of immigration policy (i.e., Title 42 'Remain in Mexico') and the COVID-19 pandemic. The health impacts of this have not been well-documented. We aim to explore the lived experiences of recently arrived refugee and asylum-seeking women who accessed or attempted to access reproductive and infant health care during the COVID-19 pandemic in Tijuana.

Methods: This qualitative research was conducted in partnership with *Al Otro Lado*, a community-based non-profit organization in Tijuana, Mexico. Participants were recruited from their Mother-Baby assistance program. 34 semi-structured, in-depth interviews were completed in Spanish. Women were eligible to participate if they were between the ages of 18-54, actively seeking or planning to seek asylum to the U.S. and had been pregnant or postpartum after March 2020.

Results: In preliminary analysis, a majority of participants reported one or more unplanned or unwanted pregnancies. Exposure to food insecurity, poor accommodations, and violence contributed to difficult or high-risk pregnancies. Pandemic-related restrictions imposed by public clinics and hospitals disrupted service access, contributing to staffing and bed shortages and delayed access to care, which was particularly impactful for laboring women. Participants encountered obstetric violence and mistreatment from health care providers in Tijuana.

Conclusions: There appears to be an unmet need for safe, accessible, sexual, reproductive, and infant health care services for asylum-seeking women and their children. The pandemic has only exacerbated health inequalities for this already marginalized population.

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175 1:20 pm

Gender-Based Violence among Asylum-seeking Women in Tijuana

Arianna Spata, Public Health-Epidemiology and Latin American Studies (M)

Seeking asylum safely and with dignity is a human right according to international law. Xenophobic public health and immigration policies, such as Title 42, have interrupted and prolonged this legal process for many by barring entry into the United States under the guise of preventing COVID-19 infection. At the San Ysidro Port of Entry, Title 42 has disproportionately affected racialized individuals from the Global South, forcing this population to wait indefinitely in overcrowded and dangerous conditions in border cities, including Tijuana. With an increasing proportion of women and children approaching the border to seek asylum, special attention is needed to identify their lived experiences of gender-based violence (GBV) in the asylum-seeking process amidst the COVID-19 pandemic. This study aimed to understand asylum-seeking women's exposure to GBV along their migration route, and its resulting emotional impacts.

In collaboration with *Al Otro Lado*, a legal, non-profit organization based in Tijuana, Mexico, we conducted in-depth, semi-structured interviews (N=35) with women aged 18-54 years intending to or currently seeking asylum within the United States. Eligible women also had to have experienced a pregnancy since March 2020.

Preliminary findings demonstrated that GBV was experienced by asylum-seeking women pre-flight and in-transit to the U.S. Pre-flight violence was described as a catalyst for migration; women recounted threats of kidnapping and extortion from local criminal organizations and intimate partner and sexual violence, with limited recourse for their assailants. While in-transit to the US-Mexico border, women faced further GBV along their migration routes, including sexual assault, exploitation, and harassment. While awaiting 'legal' opportunities to cross into the US, most women lived in under-resourced, overcrowded shelters with poor security and limited privacy. Others feared being located by their perpetrators and felt insecure while waiting in Tijuana. Participants reported sexual and reproductive healthcare to be difficult to access, with little to no mental health services available.

The harmful impacts of exclusionary US immigration policy are evident in the lived experiences of asylum-seeking women. Urgent efforts are needed to expedite the asylum-seeking process and provide safeguards for vulnerable populations, including recognizing GBV as grounds for seeking asylum.

176 1:35 pm

The Association Between Peer Support and Age Among Cisgender Women Diagnosed With HIV

Tobi Pavlas, Master of Social Work (M)

The Association Between Peer Support and Age Among Cisgender Women Diagnosed With HIV Introduction and Significance Women are the most populous demographic for contracting HIV through heterosexual intercourse in the world today. Globally, HIV peer support programs have been conducted to better inform treatment protocols. This strategy has been shown to be beneficial to participants but further research is needed. Examining the relationship between older and younger cisgender women living with HIV in peer support strategies can inform medical programs, testing strategies, medication compliance, and the prognosis of the disease to improve the quality of life for women living with HIV.

Methods: Data were collected from Christie's Place in San Diego in 2018 from 95 cisgender women living with HIV who participated in the peer navigation program, Lotus, or comparison groups. Logistic bivariate regression showed the relationship between older and younger ages and aspects of peer support.

Results : Older WLWHIV (n=61) reported at the post-test that they were less likely to discuss safer sex methods with a partner (p=.036) and less likely to discuss the use of PrEP with a partner (p=.027) than younger WLWHIV (n= 36).

Conclusion: Differences in peer support outcomes among these age groups inform us how to improve HIV prevention strategies for cisgender women living with HIV.

177 1:50 pm

Association Between Living Alone and Physical Activity Among Women Ages 18-64 years, BRFSS, 2019

Neeraja Ramesh, MPH (M)

Background: In the United States, the prevalence of meeting the aerobic and muscle-strengthening guidelines, a cost-effective strategy to prevent chronic diseases is low for women with functional disabilities (15.3%) compared to women without any disabilities (23.1%). A gap remains for women with disabilities in meeting the recommended physical guidelines, illustrating the importance of further investigation. We examined the association between meeting physical activity guidelines and living arrangements among women with functional disabilities ages 18-64 years that participated in the 2019 BRFSS.

Methods: The study population included 29,047 women aged 18-64 years with functional disabilities. The association between following physical activity guidelines provided by

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The Physical Activity Guidelines for Americans, 2nd edition, and living arrangements (living alone or living with household members) was examined. The multivariate logistic regression analysis adjusting for social demographic variables, urbanicity, smoking, heavy drinking consumption, chronic diseases, and BMI was used to estimate the association at a significance level of 0.05.

Results: Of the 418,268 participants, 389,221 were excluded because of study population inclusion criteria and incomplete responses to the survey. Among the study population, 14.7% followed the physical activity guidelines and 17.0% reported living alone. After adjusting for covariates, the odds (OR 0.767, 95% CI 0.651-0.905) of following recommended physical activity were significantly higher among women living with household members compared to women living alone.

Discussion: Living alone is a risk factor for engaging in physical activity among women with disability. Social support should be considered an important criterion for engaging in physical activity among people with disability. Further investigation is required to assess the potential causes such as emotional barriers not assessed in this study.

Conclusion: The findings from this study point to the impact of living arrangements on physical activity among women with disabilities. Opportunities exist for the continued promotion of physical activity using resources and programs that build social support.

SDSU

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Abstracts of Presentations

Session D

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Session D-1

Oral Biological and Agricultural Sciences 5

Friday, March 3, 2023 3:00 pm

Mata'yuum

178 3:05 pm

Developing New CRISPRi Toolkit for Marine Bacteria

Alpher Aspiras, Cell and Molecular Biology (U)

The genetic tools to study host-microbe interactions and their underlying processes for marine bacteria are currently limited. To diversify the tools available for the genetic manipulation of marine bacteria, we set out to expand a genetic toolkit and develop new parts that broaden compatibility. To develop and test our new tools, we used the marine bacterium *Pseudoalteromonas luteoviolacea* that produces a contractile injection system, called Metamorphosis-Associated Contractile Structures (MACs), to induce metamorphosis of the tubeworm *Hydroides elegans*. We hypothesize that by using CRISPRi techniques to target metamorphosis-inducing genes in *P. luteoviolacea*, we will be able to knockdown gene expression in the production of MACs. CRISPRi Golden Gate Assembly (GGA) was utilized to assemble different DNA fragments (pBTK) into a plasmid that targets the *P. luteoviolacea* metamorphosis-associated gene. The assembled CRISPRi plasmid was then conjugated into *P. luteoviolacea*. To confirm the successful knockdown and its subsequent effect on tubeworms, we used metamorphosis as the biological readout in a biofilm metamorphosis assay involving *H. elegans* and our conjugated marine bacteria. The genomic components of our plasmid toolkit allow for its broader use in a variety of different marine bacteria. This project provides a proof of concept that we can manipulate the phenotypes of marine microbes using modular genetic engineering techniques. Manipulation of marine bacteria has the potential to benefit industries as diverse as aquaculture, biomedicine, and biomanufacturing. Future biotechnology in gene manipulation of marine bacteria can be carried out since different genes reflect different functions and marine bacteria remain an untapped resource for biotechnology.

179 3:20 pm

Tracking a lytic toxin and its consequences in the IBD microbiome

Nicole Jacobson, Cellular and Molecular Biology (D)

The human gut microbiome is a very dynamic and complex system in which bacteria are vying for survival. Bacterial species have evolved a wide range of mechanisms in order to outcompete each other to establish and maintain themselves in the available ecological niches. In the case of the human gut, a handful of common players can be both commensal and opportunistic pathogens. These include *Bacteroides*, *Bifidobacterium*, *Clostridium*, *Faecalibacterium*, *Eubacterium*,

Ruminococcus, *Peptococcus*, and *Peptostreptococcus*.

Dysbiosis in the gut microbiome is thought to lead to diseases such as Crohn's disease and Ulcerative Colitis. We will focus on a specific gut microbe, *Paraclostridium benzoelyticum*, a gram negative, spore forming, obligate anaerobe with potential to be pathogenic (Rai et al., 2020). The strain that will be discussed was isolated from a fecal sample of a healthy individual living with an ulcerative colitis patient. While isolating phages from fecal samples, we found that this *P. benzoelyticum* lysed a number of human fecal isolates including *Bifidobacterium* and *Clostridium* species, *Peptoniphilus harei*, and *Paeniclostridium sordellii*. When we further characterized the source of lysis, we found that *P. benzoelyticum* cultures which survived chloroform, 65°C, or 95°C treatment for 10 minutes could still lyse the strains listed above. When the same culture was passed through a 0.45 and 0.22 micron filter, lysis was no longer observed. Lastly, when the toxin producing strain was induced with mitomycin C then spotted back on susceptible strains, no lysis was observed. We hypothesize that the *P. benzoelyticum* strain we isolated produces a toxic factor. This putative toxin is disseminated via germinating spores that presumably produce toxin-expressing vegetative cells. We are investigating the nature of the *Paraclostridium*-produced toxin, how it causes lysis, and whether the toxin is a virulence factor in IBD patients and/or other environments.

180 3:35 pm

Flux balance analysis of the ammonia-oxidizing bacterium *Nitrosomonas europaea* ATCC19718 unravels specific metabolic activities while degrading toxic compounds

Georgina Gabriela Canto Encalada, Biology (M)

The ammonia-oxidizing bacterium *Nitrosomonas europaea* has been widely recognized as an important player in the nitrogen cycle as well as one of the most abundant members in microbial communities for the treatment of industrial or sewage wastewater. Its natural metabolic versatility and extraordinary ability to degrade environmental pollutants (e.g., aromatic hydrocarbons such as benzene and toluene) enable it to thrive under various harsh environmental conditions. Constraint-based metabolic models constructed from genome sequences enable quantitative insight into the central and specialized metabolism within a target organism. These genome-scale models have been utilized to understand, optimize, and design new strategies for improved bioprocesses. Reduced modeling approaches have been used to elucidate *Nitrosomonas europaea* metabolism at a pathway level. However, genome-scale knowledge about the simultaneous oxidation of ammonia and pollutant metabolism of *N. europaea* remains limited. Here, we describe the reconstruction, manual curation, and validation of the genome-scale metabolic model for *N. europaea*, iGC535. This reconstruction is the most accurate metabolic model for a nitrifying organism to date, reaching an average prediction accuracy of over 90% under several growth conditions. The manually curated model can

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predict phenotypes under chemolithotrophic and chemolithoorganotrophic conditions while oxidating methane and wastewater pollutants. Calculated flux distributions under different trophic conditions show that several key pathways are affected by the type of carbon source available, including central carbon metabolism and energy production.

181 3:50 pm

What Makes a Tubeworm? Understanding The Developmental Building Blocks of *Hydroides elegans*, a Marine Biofouling Tubeworm

Emily Darin, Cell and Molecular Biology (D)

Interactions between microbes and hosts are central for many organisms, yet our understanding of how bacteria promote host development is limited in many cases, like humans. To study this phenomenon, we use *Hydroides elegans*, a marine biofouling calcareous tube worm that's metamorphosis is induced by the marine bacteria *Pseudoalteromonas luteoviolacea*. Using this model, my overarching research question is to determine how innate immunity and metamorphosis pathways are established in response to commensal or pathogenic bacteria in the embryo and larva. I will use molecular techniques such as qPCR and in-situ hybridization to better understand how immune genes in *H. elegans* are expressed during exposure to metamorphosis-inducing bacteria and pathogenic bacteria. Another way to better understand the underlying developmental mechanisms behind this relationship is by making *H. elegans* transgenic. In doing this, I will be able to functionally characterize how *H. elegans* develop and complete their life cycle, using techniques such as RNAi or electroporation, both of which would be novel mechanisms for this organism. By determining how *H. elegans* develops in response to bacteria, I will be able to understand the mechanisms behind how microbiomes are influencing development in humans and other species.

182 4:05 pm

Isolating bacteriophages from a Crohn's Disease patient

Cole Souza, Master's in Microbiology (M)

Isolating bacteriophages from a Crohn's Disease patient
Inflammatory bowel disease (IBD) encompasses two conditions, Crohn's disease (CD) and ulcerative colitis (UC), and is characterized by inflammation of the gastrointestinal tract. These diseases are correlated with a decrease in the microbial diversity in the gut. While much is known about the role of the microbiome in IBD, the role of the virome—specifically how bacteriophages modulate the gut microbiome—is poorly understood. We hypothesize that a bloom of lytic or temperate phages in the gut plays a role in modulation of the microbiome and the consequent inflammatory response of the human host, and therefore impacts disease state and progression. To address this hypothesis, we have isolated bacteria from patients with IBD and house-hold controls (HHC)

in anaerobic conditions. We then use the bacterial isolates to identify and characterize bacteriophages found in the gut from either diseased or healthy individuals. The isolation and characterization of anaerobic bacteriophages remains difficult, and many fewer phages are known for anaerobic than aerobic bacteria. In this presentation, we will show our approach for isolating bacteria and creating phage lysates from the stools of IBD patients and matched healthy individuals using both classic and enrichment strategies. We will also show that bacteriophages isolated from a Crohn's disease patient are able to plaque on bacterial isolates from the same individual. Our goal is to identify which phages are positively or negatively associated with disease, and the mechanism by which they promote the disease or protect from it.

Funding: NIDDK RC2DK116713 Computational and Experimental Resources for Virome Analysis in Inflammatory Bowel Disease

Session D-2

Oral Humanities, History, Literature, Philosophy 5
Friday, March 3, 2023 3:00 pm
Metzli

183 3:05 pm

"Free Art"

Mariam Ahmed, Masters in Fine Arts, Creative Writing (M)

Novella Excerpt of my Fall '22 Fiction Workshop writing project titled "Free Art," this piece explores the intersection of life as a budding 22 year old poet entering the world in 2012 and navigating life as an artist while writing to her musician pen pal over email. The parasocial relationship turns reciprocal when the rapper writes back to her in brief notes. Daya, the poet, describes her life over the next year and reveals the interactions, people, and places she encounters to her new friend as she experiences the ups and downs of her own timeline. Poetry and prose intersperse throughout the epistolary work to produce a hybrid literary format that the audience can follow, along with chapters and cryptic quotes/lyrics pulled from songs by the now defunct band of which Shue, the musician, was a former member. Readers will navigate the world Daya illustrates -- the dreary yet all-too-familiar Pancake Hut, the fanciful and carnival-esque novelty store called "Twirkworld," her adventures in the Bay Area and LA. And underneath it all, a sinking feeling that something is brewing, a deep and slow pain that builds up until it cumulates into a breakdown. Simultaneously, in a parallel timeline, it seems, Shue is having an addiction crisis in his world as a rap artist in New York, needing to leave the country to find himself -- only to have another breakdown, he writes to Daya. These letters, these stories that the artists trade with one another are the main plot line that the audience craves to read and hear. Who is this mysterious rapper and what's so special about his music that Daya decided to reach out and reveal her life to them like in a

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journal/diary-like format? What compelled Shue to respond, continuing to write back? Will Daya ever make it in this world as a writer? Does she even want to anymore, after all she's seen, experienced, & witnessed. The letters in "Free Art" form into a story making the reader want to know what will happen to the characters beyond the pages they inhabit in this novella.

184 3:20 pm

Restore the U.S. Criminal Justice System through the Healing Power of the Arts

Kristine White, Master of Arts in Liberal Arts and Sciences (M)

I believe it takes a specific illustration of police brutality to grab you, throw you into the air, and throw you back down into the concrete world of reality. My illustrator's name was Amadou Diallo. It was February 1999 and the first time I realized how my complexion could get me killed. 41 bullets shot, 19 pierced is small frame; he was unarmed.

The U.S. justice system is the leader in mass incarceration. African Americans are incarcerated at higher rates than their white counterparts, which continues the cycle of systemic oppression. The criminal justice system is designed to determine the guilt or non-guilt of the defendant. The Restorative justice process helps the offender break the cycle of incarceration. The victim can seek direct accountability from the offender by allowing the offender an alternative outlet to restore justice without incarceration.

Art is a creative outlet that helps individuals with learning disabilities, stress, trauma, depression, anxiety, and other psychological issues. Implementing arts restorative justice programs before sentencing an offender to prison, allows both the offender and victim the opportunity to heal. Educating current and former inmates about art and creating an outlet for expression as well as a source of income, will not only impact the individual but will have a positive impact on the communities they reside.

I created my social media campaign via Twitter in Fall 2022. My page is for anyone effected by the criminal justice system searching for information that may help keep themselves or a loved one from incarceration. One of my biggest accomplishments was my response to a Black Live Matters (@blkivesmatter) post. My response received 11,988 impressions, 16 likes, 8 profile clicks, and Black Lives Matter retweeted my response along with 4 others (the number has risen since 11/30/22).

My Twitter campaign provides statistical information and ways to implement the restorative justice process instead of criminal proceedings. My goal is to continue to advocate for the restorative justice process. Restorative justice is power and gives individuals the resilience to keep going and that is what my page will do.

185 3:35 pm

(Art)ificial Intelligence: The Role of Post-Internet Art in the Digital Humanities

Carson Poole, Masters of Liberal Arts and Sciences (M)

Art made by machinery has been part of the world's visual lexicon for decades. Traditional art forms shifted towards engaging with technology as early as the Industrial Revolution with the advent of photography; in the mid-20th Century with artworks like that of Andy Warhol, who mechanized art and repurposed manufacturing techniques into a "high art" format; and again in the 21st Century as the Internet democratized art and simultaneously removed it from tangible media all together. The Internet and Web 2.0 emphasize the sharing of information as well as interactions between the Internet's users, which has led to an unprecedented dissemination of art. In the post-Internet age we currently live in, art has become an amalgamation of algorithmically created images, pop culture interpolations, and digital illustration. Machine-assisted art, though it has existed in some form for decades, has accelerated beyond notions of what 'art' can or should be. This research will trace the origins of post-Internet art and posit how these inventions will influence art going forward.

Current research into post-Internet art includes discussion of whether art made digitally, especially art made by algorithms or NFT art, can be considered 'art' at all, or if it is something beyond that. As AI-generated art is a recent phenomenon, research on the implications of art made almost solely by computers is continually emerging. The question of where post-Internet art sits in the Western Art Historical canon is one that will be explored in this research.

186 3:50 pm

Operation Rescue: Technological Adaptions for Historic Conservation and Preservation Practices in San Diego County, California

Natalia Galeana, Historical Archaeology (M)

The purpose of this study is to examine, evaluate, and improve conservation and preservation practices of historical collections by multiple archeological institutions such as universities, museums, repositories and Cultural Resource Management firms in San Diego County, California. The various attitudes towards curatorial funding and methods, storage space, legislative policies and archaeological practices are some of the most critical influential factors in the decision making as to what artifacts and collections are discarded. Views and opinions from both archeologists and conservators about the vast accumulation of artifacts, also known as the "curation crisis," will be addressed and analyzed in this study; specifically, the neglected and well-preserved historical collections. In addition, this study will look to incorporate and adapt interdisciplinary technologies that are applicable for the conservation of historical collections by testing financial costs, adaptability, and curatorial enhancements and efficiency.

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These methods include the use of electrolysis, air abrasion, and mass spectrometry. Simultaneously, these instruments will be applied and tested on materials from both the Nathan "Nate" Harrison and Whaley House Historical Archaeological Projects to support the case of unique research potential from well-preserved historical collections. The outcomes from all these studies will supply a foundational base to understand the County's current curation crisis, which will aid in developing and improving curation guidelines that will ensure ethical handling of historical collections in San Diego County. Results will also show the importance of keeping and preserving all historical materials that are excavated not only for the exploratory use for future generations of archaeologists, but to current diverse populations who have historically been excluded from accessing and interpreting their own cultural materials.

Session D-3

Oral Humanities, History, Literature, Philosophy 6

Friday, March 3, 2023 3:00 pm

Visionary Suite

187 3:05 pm

Globalizing Education

Mariele Valle, Philosophy (M)

Decolonizing education by globalizing education will prevent the narrowing of views, which reduces all other perspectives and furthers oppression. It will allow students to confront different views' histories, teachings, practices, beliefs, and values. In this presentation, I explore methods used in the decolonization of feminism and apply them to decolonize education. I discuss the importance of decolonizing and Indigenizing education and highlight how Indigenous worldviews, humanities, and Buddhism can help decolonize education. I also discuss how these methods can contribute to an inclusive world by preventing the narrowing of students' views and empowering students to build a better and more sustainable world.

188 3:20 pm

A New Look at the Cuban Missile Crisis

Amber Orozco-Reese, History (M)

The Cuban Missile Crisis is a well researched event of the Cold War. However, upon closer look at the current scholarship, a glaring omission becomes clear. President John F. Kennedy and Premier Nikita Khrushchev corresponded from the date of Kennedy's election to the Office of President in 1960 until his assassination in 1963. Through periods of crisis as well as periods of relative calm, the two leaders reached out to one another in a total of 120 letters. While some accounts of the Cuban Missile Crisis do acknowledge the one or two letters the author finds important (namely in relation to the Trollope Ploy), there is not a complete account of the effect these letters had on the outcome of the Cuban Missile Crisis. This aspect of the letters between Kennedy and Khrushchev as relating to the Cuban Missile Crisis and the lasting effect of their year and a

half rapport prior to the placement of Soviet missiles in Cuba is the main focal point of my thesis research.

This paper in particular will approach the Cuban Missile Crisis from the perspective of a new primary source to the scholarship, the letters. The method used to appraise the letters will be close textual analysis paired with critical analysis of the context. From assessing their correspondence and relationship prior to the Cuban Missile Crisis and leading up to the all important "first" and "second" letters of the Trollope Ploy, this paper argues that the relationship created through their extended correspondence is crucial to understanding the final outcome of the Cuban Missile Crisis and its relatively short period of crisis.

189 3:35 pm

An Analysis of The School to Prison Pipeline

Tavee Binavi, Criminal Justice (U)

Students in the United States education system that are minorities are more likely to be suspended, expelled, incarcerated, or punished for minor offenses than white students. Rules such as the Zero Tolerance Policy were implemented for extreme crimes only to be watered down to minor offenses, such as talking back to a teacher. Instead of having teachers maintain the discipline of students, schools in the U.S. have placed a heavy reliance on School Resource Officers, otherwise known as SROs, to discipline students. Officers that have no training to deal with children, that have weapons on their person on school grounds, and who have the ability to make arrests on campus. The funnel from education to incarceration can begin as early as preschool. With Black children making up 19% of preschool students but 47% of preschoolers who earned one or more out-of-school suspensions, data and studies imply that school push-out for Black students starts in preschool. Students who are arrested at school may be reported to ICE for deportation. Arrests may hamper even future attempts by students to become citizens. When students are reported for flimsy indications like gang connection, such as attire, language, and simple minor infractions, it can grow out of hand and cause stress on students and their families. ICE targets immigrants who are suspected of being part of gangs. Students' emotional health will suffer significantly if they fear being separated. White students have little to no experience with any of the issues mentioned.

190 3:50 pm

#EnvironmentalJustice.Now

Da Quanisha Parks, Humanities (U)

The dynamic relationship between social justice movements and social media has had a profound impact on society and political systems. The communities impacted are historically excluded and unaware of policies and practices that affect their daily lives. The case study focal to my research is Environmental Justice with climate change agitating poor infrastructure and infrastructural practices, solutions must be transformative rather than reactionary. My project #EnvironmentalJustice.Now

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recognizes the human right to clean air, water, and overall living environment and raises awareness of environmental injustices locally and nationally. Inspired by the Environmental Justice For All Act (first introduced to Congress March 18th, 2021), it acted as a federal definition for environmental justice further used to engage with local instances of environmental racism. Case studies analyzing the media's influence on social behaviors and patterns provide a framework to examine the digital sphere and social justice issues. #EnvironmentalJusticeNow exemplifies the role that social media can have as a model tool for social justice activism.

With the goal to amass a following of individuals interested in environmental justice and willing to engage in online activism, the result is a following composed of coalitions, individuals, and community organizations. Using Environmental Justice as a case study, I developed a social media campaign to promote initiatives, information and petitions advocating for environmental justice. Focusing specifically in San Diego, #EnvironmentalJusticeNow examines the results of environmental racism in Barrio Logan. These communities' residences are cited by the United States Environmental Protection Agency as more at risk of respiratory illness due to diesel truck pollution. Yet, companies like companies like Mitsubishi Cement Corporation continue to appeal to build within the neighboring community. Using a mixed methods approach, this social media campaign supported the mission of the Environmental Health Coalition of San Diego, facilitated an interview with a local resident and activist interested in the Environmental Justice For All Act and provided offline engagement by following up with in-person community engagements. To quantify the project's impact, social media analytics were used to track engagement and test SMART goals.

191 4:05 pm

WeChat Usage and Emoji Ratings: How usage of the social media platform WeChat influences the ratings of emojis from WeChat

Brianna O'Boyle, Linguistics (M)

Abstract: This research examines the results of a survey given to users and non users of WeChat. In the survey participants were asked to examine WeChat emojis, and then asked to rate them on a scale of arousal and valence. It was predicted that WeChat emojis that appear to be similar to emojis on other platforms will have less rating variation than WeChat emojis that appear to be unique to WeChat. After calculating for outliers, it was found that 22 emojis stood out for their rating distance and even though there was some great variation observed in WeChat specific emojis, there were also some WeChat specific emojis that had very low variation. Additionally, there were some WeChat specific emojis that did not have significant variation. In the WeChat emojis with the shortest rating distance it was found that some of the emojis were like emojis from other platforms, but also some of them were specific to WeChat. It is hoped that research will help promote greater understanding of unique features of emojis in our ever-advancing technological world.

Session D-4

Oral Physical and Mathematical Sciences 2

Friday, March 3, 2023 3:00 pm

Aztlán

192 3:05 pm

Kinematics of high resolution VLT/MUSE spectroscopic sample of nearby galaxies through 3-D tilted ring modeling

Rohan Rahatgaonkar, Astronomy (M)

This thesis is part of a project aimed at providing a comprehensive study of the energetics of galactic winds and morphology of galactic gas accretion by constraining the incidence, kinematics, and morphology of cool gas flows of nearby galaxies ($z \sim 0$). The interstellar medium (ISM) is made up of gas + dust that fill the spaces between stars and is the primary ingredient for different processes that take place in a galaxy. Discerning and accounting for processes that lead to this dynamics of gas provide us insight into galaxy formation, evolution, and creation of stars and planetary systems like ours. These different processes are called feedback mechanisms which move gas in and out of the galaxy through inflow (into the galaxy) and outflow (out of the galaxy) processes. For this purpose, a deep VLT/MUSE spectroscopic sample of ~ 38 star-forming galaxies is selected from the ESO VLT/MUSE archive. This sample's wavelength range (4650 – 9300Å) at a spectral resolution of $\text{FWHM} \approx 135 \text{ kms}^{-1}$ allows us to spatially resolve cold, neutral gas flow kinematics by studying the Na I D $\lambda\lambda 5891, 5897$ transition. The IFU data also contains key emission features crucial to assessing star formation activity (e.g., H α , H β) and the presence of higher-energy ionizing sources ([OIII], [NII], [SII]). This thesis uses the H α emission line in the sample to derive accurate kinematics of the galaxies through 3D tilted-ring modelling, and then generates predictions for the NaI absorption that would be observed assuming the presence of an extraplanar layer with variable lag and in/outflow velocity. The observed Na-I absorption will then be compared with these predictions to constrain galactic fountain models. Combined with the ability to obtain maps of local star formation activity, this work will assess the incidence of cool gas flows and the self-regulating processes they arise from.

193 3:20 pm

Comparison Of Exoplanet Period-Finding Methods Via Synthetic Data

Samantha Anger, Astronomy (M)

The orbital period of an exoplanet is one of the most important observational characteristics we can measure, as it allows us to estimate the planet's orbital radius and temperature. Observations of an exoplanet's host star allow us to detect eclipses. If the orientation of a planet's orbit brings it in front of its host star, the resulting eclipse will cause the light we detect to dim. This is called a "transit". By measuring the time interval

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between “transits”, we can determine the orbital period of an exoplanet. Our research is focused on comparing several well known period-finding methods to determine which method is better for a given set of circumstances: differing levels of noise, various amounts and characteristics of data gaps, sinusoid v. sawtooth v. eclipse shaped data, etc.. To probe the effectiveness of these methods, different types of synthetic data were constructed and run through each method, and the results were compared to verify their accuracy and precision. By combining the results together, we can construct a more robust determination of the orbital period that is less likely to be affected by noise and data gaps. Our results will provide an automated, helpful tool for measuring exoplanet periods under a wide variety of realistic conditions.

194 3:35 pm

Exploring the Relationship Between Cool Gas Absorption and the Stellar Characteristics of Star-Forming Galaxies: A Study of Sodium Doublet Transition in the Interstellar Medium

Leonardo Barba, Astronomy (M)

Current models of galaxy formation and evolution are unable to accurately predict the stellar characteristics observed in star-forming galaxies. This is largely due to a lack of understanding of the impact of gas inflows and outflows on the stellar characteristics. In this study, we use measurements of the Sodium doublet transition (NaD) as a way to trace the presence of cool gas (< 1000 K) in the optical wavelength range. We analyze a spatially-resolved (~100 pc) sample of 23 star-forming galaxies in the nearby universe using the Multi-Unit Spectroscopic Explorer. A modified version of the SDSS-IV MaNGA Data Analysis Pipeline (DAP) is created to synthesize models of the host galaxies' stellar continuum and emission lines. In order to assess local NaD/star formation activity, we create maps of the NaD equivalent width - showing the amount of Sodium remaining in the interstellar medium (ISM) after removing the Sodium contribution from stellar atmospheres - for comparison with galaxy properties including total star formation rate (SFR), SFR surface density (Σ SFR), and effective radius (R_{eff}).

195 3:50 pm

Low Rates of Oxygenic Photosynthesis Implies No Animals on the Exoplanet TRAPPIST-1 e

Joseph Soliz, Astronomy (M)

Oxygenic photosynthesis has been a key factor for the development of multicellular macro-organisms such as plants and animals on Earth. Oxygenic photosynthesis uses photons in the 400 nm to 700 nm spectral region, known as “photosynthetically active radiation” (PAR). To see if plants and animals could evolve on TRAPPIST-1 e (a known planet in the habitable zone), we employ an Earth-analog model where we replace TRAPPIST-1 e with a hypothetical Earth. The critical difference is that the star TRAPPIST-1 is much smaller and lower temperature than the Sun. Compared to the Earth, this

planet only receives 0.91% of photons within the PAR. On Earth it took roughly 700 million years to build up significant amounts of oxygen in the atmosphere, whereas on TRAPPIST-1e it would take approximately 77 billion years. Considering this over 5 times the age the universe, we conclude that the likelihood of plants and animals being present on TRAPPIST-1 e is very low.

Session D-5

Engineering and Computer Science 2

Friday, March 3, 2023 3:00 pm

Legacy Suite

196 3:05 pm

Fall Prediction Using Human Pose Estimation On An Edge Computing Platform

Shreyas Narasimhiah Ramesh, Electrical Engineering (M)

Falls among elderly people can lead to serious injuries and significantly impact their quality of life. This research proposes a vision-based fall prediction and detection system using the human pose estimation (HPE) method running on an edge computing device, Xilinx Kria KV260 Vision AI development platform. The system comprises an Intel® RealSense™ D455 infrared (IR) stereo-based range-sensing camera connected to a KV260 platform. The camera captures synchronized RGB and depth frames of dimensions 640x480x3 (HxWxC) and 640x480 respectively at a rate of 60 frames per second for real-time processing. The KV260 board has a Quad-core Arm® Cortex®-A53 processor and a PL-configured DPU unit synthesized to have three cores, where each core can perform 1024 operations per clock cycle. We designed a parallel 3-stage pipeline of machine learning models on the board utilizing the available resources of the SoC to increase the efficiency and speed of the overall process. All the machine learning models are trained on a GPU server and quantized using the Xilinx Vitis-ai-quantizer to deploy on the KV260 platform. The pipeline's first model is YOLOX, an object detection model, trained on the CrowdHuman dataset, where we achieved a quantized accuracy of 74%. The YOLOX model takes an RGB frame with a dimension of 640x640x3 to produce a bounding box per human in the frame, and discards the RGB frame, preserving privacy. The second model in the pipeline is a ResNet50-based Anchor-to-Joint (A2J) regression network, trained on the MP-3DHP: Multi-Person 3D Human Pose Dataset and the ITOP dataset, where we achieved a quantized accuracy of 83%. The A2J model accepts a depth frame with a dimension of 288x288. The bounding box coordinates for each human in the frame are cropped, rescaled, and normalized. The model produces 15 key points of joint information of a detected human. The final model in the pipeline is a binary classifier that takes informative joint coordinates (x,y,z,t) and predicts and or detects human fall activity. The KV260 also has a Dual-core Arm Cortex-R5F MPCore real-time processor that invokes an alerting system whenever a fall is inferred by the pipeline.

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197 3:20 pm

Spectro-mechanical Characterization of Shock-loaded Polymers

Maryam Ghorbani, Mechanical Engineering (D)

Polymers are an important class of engineering materials with implementations in various technological domains, ranging from consumer goods to extreme environment applications. Such loading scenarios stipulate a wide range of strain rates, resulting in drastic differences in mechanical behavior. Polymers often undergo plastic deformations and ductile failure at the low strain rate loading regime, whereas brittle failure dominates the response at ultrahigh strain rates. The latter is also preferred to elucidate the fundamental deformation mechanisms responsible for the intrinsic behavior of polymers since all inelastic processes are suppressed. The overarching objective of this research is to study the mechanical behavior of elastomeric polymers under ultrahigh loading rate using a novel laser-induced shock wave setup configured to generate concurrent pressure and shear stress waves. In this experiment, a high-energy laser is focused on and exfoliates a thin metallic sacrificial layer that launches the compressive stress wave towards the sample. The compressive wave undergoes a mode conversion at an inclined interface, resulting in loading the polymer film in pressure and shear concurrently, where the ratio of pressure-to-shear is directly proportional to the incline angle. The strength of the shock wave is tuned by adjusting the laser energy until failure is accomplished. Every spot of the sample is loaded only once to avoid any time-dependent effects such as fatigue or creep. The molecular structure evolutions of shock-loaded samples were concurrently probed using built-in-house terahertz time-domain spectroscopy in right-angle reflection mode. The results indicate that terahertz waves can non-destructively reveal shock-induced, reversible, and irreversible molecular changes. The outcomes will assist in developing shock-tolerant and impact-resistant polymers for optimal protection of humans and assets.

198 3:35 pm

Trust in AI-powered collaborative robots in the construction industry

Newsha Emaminejad, Construction Engineering (M)

As a key contributor to its digital transformation, the construction sector is utilizing the opportunities provided by collaborative robots (also known as cobots) to evaluate various automation scenarios on the job sites. Artificial intelligence (AI)-powered cobots are predicted to predominate within the construction sector in the future. Despite the fact that the construction sector has made significant progress in adopting digital technologies, the black-box nature of AI and the undetermined technical and psychological implications of bringing cobots to job sites provide unprecedented trust issues. The authors' most recent research study identified the crucial aspects of trustworthy AI-powered cobots (hereafter AI cobots) used in construction. The next phase of the research study involved semi-structured interviews with 11 experts, including

technology experts and end users, to gain their understanding, experience with, and insight into the drivers and barriers of the adoption of artificial intelligence robots in the construction industry. These targeted interviews were conducted to identify and categorize the trust elements. Grounded theory was utilized to evaluate the interviews, and Nvivo was employed to code the transcriptions, investigate patterns, and generate theories. The results of the analyzes based on the interviews led us to the creation of new hypotheses/constructs about the effective factors in building trust between the worker and these cobots. This prompted us to create and publish a more comprehensive nationwide survey/questionnaire. The survey was completed by approximately 400 participants working in the field of construction and then Structural Equation Model (SEM) was deployed to analyze the responses and test the relationships between trust level and trust element, and also the relationship between trust elements themselves. The findings showed that field experts do indeed value the major trust variables indicated in our prior literature review and studies.

199 3:50 pm

Ultrasonic Guided Waves Scattering Spectra by Hybrid Global-Local Modeling for NDE in composites with varying defect features

Mingyue Zhang, Structural Engineering JDP (D)

Ultrasonic Guided Waves (UGWs) are widely used to probe structural components with geometric and/or material discontinuities in many fields, for the Non-Destructive Evaluation (NDE) and Structural Health Monitoring (SHM) of complex structures. Compared to conventional ultrasonic wave testing, UGWs, while maintaining high sensitivity to small defects, provide large area coverage and high penetration, which are particularly important in the NDE of composite structures. However, modeling UGW propagation in complex structures with discontinuities is very challenging, since purely theoretical solutions do not exist, and numerical methods are computationally expensive. A hybrid numerical method can be formulated to efficiently compute scattering spectra of the guided wave modes over a wide frequency range and for arbitrary waveguide cross-sections and discontinuities.

This approach, Global-Local (GL) method, separates the waveguide in a "local region", containing the discontinuity of the structure, and a "global region", representing the pristine waveguide. The proposed GL approach utilizes full Finite Element (FE) discretization for the "local region", and Semi-Analytical Finite Element (SAFE) cross-sectional discretization for the "global region". The GL method, implemented in a modular and parallelizable algorithm, provides the scattering (reflection and transmission) spectra, which can be used to optimize the design of NDE testing and perform prognostics on the inspected structure.

In this work, the GL method is applied for the numerical analysis of UGWs in defective aluminum and composite plates. Parametric analyses including material degradation, defect location, defect size, and defect shape are computed to study the effect of different features of defects, over a wide-frequency

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range. Energy balance considerations are also performed with respect to the validity and accuracy of the obtained solutions, while minimizing the computational cost. The numerical results of scattering spectra obtained can be useful to solve the inverse problems of defect detection, characterization, and quantification.

200 4:05 pm

Measurement of Attenuated LoRa Propagation in Sandy Loam

Soumya Konery Satheeskumar, Electrical Engineering (M)

Advances in subsurface wireless sensor systems are required to understand complex chemical and biological mechanisms that govern soil formation and processes. In this work, we have experimentally investigated the attenuation effect of saturated sandy loam texture soil on LoRaWAN signal strength in the frequency of operation of 915 MHz. We have reported experimental results of RSSI (Received Signal Strength Indicator) and SNR between two LoRaWAN sensors, one buried in sandy loam from depths of 0 to 40 (cm) with moisture contents ranging from 10% to 50%, to an above soil sensor with a free space path distance of 2 (m) away. The attenuation variations in terms of the dielectric properties of the soil obtained by the proposed measurement set-up have been compared to theoretical results of the path loss model of Peplinski and Dobson. There is good agreement between measurement and theoretical results at a 40 (cm) burial depth, at 30 (cm) after 30% moisture, and 20 (cm) at moisture contents of 20% and 40%

Session D-6

Oral Health Nutrition and Clinical Sciences 2

Friday, March 3, 2023 3:00 pm

Pride Suite

201 3:05 pm

Widening the Lens on Immersive Learning: A Neuroeducation Study Addressing a “Wicked” Empathy Problem through Story Interventions and Multifaceted Measures

Maria Keckler, Education (D)

Empathetic concern has been found to decline with training in nursing students and throughout their careers (primarily towards culturally and linguistically diverse patients). The American Association of Colleges of Nursing demands that nurses demonstrate proficiency in new, non-technical competencies to meet the needs of today’s culturally diverse patients. Nurses have been traditionally trained and assessed on technical skills through conventional instruction and, most recently, through immersive simulations. However, gaps exist in the practical assessment of neurophysiological immersion and the instruction and assessment of the psychological skills needed, including empathetic concern, to appreciate patients’

unique cultural and linguistic diversity to deliver effective patient-centered care.

Purpose: The purpose of the doctoral study is to (1) assess the effects of immersive patient story interventions on nursing students’ empathic concern —beyond self-report measures— through neurologic, behavioral, and evaluation of critical consciousness; (2) Address gaps in the immersive learning and empathy in nursing education literature, and (3) Identify future areas of transdisciplinary research and practical applications in the emerging field of neuroeducation to address educational challenges in nursing education and beyond.

Participation: Undergraduate nursing students (n=70) were recruited from SDSU’s NURS 300 (Nursing Care of the Acute and Chronically Ill Adult and Gerontological Patient I) and randomly assigned to two groups. The first group (n=35) experienced a 2D patient story video treatment, and the second group (n=35) a 180° Virtual Reality (VR) simulation treatment of the same story, putting the participant in the seat of the patient.

Methods: Two-dimensional (2D) video and 180° virtual reality (VR) versions of a patient story based on actual events were produced as part of a mixed-methods design, which included a real-time neurophysiological immersion measurement (data collected through medical grade sensors to capture brain responses while nursing students watched a 2D video or 180° VR version of the story); the Interpersonal Reactivity Index (IRI) sub-scales for empathic concern (before and after interventions), a behavioral choice, and focus groups designed to assess critical consciousness as a measure of transformational learning.

202 3:20 pm

“Effects of Patient Aggression on Pediatric Healthcare Workers”

Alexandra Nash, Psychology with an emphasis in Industrial Organizational Psychology (U)

Injury will always be a risk associated with jobs, and the risk of injury varies among the diversity of fields and positions. For example, healthcare workers have an increased risk of injury from many causes such as slips, trips, and falls; needles; and even lifting patients or machinery. However, one critical cause of injury is actually from experiencing aggression from patients, and there is a lack of research on this prevalent cause of injury. Our study looked at the potential effects of healthcare workers experiencing patient aggression. Instances of patient aggression are often called “patient behavioral events” (PBE’s), which are defined as physical aggression towards healthcare employees that caused even mild injury, regardless of whether or not the patient had the intent to harm. The current study gathered data via survey from three children’s hospitals across the United States. There was a significant, negative relationship between frequency of PBEs and job satisfaction and a significant, positive relationship between frequency of PBEs and burnout, suggesting that increased frequency of PBEs affect organizational attitudes and well-being. One pivotal finding was that healthcare employees demonstrated the same effects with increased frequency of hearing or witnessing PBEs, implying

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that when PBEs occur, they not only affect those targeted by the patient but also others who may witness or hear about the event. Future research might seek to study the effects of PBEs more in depth and whether the factors influencing the effects of PBEs can be addressed to deepen our understanding of the impact of PBEs on healthcare workers.

203 3:35 pm

Why Aren't There Enough Female Asian American Healthcare Professionals? Navigating Gendered and Racialized Discourses of Leadership

Brianna Pham, Communication Studies (M)

This review of literature explores how female Asian American healthcare professionals in leadership roles face challenges conforming to the narrow conceptualizations of what attributes constitute effective leaders, which are typically defined by masculine traits such as aggression and ambition. Placing focus on the organizational communication phenomenon of gendered discourse within leadership provides an opportunity to reflect on and critique the patriarchal and organizational norms that exist today. Feminist theories will be used as a theoretical framework to examine and critique biased interpretations of gender roles and discuss what can be done to change the patriarchal narrative. The research focuses on Asian American women, in particular, because they have dual identities as they navigate a variety of settings that are centered on American traditions, all while deciding whether or not to preserve and implement their cultural traditions. Asian cultures may incorporate ideologies and values, such as Confucianism, that are anchored in patriarchy. Much of the existing scholarship does not include Asian American women in healthcare settings because there is a lack of Asian American representation within healthcare altogether. Overall, this literature review seeks to build upon the existing knowledge about gendered discourses in leadership by incorporating research on Asian cultural dynamics, exploring how Asian cultural values strongly enforce or undermine gendered notions of leadership in the context of the United States healthcare industry. Attention to the ways in which patriarchal and organizational norms influence leadership leads to questions: how do female Asian American healthcare professionals navigate gendered discourses of leadership and how do they resist or subvert gendered discourses of leadership?

204 3:50 pm

Athletic Trainers' Perceptions of Factors that Should be Included in Medical Disqualification Consideration Following Concussion

Mira Saab, Kinesiology Pre Physical Therapy (U)

Context: Concussions are a significant concern for those in the neuroscience, medical, and athletic communities. Athletes are at specific risk of experiencing concussions that in some cases may involve discussions of discontinuing or redirecting

sport participation. Currently, no evidence-based guidelines exist to help healthcare professionals determine when sports participation should be stopped. The purpose of this study was to explore the medical disqualification process following a concussion from the athletic trainer's perspective.

Methods: We conducted 18 semi-structured interviews with athletic trainers who previously provided their contact information through an online survey. Themes and subthemes were identified using a five-cycle process including a topic review, performing a literature review, collecting and summarizing the data with a codebook developed by a three-person research team, connecting findings to current research, and making final interpretations. In this process, we discovered six themes. This abstract focuses on the theme and subthemes for factors athletic trainers use in the decision-making process.

Results: Athletic trainers described the different factors involved in weighing the decision of medical disqualification for athletes. Factors included the number of concussions (both diagnosed and undiagnosed), long-term health consequences and future well-being, health-related quality of life, symptom severity, reporting, academics, and length of recovery.

Conclusions: Athletic trainers noted different factors that are taken into consideration in the difficult decision-making process of medical disqualification. Our findings highlight that concussion history plays a role, but also how those concussions impact the athletes' life globally. Education for the athlete on the long-term health consequences, quality of life, the importance of reporting, and other factors listed following a concussion is an important part of the conversation informing these decisions, often with the athletic trainer. Understanding the factors related to the medical disqualification process in sports after the concussion can allow athletic trainers to assist athletes and other healthcare professionals in making an educated decision. Future research should examine how guidelines can be created by the factors established in this study.

205 4:05 pm

Lower Extremity Kinematics During the Landing Phase of a Lateral Broad Jump in Division I Men's Basketball Athletes

Cassidy Burns, Kinesiology- Fitness Specialist (U)

Jump landings have been associated with lower extremity (LE) injuries in collegiate athletes. Prior studies have focused on evaluating biomechanics during vertical jumping movements and cutting maneuvers, but few have assessed a single leg lateral broad jump (SLLBJ). A SLLBJ may be a more challenging task to identify faulty biomechanics. The purpose of this study is to examine the LE kinematics during the landing phase of a SLLBJ.

Six Division I men's basketball athletes ages 20-23 years (avg height: 1.9m, avg weight: 94.9kg) were tested during pre-season. Athletes were uninjured and eligible to play at the time of testing. For the SLLBJ, participants began in single leg

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stance on the push off limb, pushed off to perform a lateral jump, and landed in single leg stance on the opposite leg (landing limb). The test was performed separately on each LE. The loading phase of the jump was defined from initial contact (IC) of the landing limb to 200ms after contact. 3D LE kinematics were measured, relative to a reference standing posture, using 3D motion analysis software. Position of the LE at IC, and excursion of the hip, knee, and ankle during the loading phase of the jump were calculated. Ranges of joint angles across LE for all athletes are used to describe LE kinematics during the SLLBJ.

The position of the athletes' LE at IC was hip flexion (20.2-32.9°) and abduction (17.9-34.7°), while rotation position varied (from 4.8° lateral-13.4° medial); knee flexion (13.3-30.2°), abduction (1.0-7.1°), and varied rotation position (from 6.8° lateral-8.4° medial); and most displayed foot and ankle plantarflexion (16.0-27.0°), inversion (-1.8-15.5°), and adduction (0.1-12.4°). During the loading phase, most athletes moved into hip flexion (9.9-22.7°), adduction (11.2-19.9°), medial rotation (-1.6-13.9°); flexion (15.7-32.2°), adduction (0.1-9.1°), and medial rotation (-1.6-10.8°) at the knee; and moved into dorsiflexion (25.0-44.5°), inversion (-1.2-21.6°), and abduction (-1.0-14.8°) at the foot and ankle.

The majority of injuries sustained in jumping sports are to the lower extremities. Since lateral jumping movements are commonplace in basketball, the current study provides a foundation for future research to explore risk factors for LE injuries using the SLLBJ.

206 4:20 pm

Exploring the Effects of Prune Extract on Cellular Models of Bone Cancer

Chelsie Miller, Foods and Nutrition (U)

There is strong evidence for prunes as a health food for improvement in digestion due to their high fiber content. More recent work has shown that prunes also have a positive impact on bone health, attributed in part to the antioxidant compounds and polyphenols they possess. Despite their important antioxidant role, the anticancer properties of prunes has yet to be determined. We hypothesize that treatment of osteosarcoma cell lines with prune extract will lead to a decrease in cell proliferation and migration, driven at least in part due to the antioxidant compounds. We will treat chondrocyte and osteosarcoma cell lines with varying concentrations of prune extract, and use a CellTiterGlo assay and in vitro scratch assays to measure the effects on cell proliferation and migration, respectively. A key component of our work is establishing the optimum cell culturing conditions and developing robust protocols for important cancer phenotype assays. This includes making the prune extract of which the cells will be treated. Upon completion of these experiments, we hope to better understand the effects of prunes on bone health and disease.

SDSU

Student
Symposium

Abstracts of Presentations

Session E

SDSU | San Diego State
University

(U) = Undergraduate; (M) = Masters; (D) = Doctoral

Session E-1

Dr. Diane K. Smith Memorial Session 1

Friday, March 3, 2023 11:00 am

Templo Mayor

208 11:20 am

Investigating Deep Eutectic Solvents as CE Separation Media

Karen Campos, Chemistry (U)

Deep eutectic solvents (DES) are a binary mixture of a hydrogen bond donor and a hydrogen bond acceptor. When combined, the melting point of the mixture is significantly lower compared to those of the individual components. Discovered in 2003, the full extent of the applications of DES in analytical sciences has not yet been uncovered. DES have however been used in energy, manufacturing, and synthesis industries due to their unique properties, such as low volatility and wide-range temperature stability. DES are currently being considered as alternatives to aqueous or volatile organic solvents due to these properties to address some limitations in analytical chemistry. For example, chemical analyses in space research will need a stable solvent that can tolerate variable pressure and temperature conditions.

One such versatile analytical method is capillary electrophoresis (CE). CE separates analytes based on their charge-to-size ratio using voltage through a liquid medium, usually a buffered aqueous solution. To expand the possibilities of new analytical methods using CE, we can consider exploring DES as a CE separation media. DES has been used in CE before, but as buffer additives in small concentrations. Our group aims to be the first to study and perform a CE separation using a majority DES-based separation media for CE analysis.

An important characteristic of a CE separation is the electroosmotic flow (EOF), the moving force of the solution, and ion mobility. It is necessary to determine the EOF of DES to gain a deeper understanding of how DES impacts a separation. This project aims to experimentally determine the electroosmotic flow (EOF) and evaluate the potential to do CE separations with DES. This presentation will evaluate how different volumetric ratios of DES and water, and different additions of solid bases affect the EOF. Preliminary data shows that as the ratio of water to DES increases, the EOF increases. Also, buffer additions, like Tris(hydroxymethyl)aminomethane (TRIS), increase the EOF. Preliminary separations using DES as a separation media will be investigated as well. This work will open the doors to a new subfield of electrophoretic separations and other chemical analyses using DES as alternative solvents.

209 11:35 am

Diversity of Sperm Morphology Across the Animal Kingdom: A Quantitative Comparative Analysis Using Scanning Electron Microscopy

Ashley Pettit, Microbiology, Emphasis in Clinical Laboratory Sciences (U)

Sperm cell morphology refers to the overall shape and size of sperm and its physical components; primarily the head, intermediate piece, and tail. The head contains the nucleus, which holds the DNA for the cell and the acrosome, a cap-like structure that contains lysosomal enzymes and glycoproteins that allow the sperm to penetrate the egg cell for fertilization. The intermediate piece contains helically arranged, elongated mitochondria that provide the cell with ATP to power the flagellar movement. The tail or flagellum functions to propel the sperm via whip-like motions. Sperm morphology is widely diverse, and these differences can be observed across species using scanning electron microscopy (SEM). The San Diego Zoo Sperm Atlas displays the unique morphological structures of animal sperm cells and currently includes 75 species. In collaboration with the San Diego Zoo and the Center of Reproduction of Endangered Species (CRES), we investigated the diversity of sperm cell morphology across species. CRES provided us with fixed sperm from a variety of species for SEM imaging. The images are to be added to the Sperm Atlas to be used to aid further research and expand knowledge of sperm diversity.

To provide a broad comparison between species, sperm from 9 animals were examined; including 3 vegetarian mammals of varying sizes, a reptile, 2 amphibians, a bird, an elasmobranch, and a fish. To prepare for SEM imaging, the fixed samples were diluted, filtered through a 0.1 μ m filter using 0.1M cacodylate buffer, vapor fixed using glutaraldehyde and osmium tetroxide, dehydrated using ethanol, chemical dried with hexamethyldisilazane (HMDS), mounted on stubs, and coated with 6nm platinum. Approximately 100 sperm from each species were imaged using SEM and a series of measurements were recorded using ImageJ. Measurements obtained from each sperm include head vertical and horizontal diameter, acrosomal area, intermediate piece length and diameter, spacing between mitochondrial coils, flagella length, and total sperm length. Head shapes were categorized as oval, circular, or irregular. Any additional morphological structures were also noted. Measurements and observations were utilized to hypothesize possible correlations between sperm morphology and eating habits, animal size, mating habits, and species categorization.

(U) = Undergraduate; (M) = Masters; (D) = Doctoral

210 11:50 am

Sensitive Detection of SARS-CoV-2 Biomarkers Using Nonlinear Laser Wave-Mixing Spectroscopy Coupled with Capillary Electrophoresis and Microfluidics

Nini Shatirishvili, Chemistry (D)

Coronavirus disease 2019 (COVID-19), a highly infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has infected more than 452 million individuals and led to more than 6.1 million deaths worldwide. The situation with SARS-CoV-2 has revealed that fast and relevant detection of the infection is one of the most effective ways to stop its distribution. To prevent the pandemic from spreading and take action for timely treatment, the development of alternative and advanced diagnostic tools is crucial. For research purposes, there are several significant recombinant proteins of SARS-CoV-2 available commercially, and both antigen and antibody detection play important roles in pandemic management as well as assessment of patient prognosis. Currently, RT-PCR and detection of IgG, IgM, or viral antigen are employed in clinical diagnosis, however, despite their high accuracy those methods are expensive, time-consuming, and can be performed in well-equipped laboratories which is limited in many regions of the world. Therefore, we aim to develop an alternative pathogen identification method, which is fast, cheap, on-site, sensitive as well as accurate, and repeatable. Coupling degenerate four-wave-mixing (DFWM) laser with capillary electrophoresis has been a powerful tool to detect biomarkers of early stages of disease or virus, including SARS-CoV-2 infection. DFWM-CE can reproduce results and detect picomolar-level, both fluorescing (labeled) and non-fluorescing (label-free) samples in a few minutes. This work demonstrates rapid, label-free, PCR-free, sensitive detection and identification of SARS-CoV-2 recombinant as well as the real-life samples using laser wave mixing coupled to Capillary Zone Electrophoresis, and Microchip Capillary Electrophoresis technologies. Laser wave-mixing may be beneficial as a measurement tool in screening and evaluating a large number of patients, from their initial diagnosis through the course of treatment. Wave-mixing potential applications include early detection of diseases, cancer biomarkers, viruses, and sensitive monitoring of environmental samples.

211 12:05 pm

A Novel Method of Standardizing the Handling of Human Feces – A Metabolomics Approach

Candice Gokey, Analytical Chemistry (D)

The USDA has been publishing nutritional recommendations since 1894, but didn't involve medical or science backed research in any of the recommendations until 1992, when the first food pyramid was published. Even so, the recommended serving suggestions have not been rigorously investigated for evidence of health benefits. We are undertaking a study to evaluate the changes in metabolites that occur when fruit is

consumed in accordance with the food pyramid guidelines.

Our analysis will be performed using an untargeted metabolomics approach with fecal matter samples collected from healthy human participants who have been provided with minimum and maximum fruit servings. The aim of this in vivo study is to identify perturbed health markers related to the consumption of fruit. The study participants only requirement is the consumption of the provided fruit servings, which leaves room for multiple non-study related effects on the metabolite expression within our samples.

Current metabolomics studies involving fecal samples are inadequate at identifying outliers in sample sets because the samples are generally pooled together. Pooling the samples creates technical replicates and eliminates sample to sample variations, which is useful for a global approach to studying metabolite expression. Unfortunately, mixing the samples together also removes the ability to quantify metabolite expression in individual samples. This presentation, will discuss the development of a novel method for standardizing the handling of human feces samples for performing an untargeted metabolomics study via liquid chromatography mass spectrometry and present the preliminary results of this standardized method. The purpose of standardizing the fecal matter samples is to eliminate non-study related metabolite expression and isolate the study related metabolite perturbation. The digestion of fruit and the metabolites produced in the process are well documented, so being able to successfully identify and quantify these metabolites in conjunction with perturbation in health markers known to be affected by fruit, is key to understanding the effect of fruit serving size on overall health.

212 12:20 pm

Discovery and identification of a non-lethal mechanism for intercolony inhibition (“sibling rivalry”) in *Marinobacter*

Ellen Kuang, Bioanalytical Chemistry (D)

Marinobacter is a ubiquitous, motile, halophilic to halotolerant, marine bacteria commonly found in the core microbiome of phytoplankton such as diatoms and dinoflagellates. These phytoplankton are commonly implicated in harmful algal blooms. It has been proposed that *Marinobacter* may be a keystone taxon that regulates the phytoplankton host through siderophore production in exchange for carbon source nutrients provided by the phytoplankton. To ensure colonization by beneficial bacteria, the phytoplankton cells create a concentrated chemical environment, or “phycosphere”, surrounding the cell to encourage attachment of beneficial bacteria and suppress or inhibit growth of unwanted ones. Similarly, the bacterial community can also regulate each other through a similar process to reduce resource and space competition. In a previous study, the Carrano lab described a phenomenon observed between two “sibling” bacterial colonies of *Marinobacter* where the colonies were able to prevent territory overlap through non-lethal chemical communication that inhibits motility rather than through standard quorum

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sensing mechanisms. In this study, we set out to discover the small molecule causing this phenomenon using qualitative, untargeted metabolomics to analyze the media extracted from the agar at various zones, including the inhibition zone. We were able to identify and validate seven candidate molecules, but only one proved to be effective at limiting motility through motility assays. Then using targeted analysis, we quantified the compound across the various sampling zones using the standard addition method to confirm that the compound is present at highest concentrations within the inhibition zone.

Session E-2

Dr. Diane K. Smith Memorial Session 2

Friday, March 3, 2023 1:00 pm

Templo Mayor

213 1:20 pm

Discovering the Obvious-In-Hindsight with Quinones: Mystery of the Missing Current, Dianion's Solvent Attack, and Expanding the 3rd Redox Dimension

Rachel Staley, Analytical Chemistry (D)

A selection of research done under Diane Smith for a doctorate.

For decades, voltammograms of quinones in aprotic solvents had abnormally small second redox waves. Where is the electrical current that is supposed to be there? Through a combination of careful control of surface oxidation and concentration dependence experiments of several quinones, we showed that the missing current is located between the two normal waves and result from quinones forming H-bond complexes with phenolic groups on the electrode's surface, which accept electrons at a voltage that is shifted significantly positive from its normal position.

Most chemistry that is performed in organic solvents is done with the assumption that no water is present, but that is not true, and the solvent can be significantly more reactive with more extreme drying techniques. Methylene chloride, an organic solvent commonly used for its solubility properties and chemical stability, was found to be the target of a nucleophilic attack by the quinone dianion produced as a result of electrochemical reduction by a carbon electrode. The effect goes away completely when the concentration of water is 40-fold the concentration of the quinone.

Two-dimensional reaction schemes, such as the proton coupled electron transfer "square scheme," have been used for decades to show thermodynamic cycles between radically different types of chemical reactions, but only rarely have these been expanded into a third dimension, such as with the "wedge scheme." Here, we present an expansion of the wedge scheme into a "cube scheme" that separates hydrogen bonding, proton transfer, and electron transfer in systems involving quinones. We argue that any proton coupled electron transfer system has similar cube schemes that only depend upon their hydrogen bonding partner.

214 1:35 pm

Redox-Responsive H- Bonding for Supramolecular Applications

Laurie Clare, Chemistry (M)

In electrochemistry, molecules that have multiple H-bonding sites can be made stronger or weaker through electron transfer. These types of molecules contain either H-bond donor sites or H-bond acceptor sites. This means that binding strength between molecules can be controlled through oxidation/reduction. The strongest binding is always observed when all the H-donors are on one side of a molecule and all the H-acceptors are on the other side of a molecule. The reason for this involves secondary H-bonds. Ureidopyrimidinone (UpyH) derivatives are 4 hydrogen bond arrays that are well known for their high association constants. They have been used as building blocks in supramolecular chemistry as crosslinkers for polymers and gels and, because of inherent reversibility of hydrogen bonding, they have been utilized in "self-healing" or "smart" polymers.

In this presentation, it will be shown how proton coupled electron transfer can affect the binding strength of an UpyH array that dimerizes through self-complementary recognition. In this presentation, it will be shown through Cyclic voltammetry, UV-vis and HNMR spectroscopy that UPyH favors dimerization, then and as it undergoes oxidation it breaks apart and upon reduction the dimer spontaneously reforms.

215 1:50 pm

Studies on the Effects of Electron-Donating and -Withdrawing Groups on Ruthenium Water Oxidation Catalysts

Miguel Ibanez, Chemistry (D)

Our group recently reported a water oxidation catalyst with active-site sulfonate that is very active as electrocatalyst. Being able to perform water oxidation with a good TON and TOF in both acidic and basic pH is a desirable characteristic that allows the catalyst to be studied in a range of conditions. Acidic conditions are of interest, due to the ability of proton reduction being facilitated in acid. In this presentation, we demonstrate the effects electron donating/ electron withdrawing groups have on oxidation potentials in both acidic pH=1 and basic pH=7 conditions. Yagi's group showed that electron-donating and -withdrawing groups on terpyridine in (terpy)(NN)Ru(H₂O)₂⁺ catalyst influence the electronics and ultimately improved TOF by an order of magnitude³. We've previously reported an increase in catalytic activity with our newly developed 5 coordinate Ru(4'-x-terpy)(phen-SO₃) OTf complex, we now discuss how the catalysts performs in acidic conditions compared to the unsubstituted terpyridine analog.

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216 2:05 pm

DEA-tC

Harrison Pearce, Chemistry (D)

Fluorescent nucleobase analogues (FNAs) are important tools for the study of DNA and RNA structure and dynamics. They report on their immediate surroundings via their fluorescence responses, such as changes in fluorescence intensity or wavelength. Tricyclic cytidine (tC) analogues have emerged as important FNAs, because their behavior can be tuned via changes to their structure, displaying intense fluorescent turn-on or turn-off effects with base pairing and stacking. The Diethylamino substituted tC analog (DEA-tC) provides a striking example of environmental sensitivity, becoming up to 20 times brighter when base paired with its complementary nucleobase in double stranded DNA as compared to its brightness in single stranded DNA. That being said, DEA-tC is dim relative to the other tC analogs, and it is cytotoxic. By understanding the mechanism behind the increased brightness of DEA-tC upon base pairing, we hope to design brighter, more responsive, and less cytotoxic nucleobases.

My previous TD-DFT benchmarks calculations of the absorption and emission spectra of tC analogs have revealed that B3LYP/cc-pVDZ with an smd water solvation scheme and explicit water molecules for solvation satisfactorily reproduce the absorption and emission spectra in all but tC and DEA-tC. In this work, I present my efforts to accurately simulate the absorption spectrum of DEA-tC in 1x PBS buffer.

217 2:20 pm

A Voltammetric Investigation of the Electrocatalytic Cycle Mechanism of Fe(I) and Mn(I) Complexes

Kristine Legaspi, Chemistry (D)

Earth-abundant, first row, low coordinate transition metal complexes are promising candidates for the electrocatalysis of a variety of organic synthesis reactions. However, transition metal complexes in the M(I) state have the propensity to undergo disproportionation, hindering their ability to carry out the electrocatalytic cycle. In this study, we seek to identify and understand the mechanism by which the M(I) complexes may act as an electrocatalyst for a simple organic coupling reaction, beginning with the radicalization of benzyl bromide as a representative starting material. Initial characterization of the complex and its components by cyclic voltammetry demonstrate general stability of the catalyst, while equivalent additions of benzyl bromide exhibit the execution of the electron transfer and radical generation. Cyclic voltammetry simulations provide supplementary guidance into the relationship between benzyl bromide and the catalyst. Additional experiments conducted using analytical techniques such as mass spectrometry, x-ray spectroscopy, and nuclear magnetic resonance help to further characterize portions of the proposed mechanism and supporting details. Analysis to date suggests that the model electrocatalytic cycle is interrupted to an extent,

with contributions from both disproportionation and substituted coordination at the transition metal center. Experimental and simulated voltammograms are qualitatively consistent with this proposed catalytic cycle interruption.

218 2:35 pm

Development of an Electrochemically Regenerable Hydride Mediator

Dylan Karr, Chemistry (D)

Hydrides such as Hantzsch's ester and benzimidazole are used as stoichiometric or super-stoichiometric reagents in organic synthesis. The goal of this research is to see if either reagent can be converted to an electrochemically regenerable hydride mediator. The first step to achieving this is to realize the proposed mechanism of reduction of pyridinium 1 and benzimidazoles which consists of a 2 electron 1 proton transfer seen below. Normally, reductions of pyridiniums and benzimidazoles are chemically irreversible due to the initially formed uncharged radical dimerizing. We believe the key to avoiding dimerization is to add a H-bond donor that can H-bond to the carbonyl of the pyridinium in such a way that places an acidic proton at the 4-position of the pyridinium or 2-position of the benzimidazole so there's a H-bond to the uncharged radical allowing for a second 1 electron reduction and proton transfer to form the desired hydride agent. This presentation will detail the efforts to develop and use of these regenerable hydride agents.

Session E-3

Dr. Diane K. Smith Memorial Session 3

Friday, March 3, 2023 3:00 pm

Templo Mayor

219 TM 1

Mutating Bacteriophage MS2 to Create Minus-Sense RNA

Sophia Alvarez, Chemistry - Emphasis in Biochemistry (U)

Bacteriophage MS2 is a simple, abundant, and well-studied virus. MS2 is composed of a shell of proteins—called a capsid—that surround a single-stranded plus-sense RNA. Minus-sense strands, which are complementary to the plus-sense RNA, are transcribed from the MS2 RNA inside the host cell. Interestingly, the plus and minus sense strands of MS2 RNA do not bind together to form a double helix, even though their sequences are perfect complements. If the strands were to bind together, they would not be able to replicate or cause infection in the host cell. Identifying the features of the sequence that keep the strands from binding together is important not just for MS2, but also for other viruses, their host organisms, and the ecosystems they populate. To study this problem in the laboratory, we

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need to create a minus sense strand. We do this by creating a SmaI restriction site mutation at the beginning of the MS2 sequence and a reverse T7 promoter sequence at the end of the sequence.

220 TM 2

R132Q IDH1 sensitivity to reducing agents

Nicole Sierra, Biochemistry (U)

The proto-oncogene IDH1, isocitrate dehydrogenase 1, is a gene that provides enzymes the ability to break down fats for energy and protect cells. In the normal wild-type oxidative decarboxylation reaction, isocitrate produces alpha-ketoglutarate, with the reactant NADP⁺ being converted to NADPH. However, mutant IDH1 can catalyze a neomorphic reduction, the NADPH-dependent reduction of alpha-ketoglutarate to D-2-hydroxyglutarate, D2HG, which can competitively inhibit alpha ketoglutarate-dependent enzymes. We hope to investigate the catalytic efficiency of the enzyme to discover the relationship between kinetics and tumor phenotypes. We have previously shown that the mutation R132Q produces high levels of D2HG while still being able to produce alpha-ketoglutarate, unlike other mutants. Furthermore, we previously solved a crystal structure of R132Q with the mutant bound to isocitrate and NADP⁺ substrates under reducing conditions to stimulate the cellular environment. This crystal structure led to the discovery of the reducing agent, TCEP, forming an adduct with NADP⁺. The impact of this adduct on the catalytic activity of the mutant R132Q IDH1 is unknown. We hypothesize that the NADP⁺-dependent normal reaction will be inhibited due to the unavailability of the NADP⁺ substrate. We have conducted steady-state kinetic assays on R132Q mutant at varying concentrations of reducing agents to determine the impact of the TCEP-NADP adduct on R132Q catalysis. We show that observed rates of R132Q decrease as reducing agent concentrations increase, with different reducing agents having unique tendencies for inhibition. This project can reveal possible precautions for researchers to be aware of when crystallizing IDH1 and performing catalytic reactions, as well as help us clarify mechanisms of catalysis.

221 TM 3

Enzyme kinetics of a mutant IDH1 R132F

Divine Pungi, Chemistry (U)

Isocitrate dehydrogenase 1 (IDH1) catalyzes the reversible NADP-dependent reduction reaction of isocitrate to alpha ketoglutarate. The most common cancer-driving mutations in IDH1 affect residue R132, causing a neomorphic reaction of reducing alpha ketoglutarate to D-2- hydroxyglutarate. Previous researchers indicate that a mutation in IDH1 is linked to over 80% of lower- grade gliomas as well as secondary glioblastomas patients. Here I seek to understand how mutant IDH1 produces a new reaction that hasn't been seen in the wild type form. After designing a mutation using site-directed mutagenesis, I expressed and purified this protein. Then, I used

enzyme kinetics as well as other biophysical methods in order to test how efficiently this specific mutation produces D-2-hydroxyglutarate (D2HG). Key Term: Cancer, enzyme kinetics, IDH1, mutation.

222 TM 4

Photocatalytic synthesis of Atropisomeric Indoles with an N-C Chiral Axis using CsPbBr₃ Chiral Perovskite Nanocrystals

Dylana Guyon, Interdisciplinary Studies (U)

Our objective is to propose an efficient methodology for therapeutic agent synthesis providing a novel approach towards axially chiral N-C bonds of heterocycle targets. With the use of our catalyst chiral perovskites, we should be able to efficiently synthesize pharmaceutical motifs using photocatalytic reactions. We propose that if we use chiral ligand in our perovskite, then it will give us the atropisomeric chiral indole compound. With the use of CP1, we obtained a yield of 50% but no ee was detected. Therefore, we determined that if we use a more suitable chiral perovskite then we will get a higher ee and higher yield. With the use of CP2, we received a yield of 37% and we of 30% which concludes our hypothesis that if we use a suitable chiral perovskite, we will get the chiral product with enantiomeric excess.

Funding Acknowledgement: This project was supported by NIH MIRA to Y.Yan. This project was additionally supported by the National Cancer Institute of NIH under award numbers U54CA132384 & U54CA132379.

223 TM 5

Applying antisense oligonucleotide therapy (ASO) for autism spectrum disorder in preclinical models

Mariami Kuljanishvili, Chemistry-Emphasis in Biochemistry (U)

Background: Autism Spectrum Disorder (ASD) patients are affected with various symptoms of severity in their daily lives, including communication difficulties, problems with social interaction, and repetitive behaviors together with sensory problems. The advanced studies of ASD show that de-novo single-nucleotide mutations cause developmental disability. Our study will look to demonstrate that antisense oligonucleotide (ASO) therapy could reduce the effects of monogenetic ASD mutations.

Materials and methods: To evaluate the efficacy of the ASO approach, we have collected patient-induced pluripotent stem cells (iPSCs) for four monogenetic forms of ASD genes: ASXL3, PACS1, PPP2R5D, and SYNGAP1. We generate induced neurons (iNs) from the patient iPSCs to use as vectors of study. Lentivirus is used to induce Neurogenin2 (NGN2) gene expression in the patient cells with doxycycline (DOX). To determine the effects of ASOs on the transcriptome, control iPSC lines were differentiated and then collected for RNAseq for three weeks at weekly intervals.

Results: From the collected data, we demonstrated that iPSC

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cell markers expression decreased over the timeframe, and neural markers expression increased over the same span of time. Together with these findings, ASO dosing was optimized using qRT-PCR. Our study uses 5-10⁻⁵ 2'-O-methoxyethyl (MOE) gapmer ASOs targeting alpha-actinin as a control. The findings suggested that using ASOs could achieve 80-85% knockdown of targeted genes in patient iNs.

Conclusion and future steps: After assessing control cell lines, we would like to follow the same differentiation protocol for patient cell lines and knockdown gene expression with ASOs. Our approach will contribute to the development of RNA therapeutics for ASD patients. The study will aid our understanding of ASD and underline the cellular mechanisms of neurodevelopmental disease.

224 TM 6

Mn doped perovskites for spin polarized photocatalysis

Kevin Rubalcaba, Chemistry (U)

This projects focus is to further research the properties and interactions of metal-halide perovskites (MHP) by introducing manganese to CsPbBr₃ perovskites. By doping perovskites with Mn we notice a higher reduction of CO₂. MHPs already have CO₂ reduction properties, but with the Mn, that is multiplied. To dope the perovskites: we do a hot injection, combining MnBr₂, PbBr₂, HBr and Oleic acid. All combined in octadecene in 120°C and then adding Cs-oleate. The use of MnBr₂ to make the perovskites is problematic but using MnCl₂ yielded much more stable nano crystals. After successfully showing how to make Mn doped MHPs, introducing magnetic fields to the Mn doped MHPs further improves its CO₂ reduction properties. This project will show how using a strong magnet and UV-light exposure to the MHP, the rate of CO₂ reduction can be measured with a UV-vis by measuring the degradation of a dye we include in a solution with the Mn doped MHP. Recording the rate of absorbance over time, the concentration over time is calculated to compare the difference between CO₂ reduction in MHPs, Mn doped MHPs, and Mn doped MHPs exposed to a magnetic field and UV-light.

225 TM 7

Investigation of PCET-Based Redox-Responsive H-bonding in Simple 2 H-bonding Systems

Liam Seitz, Chemistry (U)

Based on prior work done by Diane K. Smith et al on redox responsive 3 hydrogen bond (H-bond) array dimers, a fundamental investigation on the nature of proton coupled electron transfer (PCET) was done by surveying a series of new electroactive "host" H-bond dimers. In these dimers, electron transfer should induce proton transfer across a H-bond, increasing the overall strength of H-bond binding between the "guest" and "host". In particular, the goal of this project is to investigate how electrochemical behavior and binding strength changes as the relative acidity of the electro-inactive "guest" changes. For this task, the amido pyridinium derivatives will be used as the redox active "hosts" and a series of different carboxylic acid, 2-hydroxypyridine, and amide derivatives as the electro-inactive "guests". This project includes the synthesis of these derivatives from their respective parent molecules, with analysis done using cyclic voltammetry (CV) titrations. The amido pyridiniums undergo two 1 e⁻ reductions to the quinoidal anion; in the presence of guests the quinoidal oxygen hydrogen bonds with the carboxylic acid proton leading to a proton transfer. This proton transfer from a guest H-donor group (D) to the hydrogen-accepting oxygen (A) should produce a DD-AA dimer having significantly stronger binding than the starting AD-DA dimer (Figure 1). We hypothesize that a shift in relative acidity will have a profound influence on the net hydrogen bond strength of these dimers as measured through CV titration. Thus far, the expected behavior has been observed in various mild proton donors. However, titration of the stronger carboxylic acid guest led to unexpected H₂ evolution.

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Abstracts of Presentations

Session F

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Session F-1

Behavioral and Social Sciences 5
Friday, March 3, 2023, 9:00 am
 Montezuma Hall

226 9:00 am A

Pandemic-Related Disruption in Nonparental Care and Vocabulary in the First Five Years
Matthew McArthur, Psychology (M)

In 2019, 63.8% of mothers of children under the age of three participated in the workforce and most depended on some form of non-parental care. However, in 2020, unemployment in the U.S. increased from 1.4 to 7.1 million persons (Bureau of Labor Statistics, 2020). Only one recent study has evaluated relations between parenting stress, non-parental care, and early language (Dore et al, 2022). In that study, parenting stress and time spent in non-parental care predicted language growth from 12 to 24 months. Of interest here are the impact of pandemic-related disruptions in care and anxiety on vocabulary development in the preschool period.

Participants were 34 children (16 F) from 31 to 60 months ($X=43.9$) and their caregivers. Caregivers completed a modified Covid-19 Household Pulse Questionnaire (U.S. Census Bureau, 2020). Children completed the PPVT (Dunn & Dunn, 2007) and the CCT (Friend et al., 2012). We were interested in relations between anxiety, disruption in non-parental care, and children's vocabulary given its importance to achievement (e.g., Slot, Blesses, & Jensen, Quinn, et al., 2015). Data were collected online.

The questionnaire yielded three measures of parent anxiety and a measure of disruption in care. We extracted factors for parent anxiety and vocabulary. Regressing anxiety and care disruption on vocabulary only yielded support for a marginal effect of disruption ($p=.084$). We conducted three chi-square tests of independence: anxiety X disruption, anxiety X vocabulary, and disruption X vocabulary. This analysis revealed that vocabulary varied as a function of type of disruption ($\text{Chi}^2(1) = 7.529$, $p < .006$). When care was canceled or remote, vocabulary factor scores were lower ($M = -.295$, $SD = 1.03$) than when there was no change or a transition to similar care ($M = .469$, $SD = .556$). This showed in PPVT percentile scores ($M = 59.69$ and 77.8 , respectively), accounting for variability in age.

These findings suggest that pandemic-related disruption in non-parental care is associated with variation in child vocabulary into the preschool period. Importantly, it was the type of disruption in care that was important. Children for whom care was canceled or delivered remotely had lower receptive vocabulary scores than children for whom there was little to no change in care.

227 9:00 am B

Acquiring Normative Verb Generation Data through Online Behavioral Testing

Mohamed Ali, Speech, Language, and Hearing Sciences (U)

The present study aims to provide normative verb generation behavioral data to subsequently investigate word retrieval processes in individuals with neurological disorders such as epilepsy or stroke-induced aphasia. Verb generation is a classically used paradigm to probe word retrieval in clinical settings, however normative data is not readily available to compare the performance of individuals with neurological disorders possibly affecting word retrieval processes to that of control participants. In the verb generation task, individuals are asked to produce a verb in response to a noun. Some nouns are associated with many possible verbs (e.g. "ball" can be associated with "kick", "throw", "bounce", etc.), whereas other nouns are associated with fewer verbs (e.g., "chair" which usually is associated with "sit"). Entropy in this context refers to the degree of variability in the set of verbs associated with a noun. Generating a verb in response to a noun with low entropy typically leads to shorter reaction times as compared to nouns associated with high entropy. We collected behavioral data from 42 participants, (4 male, 38 female, an average age of 28.1, with a standard deviation of 10.6). using an online data collection platform. Our stimuli consisted of 50 common nouns with varying associated entropy values. Entropy values for these nouns were calculated using data from a separate control group, which included 34 participants, (9 male, 24 female, and 1 unspecified, an average age of 28.3, with a standard deviation of 9.4). We used a correlation model to assess if there was a correlation between the entropy values and reaction times derived from our 42 online participants, and we excluded incorrect responses from participants in our analysis. As expected, we found a strong positive correlation between reaction time and entropy values, with a correlation coefficient of 0.75, replicating the finding that increased selection needs lead to increased reaction times in word retrieval. This result indicates that our normative data set shows the expected entropy effect and will subsequently be used to characterize the performance of individuals with neurological disorders on the same task.

228 9:00 am C

Normalizing Amsterdam: Characterizing the modified Amsterdam Inventory for Auditory Disability

Lydia Abel, Speech, Language, and Hearing Sciences (U)

Individuals without detectable hearing loss identified using traditional hearing tests, often report hearing difficulties in various listening conditions. Additional clinical tools are warranted to identify auditory difficulties experienced during everyday listening. The modified Amsterdam Inventory for Auditory Disability (mAIAAD) is a reliable and valid measure of an individual's overall listening difficulties and in 5 subdomains,

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but normative data only exists for a Spanish translation (S-AIADH). This study sought to characterize mAIAD responses in English-speaking individuals with normal auditory function. One hundred English-speaking, normal-hearing participants with no reported listening difficulties have been recruited. Normal peripheral and central auditory function were required and multiple subjective and objective tests were administered. In addition to otoscopy, tympanometry, acoustic reflex testing, pure tone audiometry at conventional (0.25-8 kHz) and extended-high (10-16 kHz) frequencies, speech testing in quiet and noise, a few assessments were administered to examine central auditory processing function including, dichotic digits, masking level difference, staggered spondaic words, and gaps-in-noise testing. Distortion product otoacoustic emissions measured at conventional and extended-high frequencies and auditory brainstem responses elicited with clicks and speech stimuli also were used to evaluate auditory function. An extensive case history, the 1-Minute Noise Exposure Screen questionnaire, and the mAIAD were administered. All participants had conventional pure tone thresholds <15 dB HL and at most one abnormal score on the central auditory processing tests administered. For each question on the mAIAD, participants rate their listening difficulty on a 4-point scale, where a score of 1 represents the most difficulty and a score of 4 equates to no difficulty. The average total mAIAD score was 107, with a range of scores between 88 and 112. These scores are comparable to what has been reported for the S-AIADH. With these results from English-proficient individuals with normal auditory function and no reported listening difficulties, a better understanding of the subjective hearing difficulties in individuals with normal hearing and listening difficulties can be assessed using the mAIAD to determine if further audiological testing is warranted.

229 9:00 am D

Otoacoustic Emissions Differences Between Student Musicians and Non-Musicians

Alyssa Hunter, Speech, Language, and Hearing Sciences (U)

Recreational noise exposure is becoming more of a risk for hearing loss in young adults. Furthermore, university student musicians are exposed to what might be defined as academic noise exposure; these musicians spend a significant amount of time in ensemble practices, music halls, and various performances because of various academic commitments. Researchers have reported that student musicians have poorer distortion product otoacoustic emissions (DPOAEs), a measure of cochlear function, compared to non-musician students. To date, there is no research on whether being a music major has an effect on middle ear function and DPOAEs. As a result, the purpose of this was to evaluate middle ear function and DPOAEs in three groups of students. The groups were: non-musicians; non-music major musicians; and music major musicians. Currently enrolled SDSU students were recruited for this study and categorized into one of the three groups mentioned above. Once informed consent was obtained,

otoscopy, tympanometry, a measure of middle ear function, and DPOAEs were completed. There were 21 non-musicians (16 women, 5 men), 30 non-music major musicians (19 women, 11 men), and 13 music major musicians (9 women, 4 men) who participated. There were no statistically significant differences for middle ear variables between the groups after adjusting for age and sex. This is important since the middle ear transfers acoustic information back and forth, which is needed for measuring DPOAEs. Similarly, after adjusting for age and sex, the frequency by music group interaction was not statistically significant. This means all three groups had similar DPOAEs across the frequencies tested. These findings are somewhat surprising given the expectation that musicians, either major or non-major would have poorer DPOAEs. It is possible that the non-musicians who participated in the current study had some other type of noise exposure (occupational or other recreational) not measured in the current questionnaire. More research is needed to further explore these findings.

230 9:00 am E

Increasing Engagement in Mental Health Care Among Underserved Adults: A Program Evaluation of Therapy For All at Urban Restoration Counseling Center (URCC)

Eamonn Hartmann, Public Health (M)

Introduction: Engagement in mental health care can be difficult for adults in the United States, especially those from underserved minoritized racial and ethnic communities. To address this issue, Urban Restoration Counseling Center (URCC) in San Diego offers a program called Therapy For All (TFA), which provides 15 sessions of therapy at no or low cost. This novel program has the potential to reduce mental health disparities affecting underserved communities in San Diego; however, there is a need for an evaluation to determine how to increase client engagement as only 27.5% of clients completed all 15 sessions in 2021. This study aims to identify factors that influence client engagement in TFA. Methods: A convergent parallel mixed methods design is being utilized to collect data on facilitators and barriers to client engagement in TFA. Administrative data from 2021 is being analyzed to examine the relationship between sociodemographic factors and session attendance. In addition, semi-structured, one-on-one interviews are being conducted with TFA clients and mental health clinicians to assess factors that impact client engagement from the client and clinician perspective. Results: Data collection is ongoing; administrative data from 75 TFA clients has been collected. In addition, 10 clients and 11 clinicians have completed interviews. Preliminary analysis of the administrative data reveals that 83% of TFA clients identified as cisgender female, 16% identified as cisgender male, and 1% identified as non-binary. Black or African American clients comprise 41% of the sample followed by Hispanic or Latino clients (19%), White clients (19%), clients who identified as Two or More Races (17%), and Asian or East Asian clients (4%). High school completion was the highest level of education achieved by

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31% of clients and 40% of clients had an annual income of less than \$10,000. The average number of sessions attended by TFA clients was 11. Transcripts from interviews will be analyzed using rapid qualitative analysis. Discussion: Preliminary results highlight the sociodemographic factors and average session attendance for TFA clients. The findings of this study will help to identify strategies that could be implemented to improve client engagement.

231 9:00 am F

Needs Assessment of Mental and Emotional Support Available to Adolescent Refugees in School Settings in San Diego County

Antoinette Dunlap, Public Health (M)

Purpose: There has been a movement to advocate for social and emotional learning in schools to bolster students' mental health. However, there is limited research on how social and emotional learning is implemented for students who are refugees or asylum seekers. This study aims to investigate the social and emotional support currently available to refugee adolescents in public schools within San Diego County and assess the perspectives of youth educators on their experiences offering this support. Methods: A sequential explanatory mixed methods study is being conducted to collect data on existing social and emotional learning programs offered in middle and high schools in San Diego. Teachers or educators who work with refugee or asylee students will complete a quantitative survey about their experiences of offering social and emotional support to refugee adolescents in classrooms, and a subset will take part in semi-structured interviews designed to expand upon the survey. Results: Data collection is ongoing; 11 participants have completed the survey and 4 have completed the interview. At this time, preliminary survey results indicate that 27% of respondents identified as men, while 73% identified as women. Most participants (55%) identified as White, 18% identified as Black or African American, and 18% identified as Hispanic or Latinx. Only 18% of respondents reported working at a middle school; 81% of respondents worked with high school students. Respondents felt that mental and emotional skills were just as important (64%), if not more important (18%) than academic skills for their students to learn in the classroom. However, only 18% of respondents reported working at a school that mandated curriculum to support social and emotional learning in the classroom for refugee students. Transcripts from interviews will be analyzed using applied thematic analysis. Conclusions: These preliminary results indicate that teachers value social and emotional learning skills but may need more support or resources in their classrooms. By identifying existing programs and needs, these findings will inform future interventions to improve mental and emotional well-being among refugee adolescents in San Diego County.

Session F-2

Behavioral and Social Sciences 6

Friday, March 3, 2023, 9:00 am

Montezuma Hall

232 9:00 am G

Social Support and Barriers to Care and Community Among Sexual and Gender Minority Youth at Risk for Repeat Suicide Attempts

Shefali Sharma, Psychology (U)

Background: Sexual and gender minority (SGM) youth and young adults are at a higher risk for suicide attempts compared to their heterosexual cisgender peers. Barriers to accessing mental health care and community resources (MHC+CR) may prevent SGM youth from addressing risk factors for suicide. A lack of social support may complicate overcoming barriers to MHC+CR. Given the paucity of research, the aim of the present study is to examine whether baseline levels of social support (instrumental, emotional, and informational) significantly predict the number of different system-related, minority stress-related/interpersonal, and intrapersonal barriers among SGM youth and young adults at risk for repeat suicide attempts enrolled in a patient navigation intervention.

Methods: Data were collected from 40 SGM youth and young adults participating in a suicide prevention trial. Three types of perceived social support—instrumental, informational, and emotional—were measured using PROMIS instruments. Over a period of three months, three patient navigators recorded barriers to MHC+CR. Analyses used multivariate linear regression models ($\alpha = 0.05$).

Results: When controlling for the number of intervention sessions attended and individual age, baseline scores of instrumental, emotional, and informational support did not significantly predict the number of different system-related ($b = .066$ [$p = .400$], $b = .083$ [$p = .524$], and $b = .084$ [$p = .224$], respectively), minority stress-related/interpersonal ($b = .077$ [$p = .510$], $b = .081$ [$p = .770$], and $b = .084$ [$p = .643$], respectively), and intrapersonal barriers ($b = .051$ [$p = .200$], $b = .055$ [$p = .992$], and $b = .057$ [$p = .434$], respectively) reported during the intervention period.

Discussion: This study found no relation between levels of perceived social support and reported number of different barriers to MHC+CR among SGM youth and young adults at risk for repeat suicide attempts. It may be possible that SGM youth and young adults who experience more barriers to MHC+CR receive support from others in general life domains, yet less specific help with overcoming MHC+CR barriers when concealing their SGM identity and/or mental health difficulties. Further research may examine the relationship between social support and MHC+CR barriers considering these factors.

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233 9:00 am H**Therapist-reported adaptations to evidence-based practices in mental health treatment****Elizabeth Fenelon, Psychology (U)**

Introduction: Therapists often incorporate adaptations to evidence-based practices (EBPs), which in turn influences outcomes of treatment. Common adaptations to EBPs include (Lau et al., 2017): introducing elements of other interventions to the main intervention (i.e., augmenting/adding), customizing the EBP for the client (i.e., tailoring/individualizing), and/or slowing the intervention down to align with child functioning level (i.e., removing/skipping). It was hypothesized that if a provider struggles to implement an intervention in their practice, then they are more likely to remove parts of the intervention rather than adapt it. Method: Providers (N = 572) completed an online survey entitled "Aim 1: Web-based Leader and Provider Survey Materials." The sample reported an average of 6.59 years experience (SD = 5.92), with an average of 4.22 years as a therapist (SD = 4.32); the average caseload was 16 clients (SD = 9.50). Measures included: Evidence-Based Practice Attitude Scale (EBPAS; 15 items); Perceived Characteristics of Intervention Scale (PCIS; gathers perceptions of EBPs); and Adaptations to Evidence-Based Practices Scale (AES; 6-item scale). Results: Preliminary results indicate that therapists use several types of adaptations when incorporating EBPs into their clinical practice (e.g., augmenting, removing, tailoring). Among these, removing EBP material was most often reported (e.g., I remove/skip core components of [EBP], M = 3.5 on a scale from 1-5). Augmenting/adding to an EBP was also reported, but less frequently (Ms = 2). Surprisingly, tailoring and individualizing was infrequently reported (Ms = 1.5-2). Future analysis will examine the correlation between adaptations and provider characteristics (e.g., perceptions of EBPs, years of experience). Discussion: Despite much of the literature suggesting the importance of EBPs in effective treatment, providers often struggle to adopt and implement EBPs in their practice, highlighting the need for modifications to EBPs (Lau et al., 2017). In our sample, providers reported using several adaptations, most often removing/skipping portions of an EBP. This is surprising, given the evidence for efficacy of EBPs. Next steps in this study will explore the relationship between adaptation use and provider characteristics.

234 9:00 am I**Land Occupations in Belo Horizonte, Brazil****Isabele de Lima Vargas Simoes, Sociology (M)**

Belo Horizonte, the capital of the Brazilian state of Minas Gerais provides a unique example of Brazilian housing inequality. While it was the first planned city in modern Brazil (Caixeta 2017, Lourenço 2017), plans did not include housing for working-class people within the city limits (Caixeta 2017, Lourenço 2017). Over the decades, as the city grew larger than it was initially planned for, people found ways to settle in the city's outskirts, often occupying land they did not own (Caixeta 2017, Lourenço 2017). This practice of occupying unused land is still a reality in Belo Horizonte, and in more recent decades, facing rising

prices and a severe housing shortage, people have also begun to occupy abandoned buildings. People can start an occupation process by themselves, but often they have the support of social movements. Regardless of how they find housing, working-class people have to deal with the lack of infrastructure and fight to acquire access to water, electricity, and sewage systems. This project is based on six weeks of qualitative research in the Summer of 2022, funded by the National Science Foundation. I use interviews with ten individuals involved in land occupations to show that while the occupations took place differently, many of them have had similar experiences regarding their fight to gain access to proper infrastructure.

235 9:00 am J**En Ser Mujer: Latin American Women and Digital Media Entrepreneurship****Andrea Berreondo, Mass Communication & Media Studies (M)**

In recent years more Latin American women have entered the media entrepreneurial world as they faced less barriers when entering into the industry as compared to its traditional counterpart (Sembra Media, 2017). Part of this phenomenon is women, especially those who come from Latin American backgrounds, have found a way to go around the glass ceiling. The increasing digitization of entertainment and media has created new kinds of entrepreneurial start-ups (Compaine & Hoag, 2012). These media startups can vary between digital newsrooms, podcasts, or online networking blogs with focus topics. In a study by Sembra Media (2017) 100 digital entrepreneurial sites were surveyed across Latin America. Out of those sites surveyed, 62% of them had women involved in the startup process. When it came to looking at the founders of the sites, 38% of them were women. Current literature argues in favor for women to participate in entrepreneurship. When entrepreneurship is not participated equally by women, society loses the opportunity to grow by losing the possible products, services, new jobs, and revenue (Kelley et al., 2011). Not only can it create employment, but it serves as empowerment for women (Allahar, 2015). Researchers will examine and analyze the increase of Latin American women in the digital media entrepreneurship ventures and receive information from the experiences that this group has endured. The received information will be then analyzed to understand how the social, historical, and systemic forces that prevail within the Latin American community affect content and venture participation.

236 9:00 am K**Barriers for Hispanic Mother-Daughter Dyads in an Exercise Program****Samantha Muniz, Psychology (U)**

Exercise research within the Latino communities has shown us that there is a lack of social support for women. Conmigo, a Latina mother-daughter study aims to bridge the gap of lifestyle and exercise habits that are formed within Latina mother-daughter dyads. Due to the extreme lack of public health research in Latina communities, introductory research is

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necessary to better understand the barriers mother-daughter dyads face when attending an exercise program. I conducted mixed-methods research to determine the feasibility and viability of conducting further studies on obstacles mother and daughters face when committing to a program. We conducted guided interviews with program participants about issues affecting their attendance in the program. Then coded and qualitatively analyzed the interviews. Recurring topics of childcare included distance from home, prior engagements, and the format of the program being on zoom versus in person. Furthermore, the results from this preliminary study have helped to inform the development of a future research focus that will specifically focus on factors that influence individuals' decision-making process in committing and choosing an exercise program that suits their needs. This future research could be clinically relevant in both Latinos in the United States and with Latino immigrants in the US.

237 9:00 am L

Botched this way: An autoethnographic exploration of beauty standards, celebrity, and surgical culture on Instagram

Nichole Gray, Mass Communications (M)

this study aims to build on scholarship regarding social comparison cultivated on Instagram, as well as pursues an important conversation surrounding beauty standards, celebrity and women's mental health in the 21st century. When we discuss the presence of celebrity and idealized beauty across social media, it is important to note the way these images, and the subsequent messages we take away from them have the potential to negatively impact our mood and own self-image. My work is rooted in Social Comparison Theory (Festinger, 1954) which addresses how people make sense of their social and personal value through a lens of comparison against others. In this research, Social Comparison Theory provides a framework for the analysis of experiences with comparisons on social media, while specifically exploring the impact of celebrity and drive to participate in popular culture through the application of autoethnography. My choice to explore Instagram in relation to beauty standards is based in my frequent use of the application which spanned over the last decade.

Session F-3

Biological and Agricultural Sciences 6

Friday, March 3, 2023, 9:00 am

Montezuma Hall

238 9:00 am M

Re-introduced American bison increase legume cover in restored tallgrass prairies

Mareike Lankhorst, Biology with emphasis in Ecology (U)

Grassland ecosystems were once widespread across the central United States. Conversion to agriculture and urban

areas significantly reduced the area of grasslands to a mere fraction of what once existed, removing the historical fire regime and keystone species in the process. Ecosystem restoration projects today aim to return agricultural land to prairies. Legumes, members of the plant family Fabaceae, are crucial components in prairie ecosystems, because they increase usable nitrogen in soil through symbiosis with nitrogen-fixing bacteria. We used four years of plant monitoring data to track changes in legume abundances in restored prairies that differed in bison presence, fire schedule, and age since restoration. Bison significantly increased legume cover, while fire and age had no effects. Changes due to bison presence show the impact these large ungulates have on prairie ecosystems in supporting plant diversity. The value of these results to conservation managers and future management planning will depend on whether legume promotion by bison favored native or non-native plant species.

239 9:00 am N

Studies to Elucidate Plant-Methanotroph Interactions

Chynna Bowman, Cellular Molecular Biology (M)

Ever increasing climate change presents many challenges. One such major challenge is to understand how plants are impacted by climate change. With prolonged periods of drought, high temperatures, and heavy rainstorms, plants have been forced to adapt to more stressful and unprecedented conditions. However, we lack a deeper understanding of how plants interact with their environment and how the surrounding microbial community impacts their development and stress resilience.

To bridge this gap, a closer look at plant-microbe interactions must be taken. Microbes have been shown to be beneficial to plants in many ways. Microbes within a plant's rhizosphere can exchange metabolites with the plant's roots thus providing protection from pathogens. Here we are studying the interactions during drought stress between a native California plant, *B. depauperata* (Brassicaceae) and a methane oxidizing bacterium, *Methylocaldum* sp 0917. *B. depauperata* is a perennial mustard plant limited to high elevations within the Sierra Nevada Mountains. *Methylocaldum* sp 0917 was isolated from desert soils in the Anza Borrego Desert. Previous studies have shown that methanotrophs can reduce atmospheric methane levels by using this abundant greenhouse gas as their main carbon source. Despite this exciting finding the nature of the relationship between methanotrophs and plants has been largely unstudied.

To understand the nature of this plant-microbe relationship, *Methylocaldum* was applied to *B. depauperata*'s roots and a series of measurements of plant growth, overall plant health, photosystem activity, and plant stress were taken over a 14-day period. In addition, root samples were processed for Electron Microscopy analysis. Here we report that in the presence of *Methylocaldum*, *Boechera depauperata* had a much higher resilience to drought stress. This was demonstrated by increased growth and photosynthetic activity during drought. Further, using Electron Microscopy analysis we found evidence of close physical associations between plant roots and

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Methylocaldum. Taken together our data shows that these organisms have a symbiotic relationship leading to higher stress tolerance in the plants. We are continuing to explore this relationship with transcriptomics and metabolic analysis.

240 9:00 am O

Histological analysis and experimental crosses for accurate determination of the sexual system in *Cylindropuntia chuckwallensis*

Andrew Lee, Biology (U)

The sexual systems of flowering plants are diverse and they include hermaphroditism (individuals with flowers with both female and male organs), dioecy (populations with both males and females individuals), and gynodioecy (populations with both hermaphroditic and females individuals). In the context of evolutionary biology and ecology it is necessary to be able to accurately distinguish the sexual systems of specific species. Determining the sexual system can help us to better manage a species of conservation concern. However, as flowers can carry vestigial organs, sexual system identification based morphological observations only, has led to incorrect identification of sexual systems. For example, a previous study by our lab revealed after detailed analysis that *Cylindropuntia wolfii* a cactus initially classified as a gynodioecious plant, is actually functionally dioecious. Therefore, it is important to include detailed histological analysis and experimental crosses while determining a sexual system of a plant. A putative close relative of *C. wolfii* known as *C. chuckwallensis* is also morphologically classified as a gynodioecious plant and our results from previous study further warrants the accurate determination of sexual system in this species. Our main goal is to accurately determine the sexual system of *C. chuckwallensis* through the use of histological cross sections and experimental crosses with field observations. By using histological specimens we will be able to compare flowers of different sexes to determine whether *C. chuckwallensis* is in fact a gynodioecious species. Experimental crosses on the other hand will supplement the data on the identification of the sexual system. We have secured permits for collection of *C. chuckwallensis* from Joshua Tree National Park. Based on morphological and geographical similarities to *C. wolfii* we predict that *C. chuckwallensis* is also a dioecious species.

241 9:00 am P

Seedbank and seed emergence dynamics of bridal broom (*Genista monosperma*), a potentially invasive non-native shrub

Sam Irwin, Biology (U)

Invasive species have the potential to disrupt healthy ecosystem function by competing for resources with native species, reducing biodiversity, altering the habitat itself, and even causing the extinction of native species. In 1991, Bridal Broom (*Genista monosperma*), a shrub in the legume family, was identified as an invasive species in northern San Diego County. This species can outcompete native plants and form monocultures in Mediterranean climates, which could degrade

essential habitat for several threatened and endangered species in the area and present challenges for wildfire control programs. Because of this, in 1996 the shrubs were cut down and herbicide was applied to their trunks. Despite annual treatment, the population has not been eradicated due to the species' prolific seed production and persistent seed bank that resists drought, fire, and remains viable up to 26 years in the soil. Therefore, understanding seed emergence will help managers control new seedlings and prevent *G. monosperma* from spreading further. Previously, we documented the spatial extent of the seedbank around dead plants. Currently, we are investigating if seed depth affects seed emergence. Seeds collected from the invasion site are planted at different depths to determine emergence limits. These results will inform a potential solarization treatment that would trigger germination and facilitate eradication of the existing seedbank from the area.

242 9:00 am Q

Analysis of tourist and citizen scientist data concerning humpback whales (*Megaptera novaeangliae*) in the Bay of Banderas

Rose Pollard, Biology/Zoology (U)

Many humpback whales (*Megaptera novaeangliae*) migrate to Banderas Bay in Puerto Vallarta, Mexico during the winter for breeding and calving season. The growth of whale watching tourism, while great for the economy in Puerto Vallarta, has a relatively unknown effect on the whale population. Through the Science Exchange Program, in 2021 I interned for two months under a Ph.D. student working with a local non-profit GRIMMA (Grupo de Investigación de Mamíferos Marinos A.C.). The team is studying tourism effects and all aspects of the whale population via direct observation, citizen science observations, and tourist surveys. Direct observation was from boat transects or spotting scopes at high elevations. Twenty-nine out of 71 GRIMMA fluke photos (41%) from the 2020-2022 database had been previously photographed and reported by citizen scientists on the platform www.happywhale.com. One whale was spotted 32 years ago, and the most recent was 15 days before we saw it (mean time = 11 years, n=9). The locations of the photos varied from 724 km away from the Bay to 4,023 km (mean = 724 km, n=29). The citizen scientist data are helpful and can be used to learn about migration patterns, survivorship, and population size. The second objective of the internship was to use tourist surveys to provide feedback to whale watching tour guides and assess the effectiveness of Mexican whale watching laws. Over half of the 232 tourists interviewed perceived there were more than four boats (the legal limit) surrounding a group of whales. I felt that tourists were overall less satisfied when they felt they were disrupting or interfering with the whales. For example, over half of the tourists stated that an appropriate distance to whales was more important than the distance they wanted from the tour initially; prioritizing whale safety over personal satisfaction. Most tourists stated they wanted to learn about biology and conservation from the tour. Another Science Exchange Intern is helping collect the final year of field data and the comprehensive analysis will be published by co-author Iyari Espinoza.

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243 9:00 am R

Identification of drought-tolerant oak populations (*Quercus agrifolia*) using stomatal conductance and mortality index

Ayleen Herrera, Biology (U)

Coast live oak (*Quercus agrifolia*) is a keystone species central to many southern California ecosystems. *Q. agrifolia* provides many ecosystem services and is of great cultural importance to many local tribal groups. As such, it is critical that we understand the factors that contribute to their resilience in the face of the effects of climate change, such as extreme drought. In order to better protect and restore coast live oak populations and the ecosystems they support. This experiment looks at 8 different southern California *Q. Agrifolia* populations. In a greenhouse experiment, we subjected half of the trees to drought conditions and... (explain the setup of the experiment) and how mortality is used as indicator of drought tolerance/resilience [Mention existing mortality results and what they potentially indicate] This information can help us find more accurate data on restoring *Q. Agrifolia* and building specific strategies to successfully help the coast live oak thrive in the future.

Session F-4

Biological and Agricultural Sciences 7

Friday, March 3, 2023, 9:00 am

Montezuma Hall

244 9:00 am S

The generation of an engineered HEK293T cell line bearing mutant NEMO incapable of binding to linear polyubiquitin

Sally Luong, Chemistry and Biochemistry (D)

NF- κ B essential modulator (NEMO) is a necessary scaffold subunit of the Inhibitor of NF- κ B Kinase (IKK) complex. IKK is central to the nuclear translocation of NF- κ B, which is an inducible transcription factor that controls inflammatory gene expression. Activation of IKK catalytic activity in response to TNF- κ and other canonical inducers of NF- κ B requires formation of non-degradative linear polyubiquitin chains and their association with its NEMO subunit. Active IKK phosphorylates IKK α , an inhibitor protein of NF- κ B, and triggers its degradation, thereby allowing NF- κ B to enter the nucleus. Recent observations suggest that the IKK NEMO subunit, upon noncovalent association with linear polyubiquitin, mediates a second protein-protein interaction with the catalytic IKK2 subunit and “primes” the complex for activation. In order to investigate the direct involvement of NEMO in promoting catalytically active IKK, we have generated an engineered HEK293T cell line in which NEMO has been mutated to lose its ability to bind to linear polyubiquitin. We used the CRISPR prime editing system to mutate the HEK293T cell line. The plasmids used to introduce the mutation were constructed and transfected into HEK293T cells. After transfection, the cells were

sorted into single cells using fluorescence activated cell sorting (FACS). The single cells were expanded as cultures, and we are currently in the process of verifying the mutation using Sanger sequencing and western blot. In future endeavors, the cell line will be used to compare to the normal wild-type cell line and the same engineering approach will be used to generate different mutations to monitor NEMO-mediated signaling events.

245 9:00 am T

Engineering MS2 Maturation Protein for Structural Studies

Gabriela Contreras, Chemistry with an emphasis in biochemistry (U)

Emesvirus zinderi, commonly known as MS2, is a bacteriophage from the Leviviridae family that infects *Escherichia coli* through the attachment of its maturation protein to the F pilus on the bacterial surface. The MS2 virion capsid is composed of 178 copies of coat protein organized into dimers and a single copy of the maturation protein that introduces asymmetry into the otherwise symmetrical icosahedral capsid shell. There are currently a lack of high resolution cryo-EM structures of the MS2 maturation protein due to capsid structure variability that results from conformational changes within the genomic RNA that guides capsid assembly. One way to potentially obtain high quality structures is to enhance the asymmetry introduced by the maturation protein via targeted mutations in the sequence of the maturation protein itself in order to provide a “handle” that will allow for orientation about the axis of asymmetry. Based upon previous structural studies on MS2 and related phages, potential sites for mutation were selected in an area that would not disrupt the structure of the maturation protein and its interaction with surrounding coat proteins and prevent mutated particles from infecting *E. coli*. We first mutated an external serine residue to a cysteine in order to allow for the reaction of HPDP-biotin with the free sulfhydryl group. The resulting virus used did not pass a plaque formation test, which is used to confirm whether or not the particles are infectious. We then aimed to introduce both the PstI restriction enzyme site and the formylglycine-generating enzyme (FGE) recognition motif into the same location on the maturation protein. The introduction of the PstI site will allow for the insertion of green fluorescent protein that can be used as a reporter to confirm incorporation of the maturation protein while simultaneously enhancing the existing asymmetry. The insertion of the FGE motif will allow for enzymatic generation of the formylglycine side chain, which can then be used for bioorthogonal conjugation reactions to amplify the asymmetry of the maturation protein.

246 9:00 am U

Elucidating the protein-protein interactions of *Drosophila* UNC-45 via in vivo and in vitro chemical crosslinking

Jorge Rodriguez, Chemistry (M)

UNC-45 is a protein that has been observed to play many roles in the development and differentiation of various kinds of tissues. Across different species, missense and null

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mutations of UNC-45 have been the cause of disorganized muscle assembly and intestinal cell development, retarded eye development, and increased cancer proliferation. With a structure that does not hint at any obvious catalytic activity, the most likely mechanism for UNC-45 functions is as an essential scaffold mediating protein-protein interactions. However, the number and type of confirmed protein-protein interactions for UNC-45 does not reflect its involvement in such diverse roles during the development and differentiation of various tissue types - with the short list consisting of microtubules, HSP90, HSP70, myosin, and itself. By using formaldehyde to perform *in vivo* chemical crosslinking of *Drosophila melanogaster* pupae in an effort to capture the transient and low affinity UNC-45 protein-protein interactions we were able to identify conditions that produced chemically crosslinked protein-protein complexes of UNC-45 with minimal fixation of the whole pupae. Our experiments indicate that *in vivo* protein-protein interactions can be captured in a whole living organism as small as a *Drosophila* pupa. Chemically crosslinking protein-protein interactions in their native environment is a more direct approach to identifying physiologically relevant protein-protein interactions than yeast two-hybrid assays or *in vitro* biophysical assays. After optimizing the procedures and conditions for generating UNC-45 binding protein conjugates, we intend to proceed with immunoprecipitation and high-resolution mass spectrometry to identify the proteins that are complexed with UNC-45 *in vivo*. In a parallel attempt to elucidate the interaction sites between a previously reported protein-protein interactions involving UNC-45, *in vitro* chemical crosslinking of purified mixtures of UNC-45 have been performed. Using formaldehyde for *in vitro* chemical crosslinking, *Drosophila* UNC-45 has been determined to form 2-mer to 4-mer oligomers at concentrations as low as 12 μ M. We are in the process identifying these UNC-45 interactive faces using transmission electron microscopy.

247 9:00 am V

Investigating the purification and kinetic characteristics of WT and Mutant DNA Polymerase ϵ

Ashfeen Nawar, Chemistry and Biochemistry (M)

In eukaryotic replication, DNA polymerase epsilon (Pol ϵ) is in charge of leading strand synthesis. The catalytic polymerase domain is responsible for correct nucleotide incorporation whereas the exonuclease domain excises misincorporated nucleotides. Importantly, mutations in Pol ϵ have been implicated in a variety of cancers, including uterine, colorectal, skin, and stomach. These tumor-driving mutants have not yet been well characterized. Here, by using a truncated active form of the enzyme, we first optimize the purification of WT Pol ϵ . To improve protein activity and yields, we tested different buffers and chromatography methods such as affinity chromatography using cobalt column and size exclusion chromatography to obtain protein of high purity and activity. We analyzed the effect

of various incubation time post induction on the concentration of active enzyme production, as well as the effect of different iron-sulfur cluster concentrations on the activity of the polymerase. This allowed us to identify the most robust strategy for the heterologous expression and purification of active Pol ϵ . Finally, we investigated the rates of correct incorporation of a single nucleotide in a double-stranded DNA substrate by WT Pol ϵ by performing burst assay experiments using a rapid chemical quench. We observed an initial burst of product formation associated with single enzyme turnover followed by a slower linear phase corresponding to multiple enzyme turnovers in the steady-state, typical of DNA polymerases. This will allow us to obtain values of K_d of single correct nucleotide incorporation by Pol ϵ WT *exo-* as well as single correct and incorrect nucleotide excision by WT *exo+* form of the enzyme. Ultimately, this will help us understand the factors that drive genomic instability in human cancer.

248 9:00 am W

Labeling of Membrane Protein RAF Kinase for Single Molecule Studies

Amy Ballesteros, Biochemistry (U)

Biological signaling is responsible for almost all cellular events that occur within an organism and its regulation is driven by signaling pathways. The MAPK/ERK signaling pathway has been extensively studied due to its medical relevance in cancer and its participation in crucial biological processes such as cell growth and apoptosis. A key regulatory step for this pathway is a cell membrane complex consisting of the proteins RAS GTPase and RAF kinase. RAS activates RAF by recruiting it onto the cellular membrane through specific binding events. Our lab seeks to explore the detailed molecular mechanism of RAF and the specific roles of regulatory domains during RAF activation using efficient fluorophores. Single-molecule experiments will allow us to determine different states during RAF recruitment. Visualization of proteins in fluorescent microscopy has been traditionally tagged with fluorescent proteins such as mNeonGreen, mNG. The use of fluorescent proteins as fluorophores can artificially interrupt the natural activity of proteins. For our fluorescent microscopic experiments, mNG's large size may sterically hinder RAF and interrupt the binding to the membrane. The properties of mNG are not suitable to quantify the kinetic parameters of RAF due to its fast bleaching and size. In contrast to using mNG, we will use sortase labeling chemistry to introduce bright, organic dyes to a protein of interest. Sortase's transpeptidase activity will be employed to covalently label RAF with a small organic dye, Alexa647. We will design, clone, and purify a RAF-dye protein construct and validate with single-molecule experiments in physiologically relevant conditions. Supported lipid bilayers, SLBs, are lipid bilayer platforms that mimic membrane environments that will be constructed to measure the binding of regulatory domains of RAF. There has been an emphasis on discovering molecular mechanisms of the MAPK/ERK pathway

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to pave the way for new pharmaceutical discoveries. The successful construction of RAF-Alexa647 will allow us to get one step closer to the discovery of possible therapeutics for MAPK/ERK-related diseases.

249 9:00 am X

Kinetic and Structural Characterization of Human Isocitrate Dehydrogenase 1

Elene Albekioni, Chemistry and Biochemistry (D)

Isocitrate dehydrogenase 1 (IDH1) is a cytosolic enzyme that helps maintain the redox environment and metabolite pools in cells. At physiological pH, IDH1 forms catalytically competent homodimers that convert isocitrate (ICT) to α -ketoglutarate (AKG) in an NADP⁺-dependent oxidative decarboxylation. Mutations in IDH1 typically lead to the neomorphic reduction of AKG to D-2-hydroxyglutarate (D2HG) and are associated with multiple tumor types. Mutations usually affect the residue R132, which takes part in coordinating the ICT. However, it is still unclear specifically what kind of conformational changes drive the normal and neomorphic catalytic processes. Here, we use hydrogen/deuterium-exchange mass spectrometry (HDX-MS) to analyze structural dynamics in IDH1 by allowing active exchange between backbone amide hydrogen atoms and surrounding D₂O. Comparing the fluctuations in deuterium uptake by holo and apo WT IDH1 reports on the local environments of residues involved in intermolecular hydrogen bonding and substrate coordination. We hypothesized that local changes in ICT and metal coordination, and global changes from inactive to active conformation will depend on which substrate, and perhaps which order the substrate is added. We show the most drastic changes in deuterium uptake were observed around the regulatory domain. The highest uptake difference when compared to apo was observed when all substrates were bound. Metal binding revealed large domain portions of the enzyme becoming more solvent exposed when Ca²⁺ binds, while the regulatory domain experienced a decrease in deuterium uptake. These changes supported the prediction that ICT binding drives some structural changes that were different from the closed conformation, and only upon metal and substrate binding was the fully catalytically competent structure achieved. We then extended our interest in observing the mechanism of forward and neomorphic reactions and relative activity. Here, we used spectroscopic tools to measure kinetic properties of IDH1 by monitoring the rate of NADPH formation and consumption. We compared catalytic efficiency of WT, R132H and R132Q IDH1, and WT/mutant heterodimers, and showed that heterodimerization induced accumulation of more NADPH compared to the homodimers. Understanding how kinetic rates compare in the IDH1 homodimers and heterodimers and the role in structural dynamics in catalysis as monitored using HDX-MS allow us to understand the molecular mechanisms of IDH1 catalysis.

250 9:00 am Y

Crystallization and Structural Determination of the SARS-CoV-2 Mpro Proenzyme Form

Jackson Salvestrini, Biochemistry (U)

The novel coronavirus known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is responsible for the coronavirus 2019 (COVID-19) epidemic that continues to persist. The viral main protease (Mpro) enzyme plays an important role in mediating replication and transcription of SARS-CoV-2, and as such, is an important drug target that has been studied extensively. The main protease becomes catalytically active when autoprocessing sites at its own N- and C-termini are cleaved, so inhibition of autoprocessing would prevent catalytic activity. In order to gain further insight into the mechanism of autoprocessing by Mpro and possibly suggest novel inhibitory mechanisms, a Glutamine (Q) to Lysine (K) mutation was introduced at amino acid position 306. This prevents autoprocessing, keeping the main protease in its proenzyme form. We then determined the high-resolution structure of the SARS-CoV-2 Mpro proenzyme by x-ray crystallography.

X-Ray crystallography was the method used to obtain the structure of the SARS-CoV-2 Mpro, which involves multiple steps. Single crystals were grown using the hanging drop vapor diffusion method, over an optimized reservoir solution containing Tacsimate at pH 6.0. Single crystals were cryo-cooled and shipped to the Stanford Synchrotron Radiation Lightsource, where x-ray diffraction data were collected. The diffraction images were processed in XDS. The phase problem was solved via molecular replacement in Phaser, and model building and refinement were performed using WinCoot and Phenix.

The structure of the SARS-CoV-2 Mpro proenzyme form was refined against data at 1.29 Å resolution. Electron density at the N-terminus of the protein confirmed that it was still in the proenzyme form. The crystallographic model of the proenzyme can now be compared against the active form, and it can be further used in studies such as inhibition assays to identify potential drugs that could effectively reduce the symptoms of COVID-19.

Session F-5

Engineering and Computer Science 3

Friday, March 3, 2023, 9:00 am

Montezuma Hall

251 9:00 am Z

Role of Aortic Tissue Stiffness in LV-LVAD Mechanics

Zachary Conte, Mechanical Engineering with Emphasis in Bioengineering (U)

Stiffening of blood vessels is an early indicator of cardiovascular disease and is accelerated in patients under Left Ventricular Assist Device (LVAD) support. The normal aorta serves as an elastic mechanical element that absorbs energy during the

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native heart contraction and uses the recoil to maintain blood pressure when the heart is filling. LVADs are rotary pumps attached to the heart that increase blood flow to tissues but dilute the pulsatility of blood pressure and flow resulting in areas of stasis with a propensity for blood clots and stroke. In this project, the feedback between reduced pulsatility and tissue compliance is evaluated using benchtop experiments and mechanical modeling.

Two length/diameter tubular models of the human aorta with varying thicknesses (1.8mm and 3.175mm) were fabricated from SortaClear-40 silicone to resemble the range of native tissue stiffness (400kPa and 800 kPa). A pressure-volume apparatus was assembled to obtain the stress-strain relationship for each construct by applying a range of pressures and measuring the resulting construct expansion, allowing for quantification of each model's elasticity. These models were placed in the ascending aorta position of a benchtop simulator of the cardiovascular system and pressure and flow were measured for a range of cardiac and LVAD conditions.

The results showed that when the LVAD speed was 10krpm, approximately 80% of the flow exits the heart through the LVAD, and 20% through the aortic valve. At this speed, the thick and thin constructs exhibited values for aortic pressure of 98.9mmHg and 96.2mmHg and values for systemic flow of 4.22L/min and 4.30L/min. The energy absorbed in the system was characterized by integrating the dynamic pressure-flow responses. The change in total energy per cycle with respect to each LVAD speed was 65mmHg·L/krev and 137mmHg·L/krev for the thick and thin construct, respectively.

These results show that as stiffness increases, the total energy absorbed in the system decreases. This suggests that when LVADs are implanted, the energy absorbed in the aorta is reduced. If the tissue stiffness increases in response, it is accompanied by a decrease in the energy absorbed suggesting a feedback loop designed to reestablish arterial compliance.

252 9:00 am AA

Helical flow in the aortic arch during mechanical circulatory support

Britton Mennie, Biomechanical Engineering (U)

Left ventricular assist devices (LVADs) are implantable pumps that are placed in patients with advanced heart failure who are unable to receive a heart transplant. Previous studies have demonstrated that the flow architecture in the aortic arch of the LVAD-supported heart is affected by the angle, position, and diameter of the outflow graft. The LVAD outflow graft connects to the aorta a few centimeters away from the valve, disturbing the normally streamlined flow into the systemic circulation. Reduced outflow graft diameter (OGD) has been implicated as the source of increased thrombus formation and stroke rates, secondary to disturbed flow patterns in the aorta. To inform this theory, mock loop studies were performed to measure the pattern and distribution of flow in a transparent model of the aortic arch connected to a HeartMate3 LVAD for three different OGD. Particle image velocimetry (PIV) recorded

two-dimensional velocity fields during the LVAD artificial pulse cycle. The velocity field data were analyzed in Matlab to calculate the helicity index. At the highest LVAD speed, the 10mm OGD had an average helicity index of -0.47, the 12mm was -0.22 and the 14mm OGD was -0.15. Negative values reflect counterclockwise helices with distance along the aorta, which are greatest at the smallest OGD. Helical flow in the aorta is believed to facilitate heat exchange and mixing, and may contribute to improved ventricular ejection, better oxygen transfer, and reduced atherosclerosis. Based on these findings, the smaller OGD results in a higher average helicity index but the direction of the helical pattern is opposite to that found in the normal aorta. Further investigation of the helicity during LVAD support using a three-dimensional system is planned.

253 9:00 am BB

3D-printing anatomically correct human skull surrogates

Ramiro Mantecon, Mechanical Engineering (D)

Head trauma, ranging from a skull fracture to mild traumatic brain injury, is associated with occupational and sports activities, resulting in a growing societal concern that stems from degrading the quality of life of patients and their communities. From an engineering standpoint, mechanical testing is imperative to assess the root causes of injuries, irrespective of the severity, using surrogates, given the ethical constraints surrounding in vivo experimentation. While linear and rotational accelerations have been previously associated with different levels of traumatic brain injuries, the exact thresholds are defined empirically without anthropometric relevancy. Therefore, the overarching objective of this research is forging a pathway for the repetitive fabrication of head surrogates that can be readily realized using additive manufacturing technologies (i.e., 3D printing). The approach hinged on fabricating surrogate skulls based on anatomical imaging that captures the complex geometry of adult subjects using the fused filament fabrication (FFF) printing method. To accomplish the stated objective, a twofold challenge arose. First is the selection of a printable polymer mimicking the mechanical properties of natural bone, where polylactic acid (PLA) was selected based on results of prior research on its analogy to bones. Second is the printing strategy, i.e., printing a complete skull or symmetric halves, which has implications not only for the fabrication process but also for the structural stiffness. Printed skulls were submitted to mechanical loading at a quasi-static strain rate to assess the structural and mechanical performance. Results show that PLA surrogates are appropriate for reproducing the behavior of the human skull. However, future research should emphasize the process-structure-property performance of these additively manufactured surrogate skulls under dynamic loading scenarios congruent with impacts during action sports.

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254 9:00 am CC

Preliminary Virtual Experiments on the Mechanical Performance of 3D Printed Lattice Structures

Brandon Huffman, MS Mechanical Engineering (M)

Cellular solids are ubiquitous in many engineering applications, ranging from automotive to aerospace and sport protective gears, offering superior impact mitigation in various dynamic loading conditions. Some desirable mechanical attributes of cellular solids include enhanced energy absorption, strength, and stiffness at low weight penalty to the overall structure. The latter is essential in dynamic loading conditions to minimize the inertial effects of catastrophic material and structural failures. While stochastic cellular solids (i.e., foams) have been vigorously investigated, their ordered counterparts only recently grabbed scientific and technological attention since additive manufacturing technologies readily enabled the realization of such intricate and complex structures. This research aims to assess the mechanical performance of ordered cellular solids, also known as lattice structures, fabricated from a wide range of polymers and various geometrical configurations. The approach hinges on constructing finite element simulations capable of capturing the mechanical behavior of the base polymers using nonlinear mechanical models. Several lattice structures are generated based on triply periodic minimal surfaces and translated into the finite element solver, where quasi-static and dynamic mechanical loading are strategically applied to extract the global stress-strain behavior and concurrently probe the local deformation mechanisms. The global stress-strain responses are then used to assess the efficacy of these tailored structures as a function of the loading scenario, e.g., loading rate, by calculating the specific energy absorption and efficiency. The probed deformation mechanisms are cataloged and associated with key performance metrics commonly used for selecting microcellular geometries in real-life engineering applications. The major outcome of this preliminary virtual experimentation is identifying the most promising microcellular topology for 3D printing and physical characterization. The results of this research will be used to develop optimal protective gear to eliminate or substantially mitigate traumatic brain injuries in action sports such as football.

255 9:00 AM DD

The effect of increasing heart rate on intermittent aortic valve opening during LVAD Support

Chaztyn Pangelina, Mechanical Engineering (M)

Heart failure (HF) accounts for 13.4% of American deaths (CDC, 2018), and due to the limited supply of donor hearts, left ventricular assist devices (LVADs) have become the standard of care either as a bridge-to-transplant or for long-term care (London Health Sciences Centre, 2013). The main complications of LVADs include a high risk of thromboembolic events, resulting in stroke, and aortic valve incompetence.

Intermittent aortic valve opening during LVAD therapy has been shown to improve patient outcomes by improving flow washing of the aortic root which lowers the risk of platelet aggregation by up to 250%, and decreases thrombogenicity by reducing

platelet exposure to mechanical stresses and stagnation (Mahr et al., 2017). Clinically, LVAD speed determination is centered around achieving a mean arterial pressure of ~65mmHg, which allows for aortic valve opening when left ventricular pressure is greater than aortic pressure. However, if the heart rate changes after the set speed is configured, it may alter the frequency of aortic valve opening and increase the risk of stroke.

To evaluate the impact of heart rate on flow dynamics during LVAD support, benchtop studies were performed to replicate the hemodynamic and flow characteristics. A Vivitro cardiac simulator was modified in house to integrate a HeartMate II continuous flow LVAD into the ventricular pumping chamber and adapt the systemic resistance representative of this population. Aortic pressure, left

ventricular pressure, total systemic flow and LVAD flow were measured for heart rates of 60, 90 and 120 beats per minute for a native cardiac output of 2.5 L/min. Ramp studies were conducted by starting LVAD support at 6krpm and increasing by 1 krpm until a maximum of 12 krpm is reached. The LVAD speed at which the aortic valve opened was specified by repeating measurements every 200 rpm for +/- 200 rpm from the original speed measured at which the aortic valve opened. As heart rate was increased, the aortic valve opened at lower LVAD speeds: 8800 rpm at 120 bpm, 9000 rpm at 90 bpm, and 9200 rpm at 60 bpm. The total flow rate at which aortic valve opening occurred decreased with increasing heart rate from 3.56 L/min at 60 bpm to 3 L/min at 120 bpm.

Heart rate had a notable effect on aortic valve biomechanics, lowering the threshold for improved valve opening. These results suggest that heart rate management is a potential strategy for enabling aortic valve opening at lower LVADs, lowering the risk for thromboembolic complications and stroke.

Session F-6

Engineering and Computer Science 4

Friday, March 3, 2023, 9:00 am

Montezuma Hall

256 9:00 am EE

Mechanical performance of self-healing biopolymer-amended soil

Jhansi Gadhiraaju, Construction Engineering (M)

The concept of healing and self-healing in construction materials is a novel and important topic for understanding their behavior under different environments, where they exhibit a recovery property without or with the limited involvement of any external agencies. In this study, biopolymer Xanthan Gum was used to promote soil self-healing properties. The goal of this study is to understand and present the overview of the self-healing mechanism of the biopolymer amended soil and its potential within green geotechnical and construction engineering. This study presents the results from the preliminary experiments inspecting the potential for self-healing through one-dimensional consolidation tests on biopolymer-amended

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soils using an oedometer where the sample specimens were tested under different loading and unloading conditions at different temperatures. The experiment demonstrates the potential for the Xanthan Gum in soils to persist and heal damage by itself. Furthermore, this study shows a significant increase in the compressibility index and self-healing properties of soils with the presence of biopolymers than the plain soils. The environmentally friendly characteristics of the biopolymer and the promising results of this study make biopolymer a good option for rapid temporary construction or long-standing construction sustainable in nature.

257 9:00 am FF

FEMA vs ASCE Response Modification Factor Methods

Sergio Calles, Civil Engineering - Structural (M)

Designing concrete buildings in California requires deep understanding of earthquake induced lateral loads. These loads are caused by ground motions and the structural mass. The lateral forces can be supported by different types of resistive systems. In this case study, they are reinforced concrete shear walls.

This research focuses on the behavior in lateral displacements during a seismic event. More specifically, this research compares two methods of measuring the ductility and its direct relationship with the response modification factor. The response modification factor is a crucial parameter used for finding the lateral seismic load. The value of this factor is entirely connected to the type of resistive system it adopts.

Brief description is given on shear wall, and both ASCE/SEI 41-17 and FEMA methods of finding the R Factor (ductility).

The ductility value (R factor) is a very important parameter in earthquake and structural engineering as it has become the fine line whether a structure is still standing or completely in shambles after a catastrophic natural disaster caused by earthquakes. As a result, it has become a significant part of an engineer's work to include and fully understand the ductility necessary to use in design for the creation of buildings, bridges, dam, etc.

258 9:00 am GG

Graphical Neural Network based task scheduling in Robots

Nishee Agrawal, Computational Science with emphasis in Data Science (M)

Task scheduling is a key challenge encountered in many distributed computing applications that involve multiple computing nodes. With the growing popularity of Artificial Intelligence, robots have been widely used in many commercial and military applications such as environmental monitoring, search and rescue, warehousing and logistics, etc. In this project, we aim to develop an efficient task scheduling algorithm for multi-robot systems with each robot being a computing node. Although task scheduling has been extensively studied, existing approaches mostly consider

systems with static computing nodes and are not scalable to the number of tasks. Nevertheless, robots can move, which may cause frequent topology changes, packet losses, and time-varying communication delays. To address these unique characteristics of the multi-robot system into consideration we propose an online and adaptive Graph Convolutional Network based task scheduler, which generates task schedules dynamically according to the state of the network. It can be trained using any existing scheduling algorithm as a teacher and produce results that are similar but faster than the teacher.

259 9:00 am HH

Pedestrian and Bicycle Involved Accidents Analysis and Reviewing Safe Routes to School Program Effectiveness in Chula Vista, CA

Bitu Etaati, Big Data Analytics (BDA) (M)

Walking or cycling as a means of transportation (also known as active transportation) has been highly associated with providing considerable physical and mental health benefits for individuals. According to the US Centers for Disease Control and Prevention (CDC), children aged 6 to 17 need 60 minutes of physical activity daily.

Safe Routes to School (SRTS) is a federally funded program that promotes walking and cycling to school through the 6 E's (Engagement, Education, Encouragement, Engineering, Evaluation, and Equity). This program believes that by simply replacing carpools and bus trips to school with active transportation, school-aged children can meet their daily recommended dose of exercise.

In addition to the health benefits this program can bring, the affordability of active transportation makes it a great way to transport in less socioeconomically advantaged neighborhoods. However, the active school traveling trend is drastically decreasing, impacted by different factors, including traffic safety.

Traffic accidents are the fourth most common cause of death in the US. Hence, identifying walking and cycling routes for students can be a crucial mechanism for enhancing active school travels.

The city of Chula Vista, being the second most populated city in San Diego County and home to almost 270,000 people, 25% of whom are children under eighteen, has been an active participant in SRTS project since 2007. Focusing on the city of Chula Vista, this paper will evaluate the effectiveness of the SRTS program in terms of travel behavior changes as reflected in surveys conducted by the program. After discussing the statistical analysis results on pre and post-program behavioral changes in participant schools in SRTS, this paper proposes a statistical model to identify significant variables impacting accidents near these schools. This study hopes to uncover some of the factors contributing to pedestrian and bicycle-involved accidents and provides insight to minimize them in the future.

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260 9:00 am II

Integrating equity in prioritizing bicycle safety improvement projects with a focus on using Surrogate Safety Measures (SSMs) and crowdsourced data

Amir Reza Sadeghi, Civil Engineering (Transportation Engineering) (M)

Over the past decade, non-motorized modes of transportation, such as cycling and walking, have grown in popularity because they are economical, environmentally friendly, and energy-efficient. With the expansion of active transportation, statistics show a significant increase in the number of fatalities. Between 2010 and 2019, there was a 36 percent increase in bicycle deaths in the United States. Moreover, despite the 41 percent drop in traffic volume in response to spring lockdowns caused by the Covid-19 pandemic, 697 bicyclists lost their lives in crashes in 2020, and California, with 118 fatalities, was the deadliest state for bicyclists. In this study, we proposed to develop a crash-risk scoring method for prioritizing Bicycle safety improvement projects in the county of San Diego. The prioritization methodology will have broad applicability and can be adopted for similar projects. Our study examines 50 highway bridges, 30 of which are provided by Caltrans, and the remaining are chosen based on stratified sampling to ensure that our sample is representative of the county as a whole. The majority of the studies on pedestrian and bicycle safety suffered from the limitation of the exposure data as they relied on traditional data collection methods. This project combines traditional data with crowdsourced and image-based data to develop a robust model for identifying high-risk locations. Our crowdsourced data is primarily derived from Streetlight data. For the modeling domain, this study develops street-level metrics utilizing GSV imagery of the natural and built environments. The majority of crash prediction models rely on historical crash data, which has some limitations. Crash data for roadways is rare, and vulnerable road users are underreported heavily as well. As an alternative, our study relies on surrogate safety measures (SSMs). Since SSMs can be used to identify unsafe events proactively, it is of interest to develop models to predict crash risk. Moreover, previous studies show a disproportionate bicycle crash distribution among people with different socio-demographic characteristics. In this research study, we investigated transportation equity factors to include in the proposed risk-scoring method to account for social justice across all communities.

261 9:00 am JJ

Proactive safety evaluation with Post Encroachment Time (PET) at a signalized intersection using the computer vision approach

Sina Salehipour, Civil Engineering (Transportation Engineering) (M)

Some of the challenges facing the organization of transportation safety in smart cities include investigating the impacts of new disruptive technologies, assessing the effectiveness of safety

protocols, and identifying locations with an increased risk of accidents. The traditional transportation management center (TMC) is limited in its ability to utilize large amounts of data to properly evaluate transportation safety. However, recent advances in communication technologies and big data analytics have made it possible to deal with these challenges in a more computationally efficient way. The goal of this project is to develop an intelligent transportation management center (ITMC) that adopts automated video data analysis in real-time to evaluate and improve safety. The proposed ITMC demonstrates how intelligent transportation systems (ITS) technologies and big data analytics can be utilized to proactively assess transportation safety at signalized intersections. Unlike traditional methods, which can take a long time and may not produce enough data, the ITMC can provide more accurate and timely results. This is due to its ability to rapidly collect and analyze data, as well as its ability to take into account changes that may occur over time. In traditional methods, the potential impacts of design changes, demand fluctuations, and so on can affect the safety evaluations. As a result, the conventional strategy is seen as a reactive one since it takes a substantial number of crashes before something is done. Utilizing safety surrogate measures (SSM), which are regarded as a proactive road safety diagnosis strategy, is a successful way to deal with this problem. The study will proactively evaluate safety at the chosen signalized intersection in real-time, using the results of machine vision models and SSM, such as Post Encroachment Time (PET). The deep learning model employed in this study - YOLOX - has been used to identify and recognize road users in video frames recorded with four traffic cameras positioned at an intersection in the city of Chula Vista in San Diego to evaluate the functionality and safety of that. This research has been focused on the temporal analysis of near-crash events.

Session F-7

Physical and Mathematical Sciences 3

Friday, March 3, 2023, 9:00 am

Montezuma Hall

262 9:00 am KK

Marine Debris from River Margins: A Field Study Analysis of Fragmentation and Degradation of Discarded Plastic

Ella Knight, M.S. Civil Engineering [Environmental Engineering] (M)

Discarded plastic in rivers can negatively impact marine wildlife by disrupting physiological processes and ecological habitats. To reduce the amount of debris in the oceans, we need to understand where it comes from and how it breaks down. It is widely acknowledged that the fragmentation of larger debris in inland watersheds plays a significant role in the creation of marine microplastics (MPs), but the mechanisms that drive the fragmentation and degradation of marine debris on land and during its transport to the oceans remain poorly understood.

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Current studies lack in-field analysis and have only studied plastic degradation in lab-controlled environments using uniform materials such as plastic pellets. This study specifically focuses on marine debris found in river margins from illegal dumping and homeless encampments. We set up outdoor enclosures to evaluate how common items discarded in these areas (i.e. tents, blankets, water bottles, etc.) break down in wet and dry conditions over 9-12 months. The study includes weekly observations, biweekly water testing, and quarterly lab analysis. Water analysis includes using a portable meter to measure temperature, conductivity, pH, total suspended solids (TSS), and salinity, and lab testing is performed to measure fluorescence, total organic carbon (TOC) and total dissolved nitrogen (TDN). During quarterly lab analysis, sample weights and thicknesses will be recorded. After 9-12 months, all of the samples will undergo destructive mechanical analysis and comparisons will be made with unweathered samples. The data collected will help determine the rates of fragmentation and degradation for different polymers and other materials. The results will inform how to prevent debris from entering oceans by understanding how the items change as they degrade, such as their size and whether they sink or float. The study will also provide insight into the effects of plastic degradation on water quality.

263 9:00 am LL

Water Quality and Quantity in the Redding Watershed after the Carr Fire

Evan Kolb, Civil Engineering- Environmental Engineering (M)

Wildfires can negatively impact urban populations and infrastructure such as water supply systems. The 2018 Carr Fire ravaged over 229,000 acres in Shasta and Trinity counties in northern California, near the City of Redding, significantly affecting the Sacramento River Watershed. The overarching goal of this work is to investigate the effects of the Carr Fire on the water quality and quantity of watersheds surrounding the burned area. We will focus on the municipal watershed of Redding within the Sacramento River Watershed to understand the drivers of streamflow response and water quality. We will utilize streamflow, water quality, precipitation, and remote sensing products coupled with geospatial information such as watershed characteristics, fire damage to building structures, soil burn severity, and landcover from sources including the United States Geological Survey, the National Oceanic and Atmospheric Administration, and the National Aeronautics and Space Administration. These data will be used in a five-year time series and spatial analysis to analyze changes in pH, turbidity, dissolved oxygen, conductivity, nutrient levels, heavy metals, and organic compounds after fire. Ultimately, this work will provide resource managers with information to guide post-fire mitigation and management efforts. Results may be used towards the development or enhancement of early warning systems in watersheds affected by wildfire.

264 9:00 am MM

Evaluating the Ecological Health of Alvarado Creek Tierney Kim, Civil Engineering with an Environmental Engineering concentration (M)

The San Diego River is home to different types of aquatic benthic macroinvertebrates, which are an important component of the river biota and indicators of river health. Benthic macroinvertebrates can be affected by physical, chemical, and biological changes within a waterway. Water contamination from urban sewage, acid rainfall, and surface runoff from pollutants in developed areas can also stress river aquatic ecology. This research will focus on quantifying the alterations of streamflow and water quality and impacts on the benthic macroinvertebrates in Alvarado Creek, an urban stream and tributary of the San Diego River in southern California. Bioassessment data are available at several time points since 2016 and under various vegetation conditions, which will be compared to precipitation and stream channel characteristics and conditions (water depth, stream temperature, grain size distribution, and channel geometry, etc.). We will also use the California Stream Condition Index (CSCI) to provide quantitative scores of overall stream health using benthic macroinvertebrates. We hypothesize that the underlying assumptions of the CSCI will not be valid under the brackish conditions that are present in Alvarado Creek. Developing a method to assess ecological health in areas with saltwater intrusion, such as Alvarado Creek is important, especially as disturbances may become more frequent and require evaluation.

265 9:00 am NN

Impacts of vegetation and invasive plant species on fire behavior and burn severity patterns in Otay Valley Regional Park

Anahi Mendez Lozano, Environmental Engineering (U)

Riparian zones occur along the edges of water bodies such as rivers, springs, lakes, and marshes. Native riparian vegetation provides critical benefits to riparian zones such as stabilizing streambanks, controlling erosion, providing habitat for wildlife, and regulating water temperature and are generally better adapted to fire due to higher content of moisture. However, anthropogenic disturbances such as water management, urbanization, and the introduction of invasive and non-native plants threaten native riparian vegetation communities. Otay Valley Regional Park (OVRP), one of the largest open spaces within southern San Diego County, experienced 18 brush fires (1.5 acres of damage) ignited by people experiencing homelessness in September 2019. These fires occurred near the Otay River, which has both native and non-native vegetation. The overarching objective of this study is to understand the impact native and non-native invasive vegetation has on fire and burn severity patterns in OVRP. Vegetation types are defined by the dominant plant species in the area or by the growing patterns of the plants (freshwater marsh, riparian scrub, etc.). Satellite image metrics, normalized difference vegetation index (NDVI) and difference normalized

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burn severity (dNBR) will be approximated for each mapped vegetation type in OVRP. The results of this presentation will inform future field work in OVRP to confirm the impact of specific native and non-native riparian plant species that are at risk to fire or challenges for management.

266 9:00 am OO

Utilizing remote sensing products to assess vegetation conditions after disturbance

Kathryn Tippett, Mechanical Engineering (U)

The frequency and the intensity of wildfire throughout the Sierra Nevada in California is increasing. Wildfire disturbances dramatically change vegetation conditions and overstory canopy, which impacts water quality and availability, soil erosion processes, and snowpack. To mitigate these long term risks, agencies require methods to better assess pre- and post-fire conditions to guide management techniques such as forest fuel management and revegetation strategies and their impacts on water resources. Vegetation biomass indices, evapotranspiration rates, and local runoff data can be used to quantify changes in ecohydrological and hydrogeomorphic processes at relatively high spatial and temporal scales. This work utilizes Moderate Resolution Imaging Spectroradiometer (MODIS) MOD13Q1 Normalized Difference Vegetation Index (NDVI) and Enhanced Vegetation Index (EVI), MYD10A1 Snow Cover Area, MCD15A3H Leaf Area Index (LAI), and Ecosystem Spaceborne Thermal Radiometer Experiment on Space Station (ECOSTRESS) Evapotranspiration (ET), Potential Evapotranspiration (PET), and Evaporative Stress Index (ESI), to investigate variability in vegetation conditions before and after disturbance. Two cases will be presented: 1) Sagehen, a snowy experimental watershed that has undergone forest fuel management and 2) French Gulch-Clear Creek, a watershed that was 85% burned by the 2018 Carr Fire. Previous knowledge of post-wildfire hydrology and geomorphic processes will be integrated with remote sensing products to quantify changes in vegetation conditions and snowpack levels. Preliminary satellite-based vegetation time series demonstrate that post-fire vegetation conditions do not return to pre-fire levels, where NDVI, EVI, and LAI at French Gulch-Clear Creek decreased, while SCA was more variable. We will explore the relation between vegetation and snow patterns with respect to other conditions such as soil burn severity and water availability. This work will continue to investigate wildfire impact on vegetation-related satellite-based products and implications for both short and long term watershed processes for resource managers.

267 9:00 am PP

Spatial Distribution of Dissolved Ion Concentrations of the Angelo Coast Range Reserve Watershed

Callie Summerlin, Environmental Sciences (U)

Currently there are an abundance of research projects stemming from the Angelo Coast Range Reserve in Northern California. Topics range from covering tree water stress to connections between river water temperature and its impacts

on ecological health. There was a knowledge gap that needed to be filled concerning the basic chemistry of bodies of water present throughout the protected area. In this study we aimed to identify the spatial distribution of major ion concentrations for surface water and groundwater in the Eel River Watershed of the range. This can be used to provide insight into the evolution of water chemistry as well as its flow path within the watershed and identify possible points of contamination. Ion concentrations and water quality indicators were tested at ten different surface water sites across the watershed as well as at four different groundwater sites. While the results of the study were not statistically significant, different ion concentrations were observed in the groundwater compared to the surface water with key differences seen in silica, hardness, and alkalinity. This is most likely due to outside water sources contributing to surface water and mineral precipitation in the saturated zone for groundwater. Differences in surface water throughout the river were also observed potentially due to discharge from other aquifers or flow from upstream outside of the reserve, as well as influence of mineral precipitation in the saturated zone. To monitor fluctuations in ion concentrations between the dry and wet seasons, more watershed analysis of water quality should be conducted in the future.

Session F-8

Physical and Mathematical Sciences 4

Friday, March 3, 2023, 9:00 am

Montezuma Hall

268 9:00 am QQ

Real-time, portable fluorescence sensors track sewage inputs in urban rivers

Glorya Escobar, Civil Engineering with a concentration in Environmental Engineering (M)

Rapid detection of sewage spills from aging wastewater infrastructure and other sources is critical for minimizing the risk of introducing pathogens in urban waterways. Fluorescence spectroscopy has been successfully used to monitor anthropogenic, microbial sources of dissolved organic matter (DOM); however, little research has been conducted to assess the capabilities of portable, real-time fluorescence sensors to locate sewage inputs. DOM compounds, including aromatic amino acids (e.g. tryptophan) and chromophoric dissolved organic matter (CDOM), emit radiation in the ultraviolet spectrum when they are excited by wavelengths of about 280 nm and 120-325 nm, respectively. The fluorescence profiles of these compounds are well-documented, facilitating their identification. Previous storm water studies have demonstrated that sewage contains bacteria and other compounds that have tryptophan-like fluorescence, and that a strong correlation exists between tryptophan-like fluorescence intensity and the total aerobic bacteria counts and total coliforms during storm events. This study evaluates the capabilities of Cyclops-7F™ Submersible Sensors for tracking bacterial pollution in the San Diego River by comparing tryptophan and CDOM sensor

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readings in the field with samples collected at the same sites in Alvarado Creek and analyzed for bacteria and other chemical indicators of sewage contamination. This study is important for understanding the extent to which commercially available portable fluorimeters can be used to pinpoint sewage leaks by tracking water quality in real time.

269 9:00 am RR

Spatial distribution of water temperature and dissolved oxygen in the Eel River Watershed

Joleena De La Fe, Environmental Science (U)

The purpose of this research is to investigate the temperature and dissolved oxygen (DO%) differences among varying locations and depths within the Angelo Coast Range Reserve. Data was collected from river hiking, kayaking, and swimming in Fox Creek, Elder Creek, and the Wilderness Lodge Pool within the Eel watershed. This research aids data that is relevant to the survival of juvenile salmon in the drier season and how climate change could possibly impact the watershed. Temperature and DO are important to juvenile salmon as they don't survive well in high temperature and low DO waters. The data gathered includes readings from continuous transducers in Fox and Elder Creek and manual temperature and DO measurements at all three sites. A statistically significant correlation between depth and DO and depth and temperature in the Wilderness Lodge Pool indicates that this site would have more suitable conditions for juvenile salmon during the dry summer season compared to Fox and Elder Creek, which had weak to moderate correlations.

270 9:00 am SS

Nature-based solutions for enhancing soil hydro-mechanical properties

Nawaf Alneami, Civil Engineering (U)

Climate change has increased the number of climate-induced hazards we are facing today by increasing the intensity and frequency of rainfall events and other extreme weather conditions. These climate extremities are predicted to get even worse over the next coming decades, leaving soil remediation at the utmost of importance. Different soil stabilizers can help mitigate the effects of climate-induced hazards and have been at the forefront of soil slope remediation. Unlike concrete, whose production leads to greenhouse gas emissions, nature-based solutions, such as vegetation and biopolymers have been seen to stabilize potentially unstable slopes along stream banks and are able to mitigate climate-induced geohazards due to their role at the soil-atmosphere interface and soil hydro-mechanical properties. Since biopolymers have been seen to increase plant growth, vegetating, and adding biopolymers to slopes or stream banks are key for ecological restoration and rewilding, providing several additional co-benefits. Therefore, the main objective of this study is to gain insights into the soil-water-vegetation-biopolymer interaction and how it controls soil hydro-mechanical properties. Four different sample types were prepared including plain soil, rooted

soil, biopolymer amended soil, and biopolymer amended rooted soil. After the development of a complete root system, several different hydraulic and mechanical tests were conducted to determine the effect of soil type. In particular, the hydraulic behavior of all samples was investigated by determining the saturated permeability, soil water retention, and infiltration and evaporation rates. Vegetated-biopolymer specimens showed lower permeability and infiltration rates compared to other soils. Finally, the direct shear tests were performed to evaluate the shear strength characteristics. The results showed that any combination of the soil treatment led to a slight decrease in the cohesion values leading to altered shear strength. These results are beneficial to engineers in better understanding the vegetation and bio-cementation techniques and their implementations, especially in severe drought environments.

271 9:00 am TT

Anammox Enrichment with a Low Maintenance Anaerobic Baffled Reactor

Grace McKenzie, Environmental Engineering (U)

Elevated nitrogen concentrations in wastewater effluent discharged to surface waters is a problem for fish toxicity and eutrophication. Anaerobic ammonium oxidation (anammox) is an environmentally friendly and cost-effective alternative to traditional wastewater treatment methods that utilize processes like nitrification and denitrification for nitrogen removal. Anammox bacteria are able to convert ammonia directly into nitrogen gas in the presence of nitrite. However, anammox bacteria grow slowly and require specific temperature, pH, redox and other growth conditions. The goals of this project were to develop a low maintenance and low cost means of growing anammox bacteria, using an anaerobic baffled reactor (ABR) tank, regularly fed with a nutrient-rich solution. We performed weekly measurements of dissolved oxygen, pH, electric conductivity, and temperature to evaluate ABR performance and optimal conditions for anammox growth. We tracked nutrient (ammonium, nitrite, and nitrate) concentrations, which showed > 98% removal of ammonium and nitrite after ~100 days. Anammox activity tests, performed for each chamber of the ABR, demonstrated N removal under anaerobic conditions.. Through collaboration with the Los Angeles Sanitation County District, qPCR analysis was performed that confirmed the presence of anammox bacteria, among a mixed consortium of bacteria, in the ABR. Future experiments include transferring our anammox bacteria into smaller, more portable ABR tanks for wider use in decentralized or small-scale applications.

272 9:00 am UU

Investigating the ability of anammox bacteria to degrade nitrogen-containing chemicals in wastewater

Polina Popova, Environmental Engineering (U)

This project aims to establish an anaerobic ammonium oxidation (anammox) enrichment reactor for use in studies on the removal of quaternary ammonium compounds from

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wastewater. Since its discovery in 1995, anammox bacteria has emerged as a promising low-cost and low-maintenance alternative to conventional biological nitrogen removal methods used for the removal of ammonium from wastewater. Converting ammonium to nitrate and nitrogen gas in the presence of nitrite, the use of anammox bacteria eliminates the need for carbon inputs and decreases oxygen demands, as compared to traditional aerobic techniques, and offers a viable solution to counter the impacts of nitrogen-rich wastewater effluents. In this project, we aim to establish a stable anammox bacteria community using an up-flow column reactor, in order to test the microbes' ability to break down ammonium-containing compounds. Previous studies have demonstrated the ability of anammox to remove nitrogen-containing compounds, including select pharmaceuticals and antibiotics, pointing to its potential ability to indiscriminately target several types of the ammonium-containing compounds found in wastewater; however, research is limited on these topics. The anammox reactor, which is maintained under anaerobic conditions using nitrogen gas, operates at an average temperature of 27.5°C and receives synthetic influent feed containing 100 mg/L of NH₄-N and 120 mg/L of NO₂-N. Over 13 weeks of the ongoing startup period, it has demonstrated an average removal of 11.60±7.96% for ammonium, which is significantly lower than the target removal of >90%. In order to reach full performance potential, modifications to the synthetic feed will be made to support anammox bacteria growth over competing species. Due to the microbes' slow growth rate, more time for biomass establishment is also required.

273 9:00 am VV

LCLUC Impacts of Arctic Oil/Gas Exploration

Avi Martin, Geographic Information Science and Technology (U)

Arctic ecosystems are sensitive to human activity. Nowhere is this more evident than in the case of large-scale industrial development and infrastructure failures, as recently (May 2020) highlighted by widespread ecological degradation caused by an oil spill in Norilsk, Russia. Understanding the history of such development is key to determining its environmental impacts. Here, we determine the history and geography of fossil fuel exploration in North Slope Borough (NSB), Alaska and Yamal Peninsula, Russia. To do so, we first conduct a thorough literature review using SDSU's OneSearch database, as well as Google Scholar and similar online tools. Once compiled, historical records will be synthesized with independent geospatial and remote sensing observations to map the impact of oil and gas exploration on permafrost degradation, as well as associated effects on terrestrial ecology and surface hydrology. Results will be integrated into social science models to identify and forecast vulnerabilities of eight underserved communities in NSB, Alaska associated with energy expansion by National Petroleum Reserve-Alaska and the Alaska National Wildlife Reserve. Socioeconomic models for NSB will be built off existing frameworks developed for earlier

research in Yamal, but extended to also include region-specific analysis of infrastructure development. This research responds to the United Nations Environment Program call to action to identify regions most susceptible to permafrost degradation, and will also help develop measures to mitigate the impacts of expanding oil and gas infrastructure on susceptible communities. This work will support ongoing research funded by NASA's Land Cover-Land Use Change program (solicitation NNH21ZDA001N).

274 9:00 am WW

Thaw depth and water table trends in Utqiagvik, Alaska during the summer of 2022

Kristine Bernabe, Biology, Emphasis in Cellular and Molecular Biology, B.S. in Applied Arts and Sciences (U)

Recent studies show that permafrost, critical for several Arctic environmental functions, is becoming a more prevalent problem in the Arctic tundra, especially as climate change progresses. As a result of permafrost degradation, concerns about Arctic hydrology and greenhouse gas emissions have become a huge issue. For instance, methane emissions have been observed to increase with deeper thaw depth. Utqiagvik, where this study takes place, and the larger Alaskan Arctic tundra are experiencing rapid warming and permafrost degradation. This study compares thaw depth (TD), the level down to which permafrost thaws, and water table (WT), the level at which the ground is saturated with water, at three different sites (BES, BEO, and CMDL) in the Arctic tundra or, more specifically, Utqiagvik, Alaska during the summer of 2022. Measurements were taken from late June to mid-August of 2022 along established transects using metal and stick probes specific to each variable. Meteorological data were also measured using three eddy covariance towers on each site. The goals of this study include determining the overall TD and WT trends at the individual sites and whether or not these trends differ. The influence of meteorological variables, such as rain and temperature, on TD and WT are also considered. This study hypothesizes that (a) TD will decrease throughout the summer, (b) WT will decrease throughout the summer except for rain events, and (c) TD and WT will differ across the three sites. Results show that TD became deeper as the season progressed and that temperature possibly influenced the thaw rate. TD did not differ across BEO, BES, and CMDL. WT generally decreased throughout the season except during heavy rainfall. Average BEO and BES WT levels significantly differed, with BES having a WT mean of 13.3 cm and BEO with -3.0 cm. The small number of observations limits the study. However, future work will include collecting more measurements to observe the tundra's heterogeneity better and comparing 2022 data to previous years to determine long-term changes in TD and WT trends in Utqiagvik.

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Session F-9

Physical and Mathematical Sciences 5

Friday, March 3, 2023, 9:00 am

Montezuma Hall

275 9:00 am XX

Examining the Mechanism of CO₂ Reduction on Silver Nanoparticles via Surface-Enhanced Raman Spectroscopy

Christopher Turchiano, Chemistry (M)

Fossil fuel consumption has been identified as a key driving force behind increasing global CO₂ concentrations. While efforts are in place to reduce mankind's CO₂ emissions, there are comparatively few existing strategies to reduce global CO₂ levels. CO₂ reduction reactions (CO₂RRs) address this by converting readily available CO₂ to value-added products. Different reduction products, such as carbon monoxide (CO, 2 e⁻ reduction), methanol (CH₃OH, 6 e⁻ reduction), and methane (CH₄, 8 e⁻ reduction), are observed as CO₂ conversion products. Though progress has been made to improve CO₂RR efficiency, the mechanisms of multi-electron reduced product formation are still vague. Herein, we propose to use surface-enhanced Raman spectroscopy (SERS) to unravel these mechanisms. SERS is a highly sensitive analytical technique in which as the localized surface plasmon resonance of metal nanoparticles has been shown to increase the Raman signal of adsorbed species by several orders of magnitude. The SERS mechanism typically involves a plasmon-induced near-field effect and a charge transfer-induced chemical enhancement. In this work, silver nanoparticles, known to exhibit some of the strongest plasmon-induced near field effect, will be deposited on silicon electrodes to form SERS- and CO₂-active interfaces. Black silicon – an extremely effective substrate for SERS – with various structural modifications will be studied to probe the CO₂RR intermediate species. Exploring and ultimately understanding the mechanism of CO₂RRs on silver and other noble metal nanoparticles will prove crucial in the development of future photoelectrochemical devices.

276 9:00 am YY

How Does Bacteriophage MS2 Selectively Package its Own RNA in vivo?

Amineh Rastandeh, Chemistry (M)

RNA viruses, like bacteriophage MS2, are able to package their own genomes with high selectivity within a host cell, even though the host cell is packed full of other nucleic acids. The mechanisms behind this selectivity are not completely understood, but previous studies suggest that specific regions of the RNA—termed “packaging signals”—serve as recognition sites for the viral proteins as they assemble into capsids around the RNA. MS2 capsids are made up of two components: 89 dimers of the coat protein (CP) and 1 copy

of the maturation protein (MP). Previous models of packaging selectivity in MS2 focus on the role of the coat proteins, as they are the major component of the capsid and are known to interact strongly with multiple stem loops in the RNA that act as packaging signals. However, the MP interacts directly with the RNA in mature virus particles and might therefore play a role in packaging selectivity. To test this hypothesis we introduce mutations into the MP gene, grow up virus particles, and then sequence the RNA that is packaged in them. By measuring the ratio of viral and host RNA in vivo, we determine the packaging selectivity. In this poster, I will discuss results and difficulties encountered thus far. Additionally, I will outline future experiments to better understand the role of CPs in packaging selectivity.

277 9:00 am ZZ

Using DNA strands to study the RNA clusters formed during in vitro transcription

Herman Dhaliwal, Physical Virology (D)

During in vitro transcription of RNA molecules, there is a phenomenon that causes RNA molecules to form multimers. As the RNA is heated, the multimers re-fold into individual molecules. Our native agarose gels, show incubation in transcription buffer of the RNA at high concentrations can form some multimers but not to the magnitude of what is observed during in vitro transcription. However, numerous RNA molecules can be synthesized from a single DNA template, bringing each partially transcribed RNA strand in very close proximity to each other. Due to long-range interactions, RNA molecules cannot always fold to their secondary structure until the molecule is completely synthesized. Some sections of the partially transcribed RNA molecules could be base pairing with complementary regions on other unfulfilled RNA molecules. To better understand the clustering, we take advantage of complementary DNA strands to mimic RNA molecules as they are being synthesized and study the average bindability. This allows us to narrow down the contact points between different RNA strands that could be responsible for the RNA clusters observed during in vitro transcription

278 9:00 am AAA

Determining Binding Constants of Ligand-Metal Complexes Through Fluorescence Spectroscopy

Wyatt Mathers, Chemistry (U)

The fluorescence quenching properties of silver nanoparticles (AgNP) in the presence of tryptophan is well understood. Amino acids introduced into a nanoparticle solution begin binding to the surface in the form of a metal-ligand complex. Interactions such as this are very important in determining how metal nanoparticles such as silver will interact in the presence of proteins. However, it is very difficult to properly calculate the actual number of ligands that will bind to each individual nanoparticle surface. Tryptophan is one of the major amino acids in proteins that strongly fluoresces (tyrosine, and phenylalanine

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are the other two). By comparing the fluorescence values of a tryptophan solution before and after the addition of AgNP, we can apply these values to a Stern-Volmer plot and find exact binding constants for amino acid complexes.

With this analysis, we propose that the relative amount of tryptophan binding per surface of AgNP is very high, covering multiple layers more than expected to be possible. After running some preliminary experiments to find the concentrations of the complexes formed, the amount of tryptophan quenched has been shown to be much greater than initially predicted. Dynamic quenching of the mixture was considered ultimately impossible as the calculated rate constant was much higher than that expected for the diffusion of molecules within the solution. Yet if the process involved static quenching the results would seem to imply that there are multiple layers of tryptophan binding to the surface of each nanoparticle. Our work has now focused on changing the solution conditions individually to understand how each variable affects the overall behavior of the tryptophan-AgNP complex. Such conditions include changing the pH of the environment or adjusting the concentrations of either the AgNP or tryptophan. Once a correlation has been established, a range of tests can then be performed to determine exact calculations for amino acid binding. Further experimentation on both tryptophan concentrations, as well as initial AgNP values, is to be performed within the next few months in order to refine our results into a comprehensive set of conclusions.

279 9:00 am BBB

Functionalizing MS2 VLPs With DNA Oligonucleotides

Alaina Sekany, Biology (U)

Many viruses, including model virus MS2, are composed of just a single strand of nucleic acid surrounded by a shell of capsid protein. Upon entering the host cell, an MS2 particle takes advantage of the host's cellular machinery to produce copies of its nucleic acid and capsid proteins. These newly synthesized components assemble into thousands of new virus particles that will go on to infect other cells in the host colony. Researchers have found ways to assemble MS2 "virus-like particles"—a non-infectious MS2 virus particle analog—in vitro, by simply combining its separately synthesized components in the proper buffer conditions. To examine the physical chemistry involved in this "self-assembly" process, scientists have developed single-particle techniques that can resolve the assembly of individual virus-like particles. In order to perform these experiments, we must immobilize the assembling particles so that we can monitor them over time. My colleagues and I are developing new methods for immobilizing these particles using DNA oligos with an attached biotin. The DNA biotin oligo is first hybridized with the MS2 RNA via complementary base pairing at the 5' end of the RNA. Those hybridized nucleic acid molecules are then combined with MS2 coat proteins, yielding MS2 virus-like particles with a protruding RNA-DNA hybridized handle. Using RNase treatment and gel electrophoresis, we were able to confirm that

hybridized MS2 VLPs were produced. Going forward, we can purify the hybridized MS2 VLPs and use them in single-particle experiments, which could provide additional insight into how MS2 particles self-assemble and infect their host.

280 9:00 am CCC

Preparation of G β 1-AuNP conjugate

Sierra Murrell, Chemistry (U)

The purpose of creating the G β 1 protein is for the creation of the G β 1-AuNP conjugate for a secondary research project revolving around creating and testing the stability of protein gold nanoparticle conjugates. For the G β 1 protein to act as an effective control for the previously mentioned experiment, there needs to be the Cysteine amino acid that allows for a covalent bond to form between the protein and the surface atoms of gold nanoparticles. The Cystine will also have a high affinity to form a covalent bond and has the specific immobilization that is necessary. The Cysteine residues will need to reside on the C terminal of the protein. Therefore, we needed to clone a sequence of amino acids on the C terminal that are not naturally occurring. The cloning technique that we used clones the correct genes of interest into an expression vector: pET21a. We used DNA primers to amplify the DNA segments of the wildtype protein G. We designed the primers and ordered them. A digestion of the insert and vector was performed followed by the ligation of the two, and then the sample was transformed into top 10 cells. A colony PCR was performed on the colonies that grew, and a gel electrophoresis was run to determine if any positive colonies were present. We had two positive colonies as determined by the gel; however after sending for DNA sequencing, only one of the colonies contained the correct sequence. The protein with the correct sequence was then expressed by transforming the plasmid with the corresponding insert into BL21 cells. The sample was grown in LB until it reached its optimal density of 0.78. After expression, the protein was purified by freeze-thaw, HPLC, and a Lifillizer. A protein gel was run and showed that the G β 1 protein was purified accurately.

Session F-10

Health Nutrition and Clinical Sciences 3

Friday, March 3, 2023, 9:00 am

Montezuma Hall

281 9:00 am DDD

Healthcare Access Among International & Domestic San Diego State University Students

Hadeel Ali, Public Health (U)

Background: The United States is home to the largest international student population, with over 1.1 million students enrolled in U.S. colleges and universities during the 2019-2020 school year. However, in order to study in the U.S. International

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students must meet various requirements such as maintaining valid health insurance coverage during their studies. In regard to San Diego State University, students must obtain their health insurance through a pre-approved plan known as JCB Insurance Solutions. Despite the requirement to have health insurance, many international students cannot properly access healthcare due to low health literacy, language barriers, cultural differences, financial difficulties, etc (Hyun Jang, 2021). Due to the underuse of healthcare services and lack of integration assistance by their institutions, many international students suffer the consequences and are simply less likely to access healthcare while studying in the U.S. (Adegboyega, 2020).

Methods: This study was administered through a qualitative survey, and the same survey was presented to both students in English. Questions were based on collecting data regarding the participant's demographics, healthcare accessibility, healthcare attitudes, beliefs, language barriers, financial concerns, etc. Participants were asked to answer questions on the survey that apply to their own access to healthcare as a current SDSU student.

Results: According to the data collected of all the 66 San Diego State University (SDSU) students who took the survey, 34 (51.5%) of the participants were domestic students and 32 (48.5%) of the participants were international students. Results showed that international students at SDSU faced more barriers in their efforts to access healthcare in the US.

Conclusion: Domestic and international students who attend SDSU have difficulty accessing the US healthcare system. However, international students reported higher rates of disadvantages. International students struggled more with numerous barriers. These findings are significant as they bring awareness to the fact that international students at SDSU may need additional support when it comes to accessing healthcare. This is key to ensure that the health and well-being of all students are prioritized despite their backgrounds.

282 9:00 am EEE

Do mental health symptoms among nurses vary by their primary department?

Krishnaraj Gohil, Epidemiology (M)

Background: The COVID-19 pandemic profoundly negatively affected mental health globally, especially among frontline workers who combat the virus, such as nurses. This study aimed to learn more about how the pandemic impacted nurses by examining whether mental health symptoms differed across hospital units.

Methods: Data was collected from 278 nurses from one hospital in San Diego. Participants completed a survey that assessed: demographic characteristics (age, gender, marital status, race/ethnicity), job title, primary unit (acute care, progressive care, intensive care unit [ICU], Emergency Department [ED], others), symptoms of depression and anxiety (measured with the Patient Health Questionnaire-9 [PHQ9] Range: 0-27 and General Anxiety Disorder-7 [GAD7] Range: 0-21 symptom screeners). **Analyses:** descriptive statistics and tests for

normality were determined for the study population and by the level of exposure to determine the distribution of the data. The data were not normally distributed; hence, the Kruskal Wallis test and post hoc multiple comparison tests using the Dwass, Steel, and Critchlow-Fligner methods were applied to examine differences in mental health symptoms and primary unit.

Results: Participants were mostly female (90.3%) white (63.3%) and married (88.8%). Kruskal-Wallis chi-square test identified a statistically significant difference in the median PHQ9 and GAD7 among different primary departments, which are acute care, progressive care, ICU, ED, and others (PHQ9, $\chi^2=26.26$, $p<0.001$ and GAD7, $\chi^2=15.86$, $p=0.0032$). The median PHQ9 value was highest in the emergency department (median= 11, IQR= 9), followed by ICU (median= 10, IQR= 8), progressive care (median= 8, IQR= 8), acute care (median= 6, IQR= 9), and other departments (median= 5, IQR= 7). The median GAD7 value was highest in the emergency department (median= 10, IQR= 10), followed by ICU (median= 9, IQR= 7), progressive care (median= 9, IQR= 9), acute care (median= 6, IQR= 9), and other departments (median= 6, IQR= 6).

Conclusion: The PHQ9 and GAD7 values were observed to be highest in the ED. Mental health support should be provided to all healthcare professionals, but may need to be directed towards those working in the ED and ICU who are likely treating the most critical patients.

283 9:00 am FFF

Exploring Existing Resources and Neglected Healthcare Barriers of Chronic Diseases Among Refugees Resettled in San Diego

Marleen Odeesho, Kinesiology- Pre- Physical Therapy (U)

In 2022, more than 25,000 refugees were resettled in the U.S. Due to pre-migration violence, the resettlement process, and the daily stressors refugees face, managing chronic illnesses becomes difficult. Therefore, the Centers for Disease Control and Prevention, have constructed Syrian and Iraqi refugee health profiles that show high incidents of non-communicable diseases in the refugee population. Difficulty managing non-communicable diseases is a result of a lack of resources such as language barriers, difficulty navigating the healthcare system, and loss of social support. Due to the consequences of war where affected populations become vulnerable and at a higher risk of cognitive impairment, the risk and effects of dementia have not been explored in the refugee population. Our study in the UCSD Displacement & Health Lab aimed to explore knowledge, attitude, and behavior towards dementia in camped and un-camped refugees in San Diego, and it aimed to understand barriers to accessing aging healthcare services. Specifically, we investigated how refugees access health information and major sources of health education.

We recruited 35 participants through flyers in community-based organizations and the snowball method who voluntarily agreed to engage in semi-structured interviews conducted in their native language, Arabic. We conducted four focus groups and 19 individual interviews. In seventeen cases, 11 had lived

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in camps and 12 had not. This presentation will focus on the results of multiple interviews. Audios were transcribed and translated using reverse translation for accuracy. The translated transcripts are coded for the major emerging themes that appear across the participants' interviews and summaries are produced that point to the major challenges and barriers to managing their health.

This exploratory qualitative research study reports the health status of the preliminary results to show that stress associated with the immigration and resettlement process leads to chronic illnesses. However, refugees are not being provided with important information about the symptoms, treatments, and prevention of these illnesses. This leads to a lack of knowledge regarding dementia and other chronic illnesses prevention.

This research builds evidence-driven recommendations for future health management interventions that will lead to improvement in refugees' physical, social, and emotional health and well-being.

284 9:00 am GGG

Exploring Psychometric Properties of a new Oral Behavior Social Support (OHBS) Scale in English and Spanish

Kenya Benitez, Rhetoric and Writing Studies (U)

PURPOSE: The purpose of this study is to explore the properties and response patterns of a new subscale about social support for toothbrushing behavior among people who identify as Mexican/Mexican-American/Mexican-origin/Chicanx.

METHODS: Data are from a subsample from a larger scale development and validation project. The participants were categorized by sex assigned at birth, preferred language (English/Spanish), and marital status (single/married). 62 participants completed an Oral Health Behavior Social Support (OHBS) survey, then a repeat OHBS survey and interview. Participants were between the ages 21-40, residing in the following counties in California or Arizona: San Diego, Imperial, Riverside, Orange, Yuma, Santa Cruz, Cochise, or Pima. The repeat surveys and interviews were conducted between April-September 2022, and lasted approximately 60 minutes; participants received a \$25 amazon gift card. A trained bilingual research assistant obtained informed consent and collected all data in each participant's preferred language. Participants waited 2-4 weeks after taking the baseline survey before taking the repeat survey. Repeat survey responses for the new brushing support scale only were assessed, and responses by language and source of support group (family, health providers, others) were compared. Data were analyzed in SPSS 28. Descriptive statistics were tabulated. Cronbach's alphas were calculated to assess the new subscale's psychometric properties in English and Spanish.

RESULTS: Of the 62 participants, 40 spoke English, 22 spoke Spanish, 15% were men, and 60% were single. Cronbach's alphas for Brushing Behavior were above 0.96 in English and above 0.97 in Spanish. Average responses in both languages

showed that participants get more support for brushing from family (1.9 English; 2.5 Spanish) and health providers (2.8 English; 3.0 Spanish) rather than others/friends (0.5 English; 0.9 Spanish). Response options were 0=never to 4=always.

CONCLUSION: Providers had the biggest influence on participants. The set of 12 items in the new brushing subscale were consistent, showing good reliability given the high alphas. This was a relatively small convenience sample, but shows that the new subscale captures different responses by subgroup and shows strong psychometric properties in both languages.

285 9:00 am HHH

Understanding of Cardiotoxicity Risk among Limited English Proficient Older Adults with Cancer

Dana Patterson, Public Health, Health Management and Policy (M)

Patients with breast cancer on their left undergo treatment such as radiation and chemotherapy and as a result, some are at risk for cardiotoxicity. Cardiotoxicity is damage to the heart muscle which can occur as a result of cancer treatment. This can affect the function of the heart and lead to cardiovascular complications or cardiovascular disease. Cardiovascular disease is the leading cause of death among cancer survivors, and it is imperative that patients understand their risks associated with treatment. Minority older adults that are limited English proficient (LEP) face additional barriers when seeking access to care such as language barriers which can negatively impact patient-provider communication leading to sub-optimal care outcomes. The persistence of cardiotoxicity in cancer survivors, even more among minority and under-represented populations, demonstrates there is an insufficient understanding of the needs of this high-risk population. Our goal was to assess patient understanding of risks among older LEP adults. We are presenting the results of our iterative development of a bilingual cardiotoxicity semi-structured interview guide that we developed using the Capability, Opportunity, Motivation and Behavior (COM-B) model for pre-implementation. Our study was approved by the UCSD IRB. We employed evidence-based methods to consider our study measures and conducted cognitive testing with a Latina cancer survivor and oncologists to ensure the guide was appropriate, further we then utilized dual-forward translation and adjudication for ensuring an accurate transcreation into Spanish. We present our study and translation protocol; patient accrual begins this spring. Findings from our data will help to inform organizations about strategies that can be used to improve patient activation in treatment planning for recently diagnosed patients at risk of cardiotoxicity.

SDSU

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Abstracts of Presentations

Session G

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Session G-1

Behavioral and Social Sciences 7
Friday, March 3, 2023, 11:00 am
 Montezuma Hall

286 11:00 am A

COVID-19 Vaccine Hesitancy in the Imperial Valley
Katherine Ekonomo, Psychology (U)

Even though COVID-19 vaccines have been widely available in the US for some time, a significant proportion of the population remains unvaccinated. Vaccine hesitancy is particularly noted among racial and ethnic minorities, reflecting existing inequalities in COVID-19 infection and mortality rates (Khubchandani & Macias, 2021; Callaghan et al., 2021). Contributing factors may include medical mistrust due to past racism and greater exposure to misinformation (Bogart et al., 2021; Khubchandani & Macias, 2021). Vaccine refusal more generally is also associated with higher levels of political conservatism and religiosity (Callaghan et al., 2021). Due to the continuing impact of the pandemic, there is a need for information on how these and other factors operate in different populations. One understudied region is California's Imperial Valley, a rural agricultural region that borders Mexico and has a predominantly Mexican American population. Studies suggest that such populations may mistrust medical institutions due to fear of job loss and deportation, while language barriers may make them more susceptible to misinformation (Gehlback et al., 2021). In our study, we, therefore, used a Qualtrics survey to examine the relationship between demographic, socio-cultural, and psychological factors and COVID-19 vaccine hesitancy among 40 adults in the Imperial Valley. Our predictor variables included demographic factors (e.g., ethnicity, language, education, employment, and income), and measures of conservatism, religiosity, individualism, and attitudes about science. We also asked about participants' sources of information about COVID-19 and about their trust in different sources. Our outcome measures included whether participants had been vaccinated (and how many doses) and why or why not. We also asked about specific misconceptions about the COVID-19 vaccine, including purported side-effects like infertility, that it is part of a political plot, and about alternative treatments like Ivermectin. We analyzed the data using logistic regression to see what factors contributed to participants not getting the vaccine. Our preliminary results suggest that misinformation continues to be prevalent and associated with higher levels of vaccine hesitancy in this region. Positive attitudes about science, however, may counter these effects. This suggests the need for better science education and communication for diverse populations.

287 11:00 am B

Alcohol consumption associated with stress due to COVID-19
Caitlyn Brucks, Psychology (U)

Purpose: To examine associations between alcohol consumption and COVID-19-related stress among undergraduate students.

Methods and Data: Between May 2021 and June 2022, data were collected via an online platform from students at a public university. Participants completed questionnaires about COVID-19-related stress, alcohol use, and mental health. Participants over 25y or with incomplete data were excluded (final N=979). A multivariate linear regression analysis was used to test whether stress due to COVID-19 was associated with the frequency of alcohol consumption and changes in alcohol use after controlling for age, sex, income, race, and ethnicity.

Results: Of the 979 subjects, 711 (72.6%) were female and 486 (49.6%) were white. The mean age was 20.2y (SD=1.64). The regression analyses comparing change in alcohol use [$R^2=0.022$, $F(6, 963)=3.469$, $p<0.001$] and frequency of alcohol consumption [$R^2=0.074$, $F(6, 954)=12.695$, $p<0.001$] to COVID-19 related stress were statistically significant. Change in alcohol consumption compared to before the pandemic was associated with COVID-19-related stress ($B=0.89$, $t=2.74$, $p<0.01$) and age ($B=-0.45$, $t=-2.92$, $p<0.01$). There was an association between overall alcohol consumption and COVID-19 related stress ($B=-0.88$, $t=-2.75$, $p<0.01$), age ($B=-0.16$, $t=-5.20$, $p<0.001$), sex ($B=-0.07$, $t=-2.10$, $p<0.05$), and race ($B=0.18$, $t=5.63$, $p<0.001$). Change in drinking during COVID-19 was significantly correlated with frequency of alcohol consumption [$r(959)=-3.53$, $p<0.001$].

Conclusion: Results revealed that, within this population, stress related to COVID-19 was associated with a change in alcohol use compared to before the pandemic as well as overall frequency of alcohol consumption. Based on the correlation between change in alcohol use and frequency of alcohol consumption, it appears that participants who consumed alcohol more frequently also reported increases in alcohol use during the pandemic. Research supported by the SDSU seed grant.

288 11:00 am C

Stage at cancer diagnosis and cannabis use among adult cancer survivors in Southern California
Nasim Kasiri, Master of Public Health - Epidemiology (M)

Purpose: To examine the association between cancer stage at diagnosis and cannabis use or consideration of use since diagnosis.

Methods: Patients receiving care at UC San Diego Moores Cancer Center between 2018 and 2019 participated in an online survey between March and June of 2022. Of the 5,901 patients invited, 954 provided responses (16.2% response rate), which were weighted. The outcome of interest, cannabis use or consideration of use (binary; Yes-No) was assessed with two self-reported items. The exposure of interest, self-reported cancer stage at diagnosis, was defined as Stage II, Stage

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III, or Stage IV vs. Stage I (referent) and dichotomized as non-advanced (Stages I/II, referent) or advanced (Stages III/IV). We used logistic regression to estimate odds ratios (ORs) and 95% confidence intervals (CIs) for the association between the stage at diagnosis and cannabis use, adjusting for potential confounders (age, sex, race/ethnicity, education, employment, and cancer type).

Results: Mean age of respondents was 62.8 years (SD=0.6) and 58.3% identified as female. The majority (57.7%) identified as non-Hispanic White and 15.8% as Hispanic/Latinx. Nearly half (41.6%) of respondents reported cannabis use or considered use since diagnosis, the majority of whom (63.6%) were diagnosed with non-advanced stages. Advanced stage cancer diagnosis was associated with a 60% higher odds of cannabis use or consideration of use [adjusted OR (AOR)=1.60; 95% CI=1.08, 2.37] compared to non-advanced stage cancer. When assessed individually, stage at diagnosis was not statistically significantly associated with cannabis use or consideration [AOR=0.93 (95%CI=0.57-1.50), 1.60 (95%CI=0.97-2.64), and 1.49 (95%CI=0.85-2.63)] for Stage II-IV, respectively, when compared to Stage I.

Discussion: Cancer patients and survivors have an interest in and report use of cannabis during their cancer care. Patients diagnosed at advanced stages of cancer may consider and/or use cannabis more than those diagnosed at non-advanced stages of cancer. Further research is needed to understand the impacts of cannabis use on patients receiving cancer treatment and as a tool to ameliorate side effects, though federal regulations pose challenges.

289 11:00 am D

An exploratory analysis of factors that predict a change in depression symptoms pre- vs. post-COVID-19 lockdown among Type-2 Diabetes patients in San Diego County

Nicole Pippard, Epidemiology (D)

Background: Isolation and uncertainty resulting from the COVID-19 pandemic has had an adverse impact on mental health.^{1,2} This impact is exacerbated among those with comorbid chronic health conditions.³ The aim of this study was to explore the relationship between sociodemographic characteristics and change in depression symptoms pre- and post-lockdown measures among Type-2 Diabetes patients in San Diego.

Methods: Analyses were executed using electronic health records from Type-2 Diabetes patients at Family Health Centers of San Diego, Inc. The outcome of interest was change in depression symptoms (no change/increase in symptoms/decrease in symptoms) from the year prior to the start of the COVID-19 pandemic through the first year of the pandemic. Depression symptoms were categorized (major depressive disorder (MDD) likely vs. not likely) using the Patient Health Questionnaire-2 (PHQ-2), a validated depression screening tool (range 0-6) where a score of three or more indicates MDD likely. Sociodemographic characteristics of interest included age, race/ethnicity, language, gender, marital status, and income.

Bivariate associations and polychotomous logistic regression analyses were used to examine the association between characteristics and change in depressive symptoms from pre- to post-lockdown measures. Bias analyses were conducted to assess the strength of unmeasured confounding necessary to negate findings.

Results: A total of 4698 patients completed at least one PHQ-2 screening within one year pre- and post-lockdown. Mean age was 54.3 years and a majority of patients identified as Hispanic (59.7%) followed by Non-Hispanic White (15.4%) and Non-Hispanic Black (8.9%). Patients most often identified as married (40.6%) or single (35.8%) and more than 80% reported income \leq 100% of the federal poverty level (FPL). 676 (14.2%) and 278 (5.8%) of screenings were flagged as MDD likely during pre- and post-lockdown periods, respectively. Regression and bias analyses are pending.

Discussion: Results will describe characteristics associated with MDD status change and inform future care procedures for patients who may be vulnerable to mental health changes resulting from COVID-19 lockdown.

290 11:00 am E

Type 2 Diabetes self-management during the COVID-19 Pandemic: A Qualitative Study at a Federally Qualified Health Center in Southern California

Elana Metz, Social Work and Public Health (M)

Hypothesis: The COVID-19 pandemic led to widespread disruption throughout the U.S. healthcare system. At the same time, individuals from marginalized and medically underserved communities experienced disproportionate morbidity and mortality from the COVID-19 virus, widening existing inequities in access to and quality of care. Those with underlying conditions, such as diabetes, were at a heightened risk of serious infection and death. Therefore, we hypothesized that patients of a Federally Qualified Health Center in Southern California may have faced new challenges in managing their T2D during the COVID-19 pandemic. This study sought to understand the experiences of T2D patients during the pandemic and its impact on disease self-management to inform healthcare providers and policymakers about emergent medical needs and opportunities for this population.

Methods: Adult patients with T2D of a single FQHC were recruited by phone to participate in the study. Consenting participants were interviewed in Spanish or English about how the pandemic impacted their T2D management using a semi-structured interview guide. Audio recordings of the interviews were transcribed and translated for analysis. The Rapid and Rigorous Qualitative Data Analysis technique was used to identify common themes. Participant demographic characteristics were extracted from their electronic medical records.

Results: Twenty-six patients (76.9% female, 84.6% Hispanic/Latinx) participated in the study. Most (84.6%) interviews were completed in Spanish. The mean participant age was

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57.57 years (SD = 9.33; Range: 45-75). Participants described disruptions to T2D self-management during the pandemic, including losing access to healthy foods and facing new stressors and isolation. Participants also described making positive lifestyle changes and adapting to telehealth to continue managing their blood glucose levels.

Conclusions: Secondary effects from the COVID-19 pandemic caused worsening disease self-management for some T2D patients. Identifying these patients and connecting them to services will be an important task for healthcare organizations and providers.

291 11:00 am F

A Qualitative Study of Patient Perspectives on Best Practices for the Management of Type 2 Diabetes at a Federally Qualified Health Center in Southern California

Denise Marquez, Public Health (M)

Introduction: Substantial inequities in Type 2 Diabetes (T2D) management exist across the nation, especially in medically underserved communities of color with pre-existing health disparities. It is pivotal to elevate the voices of patients from diverse ethn racial backgrounds who disproportionately experience health inequities to identify best practices for supporting them. The purpose of this study was to qualitatively assess the perceived healthcare and social needs of T2D patients at a federally qualified health center (FQHC) in San Diego County.

Methods: Patients with T2D were recruited from an FQHC in California to participate in a one-on-one telephone interview. Twenty-six patients agreed to participate (50.7% female, 80.7% Hispanic/Latinx; mean age: 57.57). A semi-structured interview guide was designed to assess participant perspectives on best practices for their T2D diabetes management. Most interviews (84.6%) were conducted in Spanish. Audio recordings of the interviews were transcribed for analysis. Interview transcripts were analyzed using the Rapid and Rigorous Qualitative Data Analysis technique.

Results: Participants described how additional health education and supportive services related to blood sugar monitoring and nutritional intake could improve T2D management. Participants suggest enhancing T2D diabetes management with additional health education from FQHCs related to blood sugar monitoring, dietary intake, and establishing supportive interpersonal rapport with clinics. Diverse ethn racial patients expressed the benefits of positive relationships with their providers as a critical factor that motivated them to engage in T2D diabetes management.

Discussion or Implications: Future research should consider the extent of limited health literacy among T2D racial/ethnic communities as it introduces a barrier to advanced T2D management. Responses indicate that enriched patient health education and interpersonal patient-provider communication may improve health literacy and T2D management for diverse patients.

Session G-2

Behavioral and Social Sciences 8
Friday, March 3, 2023, 11:00 am
 Montezuma Hall

292 11:00 am G

Cheers to us: social support moderates relationship between social network and alcohol consumption in college students

Nancy Huynh, Psychology (U)

Alcohol consumption is often normalized among college students as a means to interact with others and make new social connections. While multiple studies have shown that both receiving and giving social support are beneficial for reducing alcohol use. In the present study, we hypothesized that a larger social network would be positively correlated with alcohol consumption, however, we predicted that social support would moderate these findings in that higher levels of support would be associated with decreased alcohol consumption. This analysis pulls data from an existing project, where 38 participants answered an online survey via Qualtrics completing questions from the 2-Way Social Support Scale (SSS) and the Social Network Index (SNI) and reporting their average weekly alcohol consumption. A linear regression model was used to analyze the relationship between embedded social network and self-reported weekly alcohol consumption, with receiving social support as the moderator in model 1 and giving social support in model 2. No interaction effect was found for receiving social support. Results indicate that the positive correlation between alcohol use and social integration lessens, as levels of giving social support increase. Since the use of alcohol in college students often carries a greater risk to health and safety, these findings potentially illustrate another pathway to achieving desired social experiences. Future studies could use factors such as loneliness to expand on the benefits of social support as an alternative investment to alcohol use in college communities.

293 11:00 am H

Traditional Machismo, Caballerismo, and Illicit Substance use among Young Latinx Sexual Minority Men

Eduardo Hernandez Mozo, Microbiology and Psychology (U)

Sexual minority men (SMM) are at elevated risk of substance use compared to their heterosexual counterparts, especially Latino SMM. Researchers have divided the concept of machismo, defined as masculine gender role norms in Latino culture, into two categories: Traditional machismo and caballerismo. Traditional machismo characterized as aggression, sexism, and wishful thinking. Caballerismo encompasses family-centered orientation, chivalry and problem-solving. The current study examined the associations between traditional machismo and caballerismo with illicit substance use. We hypothesized that elevated traditional

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machismo would be associated with higher odds of illicit substance use whereas elevated caballerismo would be associated with decreased odds of illicit substance use. We recruited 151 Latino SMM (Mage = 24.18, SD = 3.19) from San Diego through paid advertisements on hook-up sites (e.g., Grindr). A series of binary logistic regressions were performed to examine the associations between traditional machismo and caballerismo with the binary outcome reflecting use (versus no use) for cocaine, heroin, opiates, amphetamines, hallucinogens, and sedatives/tranquilizers within the past month. Traditional machismo was associated with increased odds of use of cocaine [OR = 2.47, CI [1.68, 3.64], $p < .001$], heroin [OR = 3.01, CI [1.60, 4.87], $p < .001$], opiates [OR = 3.00, CI [1.81, 5.00], $p < .001$], sedatives/tranquilizers [OR = 2.38, CI [1.46, 3.88], $p < .001$], amphetamines [OR = 3.74, CI [2.05, 6.82], $p < .001$] and hallucinogens [OR = 1.66, CI [1.12, 2.44], $p < .001$]. Caballerismo was associated with decreased odds of use of cocaine [OR = .429, CI [.293, .629], $p < .001$], heroin [OR = .356, CI [.230, .551], $p < .001$], opiates [OR = .447, CI [.296, .676], $p < .001$], sedatives/tranquilizers [OR = .607, CI [.406, .909], $p = .015$], amphetamines [OR = .499, CI [.335, .744], $p < .001$] and hallucinogens [OR = .627, CI [.424, .929], $p = .020$]. Clinicians could incorporate values based work and evaluate whether Latino SMM's values align or differentiate from cultural standards of masculinity.

294 11:00 am I

Perceptions Associated with the Use of Electronic Cigarettes

Katelyn Sasaki, Public Health (U)

Background: Electronic (e-) cigarettes are non-combustible devices that are gaining significant popularity among young adults. A recent study has shown a significant increase in electronic cigarette use among college students. The overall purpose of our study was to further understand people's perception towards vaping, as well as the current impact vaping has on the health of users.

Methods: Our research study examines the real time effects of electronic cigarette inhalation, along with the exposure among college students. For this qualitative study, virtual health interviews were conducted which included a series of open-ended questions about personal awareness and viewpoints around e-cigarettes. The questionnaire was broken up into three sections, evaluating perception, exposure, and future needs surrounding e-cigarettes. Furthermore, the inclusion criteria for this study included: students must be between 18 and 30 years of age, fluent in English, have no major health issues, and be enrolled in classes full-time. For recruitment, displayed and passed out flyers around campuses, posted on social media, emailed various organizations and faculty, used Research Match, and contacted local smoke shops.

Results : College students were motivated to vape due to curiosity and being exposed through the people around them. Results show that the participants believed that e-cigarettes are highly addictive, even more addictive and harmful than normal cigarettes. Furthermore, the participants agreed that e-cigarettes negatively affect users' health and will continue

to do so. Non-vapers reported to be in better self-reported health than vapers. Overall, the participants agreed that there is a serious problem that has become extremely normalized. However, the addictiveness of these products has made it very difficult to quit.

Conclusion: In this study, we interviewed two vapers and two non-vapers. All four participants spoke on how addictive electronic cigarettes are, either from experience or speculation, and how detrimental they can be for one's health. In the future, we can expand our recruitment efforts by going to various classes and presenting the study, as well as passing out flyers at surrounding colleges and universities. This would be helpful with improving the reliability of the results and increasing the sample size.

295 11:00 am J

College Student Vaper and Non-Vaper Health Perceptions

Alice Xayavong, Master of Public Health - Epidemiology (M)

Background: In the United States, electronic cigarettes (e-cigarettes) are increasingly becoming popular among college students. E-cigarette users have been shown to be twice as likely to report signs of depression compared to non-users, with the majority of the population between ages 18-30. In this analysis, we compared differences in vapers' and non-vapers' self-reported perceptions of their own health.

Methods: In an ongoing 3-month pilot study at San Diego State University, participants, at least 18 years of age were recruited as a vaper and non-vapor, forming a dyad. Recruitment occurred via fliers, posters, referrals, and emails where students scanned a QR code to determine eligibility. At the first monthly visit, participants were given silicone wristbands to wear continuously for seven days. At the second visit, dyads took a survey, and returned the wristbands for nicotine analysis. Twelve eligible participants, six vapers and six non-vapers, who completed two months of the study, were evaluated for perception of their overall health.

Results: Among the 6 vapers, 67% (n=4) self-reported their overall health as "good" and 33% (n=2) reported their health as "fair." By month two, health perception among vapers decreased 17% (n=1) as 50% (n=3) reported their health as "fair." Among the 6 non-vapers, 83% (n=5) reported their health to be at least "good" and 17% (n=1) reported their health as "fair." By month two, health perception increased 17% (n=1) as all non-vapers reported their health to be at least "good." By month two, 50% (n=3) of vapers felt depressed, and 67% (n=4) reported feeling tired in a short amount of time. Contrastingly, all non-vapers did not feel depressed at all and only 17% (n=1) felt tired.

Conclusions: In this analysis, vapers' perception of their own overall health followed a downward trend; they also had more reports of feeling tired and depressed. Non-vapers had a healthier perception of their own health compared to vapers overall. The use of e-cigarettes may affect how someone views their own health, therefore more research is required to strengthen this association given the pilot nature of this work.

(U) = Undergraduate; (M) = Masters; (D) = Doctoral

296 11:00 am K

Association Between Secondhand Vaping Exposure and Vaping Status Among College Students

Rafael Chavez, MPH - Epidemiology (M)

Background: The use of electronic cigarettes (e-cigarettes/vaping) among adolescents and young adults in the United States has risen and become commonly used over the past decade. Factors that contributed to the rise in e-cigarette use include tastes and flavors, rechargeable vaping pods, social experimentation, curiosity, entertainment, and social environments. The Dyad Vaping Study seeks to determine secondhand vaping exposure between vapers and non-vapers over a 3-month period among college students participating as a dyad (vaper/non-vaper).

Methods: The Dyad Vaping Study is a 3-month long pilot study. Inclusion criteria were being between 18-30 years old, currently using e-cigarettes (vaper), English fluency, internet access, and not using e-cigarettes (non-vaper). At the first visit of the month, participants were given their own silicone wristband and wore them for 7 days. The second visit of the month occurred on the 7th day of wearing the wristbands and were collected. Participants also filled out a survey, gave a urine sample, and a vaping pod. Six dyads (n=12) were analyzed using the baseline (month 1) and month 2 surveys. Only baseline and month 2 data were included.

Results: Baseline results indicated that in the past 7 days, vapers had higher secondhand vapor exposure at their residence (83.33%), compared to non-vapers (66.7%). In the past 24 hours, vapers had a higher exposure at a friend's home (33.33%), compared to non-vapers (20%). Month 2 revealed that in the past 7 days, vapers had higher exposure at a friend's home (83.33%), compared to non-vapers (66.67%). In the past 24 hours, vapers had higher exposure at a friend's home (50%) and in a public area (50%), compared to non-vapers ((33.33%), (16.67%)).

Conclusion: Our study concluded that vapers had higher secondhand vapor exposure at their residence, at a friend's house, and in a public area. Exposure to secondhand vapor in social settings may be a contributing factor towards engaging in e-cigarette/vaping behavior. However, given the pilot nature of this work, more research on dyad vaping is needed to fill the gaps of existing literature.

297 11:00 am L

Vicarious Racism and Substance-Use: Assessing the moderating roles of social-connection and ethnic-identity

Isabela Cruz-Vespa, Psychology (U)

While great strides have been made in research concerning the negative health impacts of racism, the majority of this research has focused on direct interpersonal experiences of racial discrimination — meanwhile, empirical research on other facets, such as vicarious racism, is still limited. Vicarious racism, or “secondhand” racism, occurs when hearing about or witnessing racism being committed against one’s ethnic

or racial group through mediums such as social media, in the news, or from other people. Its pervasiveness, as well as its conveyance of social rejection or marginalization, make it a salient psychosocial stressor for anyone who identifies with the same racial or ethnic group as the victim. In light of current racial health inequities, as well as the continued perpetration and visibility of racism, the current study examines if the stress of vicarious racism exposure may be linked to substance-use as a maladaptive coping mechanism in Black and Latinx participants. An online study is utilized in order to measure Latinx and Black participants’ self-reported vicarious racism exposure and related stress using a short questionnaire, as well to measure their frequency of substance-use using questions adapted from the National Survey on Drug Use and Health. Additionally, participants are asked to complete the Scale of Ethnic Experience questionnaire, and asked about their feelings of social connection and support. It is anticipated that vicarious racism-related stress and frequency of substance-use will be positively related, and that both strength of ethnic-identity and feelings of social connection will moderate this relationship. Research on this topic has public health and policy implications to raise awareness of vicarious racism, and racism itself, as population-level health risk factors.

Session G-3

Behavioral and Social Sciences 9
Friday, March 3, 2023, 11:00 am
 Montezuma Hall

298 11:00 am M

The impact of early adolescent polyvictimization on externalizing behavior trajectories and early adult criminal justice involvement

Michelle Gaspar Jimenez, Psychology and Criminal Justice (U)

Introduction: Polyvictimization, or the accumulation of childhood victimization experiences, is associated with aggressive and delinquent behavior development that persists across childhood and adolescence, increasing risk for criminal justice involvement in early adulthood. Research on the timing of polyvictimization on these trajectories and adult outcomes has been limited by cross-sectional designs and retrospective designs. To address these gaps, the current study examined the prospective association between polyvictimization and trajectories of aggressive and delinquent behaviors across childhood and adolescence, and how these trajectories related to early adult criminal justice involvement. **Methods:** The sample included 475 caregiver-youth dyads from the Longitudinal Studies of Child Abuse and Neglect. Caregivers were interviewed biannually about their youth’s externalizing behaviors from ages 4-16. Caregiver, youth, and Child Protective Services reports were combined to measure the number of victimization types (i.e., physical or sexual abuse, witnessed family or non-family violence) youth experienced (poly-victimization) during two-year intervals from birth to

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age 16. Youth reported how much of the past year they spent detained in the criminal justice system when they were young adults (Mage = 23.78, SD = 1.95). Polyvictimization and poverty were treated as a time-varying covariates, while youth race/ethnicity and binary sex were treated as time invariant covariates. Results: Growth curve modeling revealed that, although aggression was generally decreasing over childhood and adolescence, more early adolescent polyvictimization between ages 10-12, $B = 1.01$, $p = .002$, and 12-14, $B = 1.50$, $p < .001$, was associated with subsequent increases in aggression. Similarly, although delinquency was relatively stable, with greater increases during late adolescence, more polyvictimization during early adolescence between ages 10-12, $B = .27$, $p = .03$, and 12-14, $B = .67$, $p = .002$, was associated with subsequent increases in delinquency. Results also indicated that individuals with increasing delinquency, but not aggression, slopes were at increased risk of spending more time in jail during young adulthood, $B = 9.20$, $p = .02$. Discussions: Findings suggest polyvictimization during early adolescence (ages 10-14) may be particularly impactful, increasing youths' aggressive and delinquent behavior trajectories and risk for long-term criminal justice involvement.

299 11:00 am N

Supervision of Individuals Convicted of Sexual Offenses: Examining with a Public Health Perspective

Holly Hiatt, Public Health (U)

The current study involves analyzing data collected from a survey of frontline probation and parole officers as part of the larger Sex Offense Management and Supervision (SOMS) Initiative. The goal of the SOMS Initiative is to understand how frontline officers perceive their clients and the ways in which they engage in evidence-based practices. I came to this project with a public health background, and approached the data with a focus on the way officers conduct their work that impacts the health and well-being of people on supervision and the greater community. In particular, questions also arose about officer's impact on the rehabilitation of people convicted of sex offenses. This is especially important given how stigma may be counterproductive toward the goal of rehabilitation and reintegration. There are endless public health discussions that can come from the perpetration of sexual violence and violations of laws involving sexual safety, yet our focus was on parole and probation practices, perspectives, and relationships. Beginning with an extensive literature review, I gained a basic understanding of recidivism rates and what reentry currently entails and read studies looking at the effectiveness of the registry, residence restrictions, and treatment as well as the psychological impact of counseling sex offenders on treatment providers. The former two are of great interest since the public largely supports and perceives benefit from the sex offender registry despite empirical evidence either not supporting or showing the opposite. From a public health standpoint, the potential instability caused by social ostracization, employment

or residence restrictions may jeopardize community safety further. The latter is significant when we approach rehabilitation and community reintegration from a public health lens since these providers are community members. The literature review culminated in an annotated bibliography to which we can return for further key considerations from prior work on the matter.

To better visualize our data, we created a codebook in Excel and used NVivo to code by theme the open-ended responses. Many of our questions arose as we did this and analyzed numerical data using SPSS.

300 11:00 am O

Understanding Staff Perspectives on Supervision and Community Management of Individuals Who Have Been Convicted of Sexual Offenses

Emily Augustine, Journalism, Advertising emphasis (U)

The supervision and management of individuals convicted of sexual offenses receives much attention from policymakers and the public. People who have engaged in sexual harm are perceived of as a high-stakes population and are subject to myriad laws, policies, and practices aimed at restricting access to potential victims or deviant behavior cycles. Laws and policies across the United States consistently create geographic boundaries for where someone convicted of these crimes can live, the requirement of registration with local, state, and federal government agencies (sometimes for life), and the mandate to receive community-based supervision and treatment.

Despite the prevalence of these laws and policies, concerns about the potential harm created by the restrictiveness (and alternatively, punitiveness) have been raised by community members, advocates and individuals subject to the laws. One group of stakeholders we have little knowledge about are those individuals tasked with administering local and state policies related to supervision by corrections departments. In this study, interviews with eight corrections agency administrators reveal the common problems experienced by the organization responsible for oversight and management of individuals, as well as the impacts to individuals themselves.

301 11:00 am P

Risk is Feelings: Support-Giving Increases Risk Perceptions

Alicia Assang, Psychology (M)

While risk perceptions can encourage health behavior changes, highly threatening risks could overwhelm individuals and lead to resistance against change. The social factors that impact risk perceptions remain largely unexplored. Based on a mechanistic model of support-giving and health, it is possible that support-giving reduces threat related to such risk perceptions. As such, the hypothesis that support-giving would reduce risk perceptions was investigated in two studies. In Study 1, an exploratory longitudinal survey was conducted in which participants reported support-giving behaviors at time

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1 and risk perceptions related to the contagion of COVID-19 two weeks later (time 2; n = 545). Unexpectedly, more reported support-giving was associated with increased risk perceptions in regard to getting COVID-19. Study 2 was then conducted in order to further explore the causality of this relationship, as well as to assess the generalizability of support-giving to illnesses beyond COVID-19. Participants were randomly assigned to a support-giving or control condition before reporting on risk perceptions for cancer (n = 321). Once again, support-giving increased risk perceptions of getting cancer – specifically affective and experiential risk perceptions – when compared to the control condition. Since affective risk perceptions are most predictive of health behavior changes, these findings suggest that support-giving can be utilized as an intervention to encourage health behaviors.

302 11:00 am Q

Patient and Provider Perceptions on the Influence of Intimate Partner Violence on Acquiring HIV and Access to HIV Preventative Services

Sandhya Muthuramalingam, Public Health (U)

Background: Sexual minority men (SMM) experience intimate partner violence (IPV) at disproportionately high rates. Previous research has identified both IPV victimization and perpetration as risk factors for HIV acquisition. However, little is known about the impact of IPV on HIV preventive measures, including HIV/STI testing, pre-exposure prophylaxis (PrEP) uptake, and adherence to PrEP use among SMM experiencing IPV.

Objective: The objective of this analysis was to assess the opinions of 1) SMM on how IPV can affect their risk of acquiring HIV and access to preventative care, and 2) healthcare providers on treating SMM in relationships with IPV.

Methods: SMM participants were recruited from partner LGBTQ+ organizations and providers were from the LA LGBT Center Clinic. Semi-structured interviews were conducted with providers (N=10) and SMM participants (N=24). The interviews were audio recorded and transcribed verbatim. An applied thematic analysis approach was conducted to create memos, inductively generate a codebook, apply codes to the transcripts, and identify key themes in data.

Results: SMM participants discussed three main themes that influence their risk of HIV: coercion, protection and self-preservation, and vulnerability. Coercion describes the display of aggression from a partner for taking PrEP or wearing a condom during intercourse. Protection and self-preservation focused on when participants actively avoided discussing STI testing or HIV to avoid IPV. Vulnerability describes specific instances where participants experienced IPV that put them at immediate risk of acquiring HIV from their partner. Providers' interviews demonstrated two key themes that provide insight on how patients they see are at risk for acquiring HIV: the role of race/stigma and relationship power dynamics. Stigma and racism can influence victims to remain in abusive relationships or not utilize preventative measures such as PrEP. Relationship

power dynamics highlight instances such as financial dependency or controlling behavior where the abuser has the upper-hand.

Conclusion: The findings from this study provided insight into the influence of IPV with the uptake of HIV preventative services among SMM and will be used for establishing a cohort of SMM experiencing IPV in a secondary phase of the project.

303 11:00 am R

Annotating unstructured data from medical records to reduce bias in algorithms for geriatric oncology

Hoang Nguyen, Public Health (M)

Purpose: Electronic medical records (EMR) are crucial to keeping track of patients' health statuses and treatment plans. EMRs contain structured data, including well-defined fields like name or age. However, the majority of EMR is unstructured or free text, like physician notes and comments, which can be difficult to interpret. Machine learning/AI (ML/AI) uses Natural Language Processing (NLP), a novel computational approach to managing unstructured data. NLP identifies keywords for ML/AI automation so that algorithms can be trained and validated. In healthcare, most NLP algorithms use clinical ontologies, or specialized data dictionaries focused on clinical terminology. Further, they tend to be trained with homogenous English-language data, excluding marginalized groups and resulting in biased algorithms. Our study aimed to diversify algorithms using an aging and language-focused ontology to improve extraction for ML/AI classification models for diverse aging populations with head and neck cancer.

Methods: EMRs were requested from N=200 patients at UC San Diego Health's Moores Cancer Center, resulting in N=3983 individual notes for analysis. Four coders independently reviewed deidentified notes for themes of interest including nutrition, function, and language/culture. A data dictionary was created, wherein coders mutually agreed on definitions based on the American Society of Clinical Oncology and communication evidence. After coding, interrater reliability and outcomes were calculated using descriptive methods. This study was approved by the UCSD IRB.

Results: Of the initial N=3983 notes, 942 notes were discarded primarily due to notes without patients' assessment. The remaining 3,041 notes contained themes of interest, with 2,631 notes (corpus) mentioning nutrition, 1,596 including phrases about function, and 658 mentioning language barriers or culture. In the corpus of analysis, 88.1% included phrases about patient nutrition, 51.4% discussed patient function, and 17.5% discussed language or culture.

Conclusions: EMRs contain rich unstructured data. By coding and extracting age and language-related factors, we were able to contribute to an age and language ontology that can improve algorithms and reduce bias. This will inform the next step in modeling and algorithm development to identify risks for diverse and aging geriatric oncology patients.

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304 11:00 am S

The Role and Impact of the Athletic Trainer in the Medical Disqualification Process Following Concussion

Mikaela Garcia, Kinesiology, pre-physical therapy (U)

Context: Concussions are difficult injuries many athletic trainers (AT) encounter due to the limited outward signs of impairment, becoming a greater challenge when medical disqualification decisions resulting from a concussion must be determined. There are various factors that can influence and impact the AT's final decision regarding an athlete's medical disqualification. The purpose of this study was to gain a better understanding of the medical disqualification process following a concussion from the athletic trainer perspective.

Methods: Eighteen semi-structured interviews were conducted with ATs who previously completed an online survey and voluntarily provided their contact information. Themes and subthemes were identified using a five-cycle process including a topic review, performing a literature review, collecting, and summarizing the data with a codebook developed by a three-person research team, connecting findings to current research, and making final interpretations. After this process, we discovered six themes. This abstract focuses on three subthemes with the AT's role.

Results: The role of the AT consists of three distinct features including 1) education, 2) communication, and 3) the weight of the decision. Participants noted their ability to deliver concussion education to an individual is conducted through the discussion of various topics ranging from health concerns, health management, recovery time, and disclosure. ATs were often at the center of communication regarding medical disqualification following concussion surrounded by various individuals in the multidisciplinary team including coaches, parents, family members, and physicians. Lastly, participants also described how the medical disqualification decision weighed on them as health care providers and the impact of that decision.

Conclusions: Our findings reveal the importance of the ATs' role in the medical disqualification process following concussion. ATs are well educated and positioned to provide information ensuring shared decision-making based regarding disqualification. Importantly, the medical disqualification process following concussion also takes a toll on the AT as these decisions are complex and may significantly impact the athlete's future. Further research should be conducted into ATs' specific clinical and educational experience, and how these plays a role in medical disqualification.

Session G-4

Biological and Agricultural Sciences 8

Friday, March 3, 2023, 11:00 am

Montezuma Hall

305 11:00 am T

The Effect of Site Productivity and Disturbance on Microbial Compositions in the Built Environment

Kaelyn Nannini, Biological and Medical Informatics (M)

Microbial organisms are ubiquitous in every environment, including built environments. However, our understanding of the environmental conditions impacting microbial growth and diversity in the BE is still largely based on observational studies. In this study, we use an experimental approach to test how site productivity and disruption affect bacterial and fungal communities within the built environment. Specifically, we determined how differential moisture conditions, constant humidity vs. wet-dry cycling, impacted growth and diversity of microbial communities on three common building materials: gypsum drywall, medium-density fiberboard (MDF), and oriented strand board (OSB). Microbial growth was measured using culture-independent microscopic cell counting of bacteria cells, and spore counting and hyphae length measurements for fungi. Community composition was determined via bioinformatic analysis of amplicon sequencing libraries for bacteria (16S) and fungi (ITS). Moisture availability had significant effects on growth for both fungal and bacterial communities. Bacterial growth was generally lower when dry periods were introduced compared to the materials that were kept wet, especially in the later time points in the study (Days 35 and 47). This same pattern was also observed in fungal spore counts and hyphae length. Despite moisture affecting growth in both bacteria and fungi, ATP was not significantly affected by moisture availability. Interestingly, the hyphae length was significantly lower on MDF compared to the other two materials. In addition to growth, moisture availability also impacted fungal and bacterial diversity. While moisture only impacted alpha diversity in terms of bacterial evenness, beta diversity was significantly different between treatment types for both bacteria and fungi. While fungal alpha diversity was not affected by moisture availability, it was significantly impacted by material type and time point. Additionally, bacterial phylogenetic diversity was affected by Day.

306 11:00 am U

Environmental source-tracking with metabolomic data

Andrew Levine, Bioinformatics and Medical Informatics (M)

The SourceTracker (ST) algorithm uses next-generation sequencing data to determine the environmental sources of bacteria in samples contaminated by bacteria from multiple environments (e.g., polluted ocean waters). The original ST

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paper is considered a “seminal advance” in the field and has been cited >1000 times in a remarkable array of studies topics (e.g., ancient DNA, built environments and host-associated microbiomes). Recently, McGhee et al. (2020) expanded ST to work with metagenomic data and showed that different taxonomic groups revealed significantly different patterns of source origins. In the present study, we expand ST to metabolomic data and test whether using metabolite data may be more effective at determining source origins than microbial sequencing data from the same samples. Research conducted previously in the Kelley lab showed in mice found that metabolites in the gut microbiome were more effective at predicting disease than simply using bacterial features (Ho et al. 2021). Here, we explore the utility of metabolite data for source-tracking and test its ability to act as a leading indicator of changes in the gut microbiome and perhaps a better predictor of the current state of the microbiome. To explore this topic, ST will be adapted for use with metabolite data, and we will test the adapted version with data from the Ho et al. study. This study includes gut metabolite samples from very distinct treatment groups as well as samples that can be clearly used as both “source” and “sink” communities, a necessary aspect of source-tracking. Using these data, we will test whether metabolite ST can estimate source proportions in the sink samples, and we will also compare these results to sequencing data results from the same samples. Our results will determine the effectiveness of ST with metabolite data and, if successful, this could open a new avenue of exploration in how the gut microbiome is used and how metabolite ST can be used in other systems. Co Author, Scott T. Kelley.

307 11:00 am V

Characterization of Metagenomes and Pathogen Identification of the Tijuana River

Shayla Shahar, Bioinformatics and Medical Informatics (M)

The Tijuana River is a polluted transborder river that flows northwest across the border from Baja California in Mexico into Southern California before discharging into the Pacific Ocean. The river is highly impaired with raw sewage due to inadequate sanitary infrastructure in Tijuana, which enters into recreational waters in Imperial Beach. To assess the type and degree of microbial contamination, water samples were taken at two sites, a transborder and an estuary between August 2020 and May 2021. Environmental DNA was extracted from these samples and then subject to shotgun sequencing to comprehensively characterize the microbial diversity. Using the rapid taxonomic identifier tool Kaiju, we classified the microbial diversity using the NCBI nr_euk database to identify bacteria, archaea, eukaryotes, and viruses present in the samples. Additionally, antibiotics resistant genes (ARGs) were identified in the samples. The border site had greater relative abundances of ARGs, and the most abundant ARGs had multi-resistance to beta-lactam antibiotics. Finally, a SourceTracker analysis was used to determine the probable environmental sources of the communities in each sample comparing the transborder

and estuary samples to freshwater, gut, Pacific Ocean, coastal marine, soil, and wastewater samples where about 70% of the total samples were assigned to a source. Overall, this research demonstrates that common microbial species associated with human sewage are elevated in the Tijuana River, and that ARGs are prevalent in these waters.

308 11:00 am W

Soil Bioengineering for Green infrastructure: Understanding soil-waterplant interactions

Aditya Garole, Civil Engineering (M)

The concept of Soil Bioengineering is an important topic for the construction industry as the behavior of soil under different climatic and working conditions vary. Understanding the soil – Root- Water interaction to help improve soil stability is a crucial part. The scope of this study is to infuse soil bioengineering methods with green infrastructure to develop a model which can be of great benefit to the construction industry. We will also be looking at the financial aspects of this project as the model should be economically fit. This model will play a key role in climate change issues. For this experiment, we will be building Rhizotrons which happen to be the structure which can show us the root growth with and without potassium. We will be using Destructive and NonDestructive methods for root analysis.

309 11:00 am X

Lunar Farming: Mechanism of Plant Growth Promotion in Lunar Regolith by Biopolymer and Urea Fertilizer

Emily Brown, Environmental Engineering (U)

As humans plan to return to the Moon with the NASA Artemis mission, the humans living in this faraway world will need food to survive. Thus, lunar farming could become a reality sooner rather than later. Just last year, researchers have for the first time successfully grown plants (*Arabidopsis thaliana*) in the nutrient-poor lunar regolith. Thus, in order to further enhance the understanding on how plants might overcome harsh lunar environmental conditions, the present study aimed at elucidating the morphological and physiological changes occurring in plants treated with the biopolymers and urea fertilizer. The vegetal-based biopolymer and urea were applied at two different concentrations. The root dry biomass, total root length, and surface in plants were significantly higher in biopolymer-amended regolith than in untreated lunar simulant. In addition, the experiments show that the mixtures containing urea fertilizer help plant growth promotion. These preliminary results show ability of plants to thrive in extraterrestrial environments and can potentially help to promote plant growth in food-scarce areas here on Earth.

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Session G-5

Biological and Agricultural Sciences 9
Friday, March 3, 2023, 11:00 am
 Montezuma Hall

310 11:00 am Y

Investigation of Endolysosomal and Mitochondrial Dysfunction in Neurodegenerative Diseases

Rhiannon Gilliard- Telefoni, Interdisciplinary: Biology, Chemistry, and Sociology (U)

The most common neurological disease is Alzheimer's disease (AD), characterized by cognitive impairment due to a progressive loss of cerebral neurons, which is affected mostly in elderly people (Wang, et al., 2019). Recent studies have indicated that endolysosomal dysfunction likely plays an important role in the early phases of the pathogenesis of neurodegenerative diseases such as AD. Whereas mitochondria play an essential role in aging, cancer, diabetes, and neurodegenerative diseases. Mutant and aberrant mitochondrial proteins alter neuronal function and cell death structurally and functionally (Malik, et al., 2019. Reddy, et al., 2009). In this experiment, I will be using primary embryonic neurons from the PSAPP mouse that models AD to define the molecular and cellular pathogenic mechanisms of Mitochondria Membrane Potential (MMP). I hypothesize that endolysosomal and mitochondrial structures and functions are significantly impacted in the PSAPP neurons, contributing to neurodegeneration in this AD mouse model.

I will establish primary cortical neuronal cultures from both the WT and the PSAPP embryos. I will use LysoTracker to measure lysosomal transport. To study mitochondrial function, I will use a ratiometric dye JC9 to measure the mitochondrial membrane potential (MMP). Live cell imaging of axons/neurites will be carried out to quantitate LysoTracker and JC9 signals. The results will be used to compare PSAPP with WT control neurons. To validate my results, I will also measure lysosomes and mitochondria in neuronal progenitor cells (NPCs) from healthy controls and AD patients.

Specifically, I will quantitate and analyze:

The size, motility, and activity of lysosomes in both healthy and disease neurons/cells. The size, motility, and activity of mitochondria in both healthy and diseased neurons/cells.

The results collected will be used to establish:

Endocytic trafficking is defective in disease neurons/cells – an essential cellular process that transports proteins, hormones, growth factors, receptor tyrosine kinases, and lipids.

Mitochondria dynamics and functions are altered in disease neurons/cells – the powerhouse to support all essential cellular functions and dysfunctional mitochondria have been implicated in many neurodegenerative diseases.

My study is expected to demonstrate that endolysosomal/mitochondrial dysfunction that occurs early in neurodegenerative disorders contributes critically to the pathogenesis of these diseases.

311 11:00 am Z

The Role of Ephrin Signaling in Neural Patterning in Planarians

Sarah Warner, Molecular Biology, MS (M)

Signaling mediated by Eph receptors and their Ephrin ligands has broad and diverse functions in animals, especially in the development of the nervous system. For example, Eph/Ephrins are involved in processes like axon guidance, neural patterning, and inhibiting neuroregeneration after CNS injury. While many studies have highlighted the roles of Eph/Ephrins in neurogenesis in mammals, we know very little about their role in planarian nervous system development and regeneration. Our lab uses the freshwater planarian *Schmidtea mediterranea* as a model to study tissue regeneration. *S. mediterranea* can regenerate any type of tissue, including the nervous system. This regenerative capacity makes planarians an excellent model organism for studying mechanisms involved in patterning the nervous system. Our previous work revealed that the transcription factor *soxB1-2* is crucial for the regeneration and maintenance of a planarian mechanosensory system with a discrete and spatially restricted pattern and that the neurons in this system arise from *pou4+* progenitor cells. A genetic screen for genes differentially expressed in *pou4+* cells to identify genes downstream of *pou4-2* transcriptional regulation identified the planarian homolog of human Ephrin type-A receptor 4 (*EphA4*) as a candidate factor. *EphA4* has been implicated in the regulation of neurogenesis and axon guidance in other animals. Preliminary experiments in our lab showed that disrupting *ephA4* function results in ectopic mechanosensory cells, suggesting that *ephA4* is required for patterning newly born mechanosensory neurons. My research aims to elucidate the role of ephrin signaling in neural patterning in planarians. To understand how *ephA4* inhibition affects mechanosensory system patterning, I will combine RNA interference (RNAi) and whole mount in situ hybridization (WISH) for markers of sensory neuron populations and patterning genes. In addition, other candidate ephs and ephrins will be identified using a planarian single-cell database, and their roles in neural patterning will be examined using RNAi, WISH, and immunolabeling of the nervous system. Elucidating the role of ephrins in neural patterning in planarians will help expand our understanding of how the nervous system is developed and maintained in a regenerative species.

312 11:00 am AA

The Role of the Transcription Factor Barhl2 in Sensory Neuron Regeneration in the Planarian Species *Schmidtea mediterranea*

Megan Daneman, Biology with an emphasis in cellular and molecular biology (U)

The planarian flatworm, *Schmidtea mediterranea*, is an excellent model to study nervous system regeneration after injury due to its abundant adult stem cell population. Our lab is interested in the role transcription factors play in the sensory neuron specification and maintenance. Our

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previous work showed that the transcription factor soxB1-2 is necessary for regeneration and maintenance of many sensory neuron populations. SoxB1-2 function is required for the expression of at least pou4-2, another factor that activates terminal genes in mechanosensory neurons. To uncover additional factors downstream of soxB1-2 that are required for the specification of other unique sensory neuron populations, we extracted soxB1-2+ neurons from the *S. mediterranea* single-cell RNA-seq (scRNA-seq) atlas. This revealed *barhl2* as differentially expressed in a subset of soxB1-2+ sensory neurons. *Barhl2* is involved in neurogenesis in humans and ganglion development in mice. Whole-mount in situ hybridization (WISH) experiments revealed *barhl2* expression in the sensory neuron enriched head periphery region and the CNS. To determine if *barhl2* is downstream of soxB1-2 and required for specification of a subset of sensory neurons, we also mined the scRNA-seq atlas for sensory genes differentially expressed in *barhl2*+ neurons and cloned seven candidate genes: *trpc6*, *slc6a-3*, *slc46a-2*, *rad60-sld*, hypothetical protein-17271, spermidine synthase, and *glra3*. We then performed RNAi knockdowns to inhibit *barhl2* and soxB1-2 and assayed for changes in gene expression by WISH. In soxB1-2(RNAi) worms, there was a decrease in *barhl2* expression confirming that *barhl2* is downstream of soxB1-2 regulation. In *barhl2*(RNAi) worms there was a slight, but inconclusive decrease in *barhl2*, *trpc6*, and hypothetical protein 17271. *Barhl2*(RNAi) worms demonstrated normal behavioral responses to vibration, water flow, light, and chemosensation assays, comparable to controls. The results suggest incomplete knockdown of *barhl2*. Thus, to increase the knockdown efficiency of *barhl2* and soxB1-2 we are repeating RNAi experiments using an adjusted protocol. Efficiency will be tested over an RNAi timecourse by qPCR and WISH. Once established, we will revisit the experiment testing the function of *barhl2* of downstream candidates. This study will provide insight into the genes involved in specification and function of planarian head sensory neurons.

313 11:00 am BB

Techniques Utilized with Induced Pluripotent Stem Cells Researching Pediatric Neurological Disease

Christina Jackson, Biology (U)

Background: Microglia are the resident innate immune cells of the central nervous system (CNS) and play an integral role in maintaining brain homeostasis and in the progression of many neurological disorders. Some of the roles of microglia include synapse maintenance, phagocytosis of apoptotic cells and protein aggregates, and surveillance of the CNS. In diseased microglia, these roles can become dysregulated, leading to a multitude of neurodegenerative diseases. In diseases like Alzheimer's Disease, microglia fail to take up and clear amyloid- (A β) and tau, resulting in plaque formation. In multiple sclerosis, microglia are hyperactive and demyelination of the subcortical and cortical brain matter occur.

One disease where microglia are thought to be the main pathogenic cell type is in a rare pediatric histiocytic disorder called Langerhans Cell Histiocytosis (LCH). LCH is caused

by somatic MAPK pathway mutations in myeloid progenitor cells. Patients with LCH often develop a progressive neurodegenerative disorder. Since microglia are derived from yolk sac myeloid progenitors, we hypothesize that microglia with a MAPK mutation are driving the neurodegeneration seen in patients with LCH. The goal for my part of the project is to use techniques developed in the Coufal Lab to understand the role of microglia in LCH and broadly their dysregulation in neurodegenerative disorders.

Methods: Using patient-reprogrammed iPSC lines, I learned how iPSCs are developed into iHPCs, and then differentiated into mature microglia. Several microglial morphology assays were learned; ramification quantification of microglia to observe what morphological phenotypes are present, and phagocytosis assays being some. Taking iPSCs that were previously reprogrammed from a patient with LCH, I will CRISPR in the LCH mutation, subclone them, run an Alu1 restriction digest, and send in my samples for sequencing to see if I got the mutation of interest. Upon getting the mutation of interest, I will then start the microglia maturation process and run numerous assays on them.

Results/Discussion: I learned of various techniques used when modeling pediatric neurodegenerative disease such as LCH. Such rare neuroinflammatory pediatric diseases can be reprogrammed to iPSCs to make microglia and cerebral organoids to understand their diseases better and to test therapies.

314 11:00 am CC

Using Human Pluripotent Stem Cells to Study Retinal Development and Photoreceptor Regeneration

Samuel Williams, Biology (U)

The retina is a complex biological structure that has lots of similarities with the brain. Retinal degenerative diseases like Age-related Macular Degeneration (AMD) and Retinitis Pigmentosa (RP) cause permanent loss of photoreceptors which there are no current cures or treatments for. The more we understand about retinal development, the better we can work towards finding treatments and cures for these retinal degenerative diseases and restoring the photoreceptors that were lost to these diseases. For my project, I am creating triple fluorescent reporter cell lines from pluripotent stem cells (PSCs) that will allow me to visualize cells, verify gene expression and track retinal development. These cell lines can be used in 2D and 3D differentiations to assay the development of specific retinal cell types. These cell lines will be validated by creating 3D retinal organoids, followed by FACS sorting and RNA sequencing to verify gene expression. I am also creating plasmid constructs to allow for inducible overexpression of genes like *NRL*, and *LHX4* and direct conversion of PSCs into rod and cone photoreceptors. These constructs can be integrated into PSCs via CRISPR-Cas editing to convert the PSCs to eye field progenitor cells and later into photoreceptor-like cells. The organoids and 2D cultures can then be used for further experiments involving drug screening and help us to better understand retinal biology.

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The culmination of these experiments will allow us to better understand the retina and retina degenerative diseases. The tools that I am making in these experiments will prove to be useful in studying cures and treatments for these diseases for years to come.

Session G-6

Biological and Agricultural Sciences 10

Friday, March 3, 2023, 11:00 am

Montezuma Hall

315 11:00 am DD

Role of ABC Transporters in the Planarian species *Schmidtea mediterranea*

Rania Atto, Microbiology (U)

The largest known family of transporter genes is the ABC (ATP-binding cassette) transporter family. ABC transporters bind to and hydrolyze ATP to allow for import or export of substrates across membranes. ABC transporters have known roles in drug-resistance, nutrient import, and movement of toxins and drugs across membranes, but have not been characterized in a highly-regenerative organism like the planarian *Schmidtea mediterranea*. *S. mediterranea* are non-parasitic flatworms with a large population of stem cells (called neoblasts) that allows them to regenerate whole worms from small tissue fragments in less than one week. Studying ABC transporters in planarians may uncover roles these genes play in stem cell-based regeneration and maintenance of tissues. Our lab identified 21 ABC transporters in *S. mediterranea* using BLAST to compare known ABC transporter amino acid sequences from *Lytechinus pictus* and *Strongylocentrotus purpuratus* (sea urchin species) to the planarian transcriptome. We first explored enrichment of these genes within cell populations from published single cell RNA-seq (scRNA-seq) data and found they are enriched mainly in epidermal, neural, intestine, parenchymal, neoblast, pharynx, and glial cell clusters. We hypothesize ABC transporters may have significant roles in filtering waste and transporting substrates into the epidermis, gut, and central nervous system in *S. mediterranea*, along with functional roles in stem cells that may affect regeneration. We are cloning these genes and will perform whole-mount in situ hybridizations (WISH) to determine which cell and tissue types express each gene; we have cloned and performed WISH for 12 out of 21 genes thus far. We found they have expression patterns within the epidermis, brain, intestines, and neoblasts, correlating with scRNA-seq data. We are performing RNAi knockdowns of each gene using in vitro transcribed dsRNA to screen for any phenotypes (e.g., morphological changes) in intact and regenerating (amputated) worms. We will also expose planarians to irradiation to deplete the neoblast population and confirm expression of any of the genes within the stem cells. These experiments will provide a better understanding about what roles ABC transporters play in *S. mediterranea* and how loss-of-function may affect stem cell-based regeneration and tissue homeostasis in a highly-regenerative organism.

316 11:00 am EE

PPAR d/b role in Nrf2 antioxidant function

Sydney Roman, Biology (U)

Two key metabolic pathways are sensitive to nutrient availability and storage: PPAR (peroxisome proliferator-activated receptors) and Nrf2 (nuclear factor erythroid 2-related factor 2). PPAR functions in lipid storage and accumulation, sensing bioavailability of substrates and directing towards an energy conserving or generating phenotype. Nrf2 is a transcription factor that produces the antioxidant glutathione which coregulates PPAR. There is evidence from past publications that Nrf2 may regulate PPAR function, though crosstalk between the pathways is poorly understood. Here, we examine the role of understudied PPAR d/b in Nrf2 antioxidant function. We exposed zebrafish (*Danio rerio*) to PPAR d/b antagonists and agonists from 24-96 hpf. We also use Nrf2a knockdown (mutant) zebrafish, and assess PPAR-related gene expression. RNA was isolated at 96 hpf, converted to cDNA, and qPCR was performed to examine gene expression of Nrf2 transcriptional targets. Nrf2a mutant embryos had elevated PPAR gene expression, suggesting that Nrf2a may be a negative regulator of PPAR function. This research demonstrates that energy-sensing mechanisms may also rely on redox signaling within embryos, and may influence metabolic health.

317 11:00 am FF

Embryonic development is affected by chemical leachate resulting from tire wear particles (TWP) in the zebrafish, *Danio rerio*

Jenielle Domaol, Biology (U)

Tire wear particles (TWP) are small micro- or nano-particles resulting from the friction of tire tread against roads. These microplastics have been found in waterways, usually through rain and wind, posing a potential risk to exposed aquatic life. The goal of this project was to assess the toxicity of chemical leachate from TWP and how it may affect the health and development of aquatic life, like *Danio rerio*, zebrafish. We also wanted to determine if solar-simulated or dark conditions intensified the effects of TWP, considering processes like photodegradation, photochemical oxidation, etc. occur in sunlight. For this project, zebrafish were exposed to a TWP solution, treated in solar-simulated or dark conditions, of 0% (light), 0% (dark), 25% (light), 25% (dark), 50% (light), 50% (dark), 75% (light), or 75% (dark) from 0 days post fertilization (dpf) to 4 dpf. On days one through three, the mortality rate was noted and each vial or petri dish was refreshed. On the fourth day of exposure, the overall survival rate and any physical defects were noted and imaged through light microscopy. From TWP exposure, there was an increase in mortality, yolk sac edema, impaired hatching, and craniofacial malformations, and a decrease in swim bladder inflation for all the exposed light and dark groups. Pericardial edema increased for the 25% and 75% dark groups and for the 50% and 75% light groups. Spinal deformities also increased for the 50% and 75% light groups and the 50% dark group. Ethoxyresorufin-O-deethylase (EROD) activity, a visual measurement of

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CYP1A metabolic activity, was also assessed in the gut, liver, and brain by exposing the embryos to 7-ethoxyresorufin (7-ER). The EROD activity conveyed an increase in CYP1A activity in the liver and brain regardless of light status and a decrease in gut CYP1A activity in both light and dark groups. Interestingly, TWP decreased EROD activity in the gut. Overall, these results suggest a disruption of embryonic development in zebrafish when exposed to TWP and an increase in liver and brain metabolism of TWP due to potential damage in the gut microbiome, regardless of solar simulated or dark conditions.

318 11:00 am GG

Comparative assessment of the fungicide Boscalid with its primary metabolite M510F01 in zebrafish embryos

Julia Goebel, Master of Public Health - Environmental Health (M)

Succinyl Dehydrogenase Inhibitors (SDHIs) have been used for decades, with new formulations cropping up as fungi evolve. Boscalid was introduced to United States agriculture in 2003 and was determined to be effective for fungal management and safe for aquatic discharge and human consumption. Recent studies have found Boscalid's primary metabolite, M510F01, on crops and in irrigation runoff as well. However, limited information is available about the aquatic and developmental toxicity of M510F01. The goal of our study was to compare and contrast the developmental toxicity of Boscalid with its metabolite, M510F01. Zebrafish (AB, wild-type strain) embryos were exposed to Boscalid or M510F01 from 3-96 hours post fertilization (hpf) at concentrations of 0.03, 0.3, or 3 µg/L. Embryos were examined for aberrant morphologies at 96 hpf using microscopy. Boscalid exposures at concentrations of 3 µg/L increased incidence of blue sac disease by 27%, craniofacial malformation by 91%, pericardial edema by 68%, delayed swim bladder inflation by 33%, and yolk edema by 74% ($p < 0.001$ for all morphologies). 3 µg/L M510F01 increased the incidence of blue sac disease by 24% ($p = 0.005$). To assess whether Boscalid and M510F01 impact Cytochrome P450 1a (Cyp1a) activity, embryos were exposed to Boscalid or M510F01 (0.03 µg/L) from 96-100 hpf concurrently to 7-ethoxyresorufin (EROD)—a fluorometric indicator of Cyp1a activity. There is no significant change in acute EROD activity for Boscalid or M510F01. RNA sequencing and pathway analysis were performed to assess the mechanisms of xenobiotic response to Boscalid and M510F01 exposures (0.03 µg/L). Overall, this research suggests that M510F01 exhibits reduced aquatic and developmental toxicity when compared to Boscalid.

319 11:00 am HH

Toxic Effects of Mining Practices in Northern Chile on Embryonic Development

Shilpa Mudumbe, Cellular and Molecular Biology (U)

Indigenous communities living in the Antofagasta region of northern Chile (near the Atacama Desert) are exposed to harmful levels of environmental pollution, largely resulting

from the abundant mining industry in the region. Heavy metal particulate matter found in the air and soil can have detrimental impacts on human health, such as liver and kidney damage, nervous system disorders, and birth defects. To further study the effects of heavy metal toxicity, this research project uses zebrafish as a model organism for human embryonic development. Zebrafish embryos were exposed from 0-96 hours post fertilization to toxicants extracted from rooftop dusts collected in communities in northern Chile. Microscopic analysis of endpoints such as mortality and common structural defects were performed. Results showed that toxicants from the villages of Chiu Chiu, Toconce, and Caspana appear to be the most toxic to embryos, with prominent effects in hatching and mortality rates. These sites are all located along the Rio Salado in the eastern region. These dust samples had elevated geoaccumulation and enrichment factors for Cu, As, Cr, Pb, Cd, and Mo, suggesting that these sites were highly contaminated with metals and that there is a highly anthropogenic contribution. Overall, this research suggests that transported dust from mining industries in the Antofagasta region may impact human development.

Session G-7

Engineering and Computer Science 5

Friday, March 3, 2023, 11:00 am

Montezuma Hall

320 11:00 am II

Ultrasonic Detection and analysis of Ply-Waviness defects in Carbon Fiber Reinforced Polymer laminates

Nathan Machak, Aerospace Structural Mechanics (M)

The use of composite materials in primary aerospace structures has considerably increased in the last decades. The superior mechanical performance and tailorable nature of such materials is although they are hindered by their expensive manufacturing processes and unknown damage evolution behavior during their lifetime. Among the manufacturing defects that particularly characterize automated methods and/or complex parts, ply waviness in Carbon Fiber Reinforced Polymer (CFRP) could lead to strength reduction and complex behavior, and needs further attention, both in its detection and understanding of damage evolution.

Ultrasonic c-scanning techniques are well suited for composite inspection: they are currently used in the aerospace industry for non-destructive evaluation of newly manufactured parts, in-service inspections and maintenance, and can be tuned to detect ply waviness.

CFRP laminate beams specimens with induced out-of-plane ply waviness were inspected in a water submerged C-Scan system using the ultrasonic pulse-echo technique. Data were collected for a variety of different specimen parameters and system settings, including ply waviness severity, ultrasonic transducer frequency, and c-scan resolution. A customized

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code was then developed to process, visualize and analyze the waveforms collected from the tests. Front-wall, back-wall and internal wave-packets were identified using estimated calculations of the wave velocity in composite laminates. Then, different waveform features such as time-of-flight and amplitude were extracted to visualize and analyze the ply waviness and its characteristics. It was found that internal and back-wall wave packets experienced a decrease in amplitude over the ply waviness region of the specimen. Furthermore, regions to the left and right of the ply waviness experienced noticeable differences in time-of-flight and amplitude for various wave packets. Additional features and signal processing techniques are employed to consistently characterize ply waviness defects and study their evolution under fatigue and other loads.

321 11:00 am JJ

Numerical and Experimental Investigation of Extreme Lunar Conditions on the Physical and Mechanical Properties of Lunar Construction Materials

Aina Narvasa, Civil - Environmental Engineering (M)

Launching and landing pads (LLP) on a lunar surface are necessary for vertical takeoff and landing as propulsive launching/landing on the bare lunar regolith surface will produce regolith erosion resulting in extremely damaging high-speed ejecta and cratering. Thus, the main aim of this research is to numerically and experimentally explore different construction methods for LLP on the Moon capable of withstanding the harsh lunar environmental conditions and the rocket blast. LHS-1 lunar simulant representing the regolith found in highland region of the Moon was used in this study. Three different construction methods were explored: biopolymer (Xanthan Gum) regolith improvement, cold isostatic pressing (CIP) and spark plasma sintering (SPS) methods. Effects of extreme cycling lunar temperatures on the uniaxial compression performance of different LLP construction methods were studied in the range -250°C to 125°C. The extensive experimental results showed that compressive strength in all lunar construction composites tends to decrease with the thermal cycling. Furthermore, it has been observed that the SPS specimens showed better resistance to the influence of the environmental conditions than CIP and biopolymer-amended specimens. In order to further evaluate effects of design, materials, and construction variables on the characteristics of LLPs when subjected to mechanical and environmental loads, multi-physical numerical simulations were carried out using MATLAB. Numerical simulations also showed that the SPS LLP system had better rocket blast resistance than other two LLP systems.

322 11:00 am KK

Ultrasonic Guided Waves Defect Signatures for Damage Characterization of Complex Impact Damages in Composite Aircraft Panels

Kalib Varela, Aerospace Engineering (M)

With the ever-growing applications of composite materials in the aerospace field, non-destructive evaluation (NDE)

techniques are needed to not only detect damages but to also characterize their complex behavior. Composite damages, particularly impacts, can be very dangerous as they are often invisible to the naked eye while reducing the strength of the laminate greatly. The need to detect and characterize these damages is crucial to maintaining and repairing aerospace structures for extended service life.

Due to the thin and slender design often present in aerospace composite structures, they lend themselves well to inspection by ultrasonic guided waves (UGWs). Additionally, UGWs offer the capability to inspect the entire structure in-situ, even if access is only available from one side, traveling long distances with high sensitivity to interference along the entire cross-sectional area of the panel. This allows for detection of defects in multilayered structures which may have complex geometries and assemblies, such as co-cured stiffeners.

The multi-mode and dispersive nature of UGWs, though, make their implementation and interpretation challenging, requiring signal processing techniques to “decode” the information gathered from the signals. One such implementation uses a Single Input Dual Output (SIDO) approach to extract UGW transfer functions. Building on experimental results of UGW data extracted from impacted composite aircraft fuselage panels, this work focuses on identifying signatures of different damage types. Narrow and broadband transfer functions are filtered in time domain to extract features from the various wavemodes.. These features constitute a database of UGW damage signatures, which are compared at each location along the panel using univariate outlier analysis.

Results show that selected feature-wavemode combinations are sensitive to specific types of damage.

Current work focuses on the implementation of other statistical methods, as well as correlating the damage signature database with the damage types, severity and location extracted from higher resolution NDE data of the inspected panels. More advanced pattern recognition techniques are sought to provide automated damage characterization.

323 11:00 am LL

The Impact Efficacy of Density-graded Polyurea Foams

Mark Smeets, Mechanical Engineering (D)

The performance of density-graded elastomeric foams has been a cynosure of the pursuit of superior impact mitigation materials and structures. Elastomeric foams exhibit a remarkable mechanical response, including resilience, toughness, and recoverability. However, recent research has only focused on the performance of mono-density foam paddings in response to various strain rates. Concurrently, research on the potential of density gradation has been burgeoning, suggesting an untapped potential to achieve higher levels of protection than those offered by their ungraded counterpart. This research aims to elucidate the layering interfaces effect on the performance of density-graded elastomeric foams in response to quasi-static and impact loading. Polyurea foam sheets were fabricated consisting of bi- or tri-layered polyurea elastomeric foams using

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two different layering techniques. In one set of samples, the foam was natively adhered by casting subsequent layers with different densities by adjusting the mixing and pouring ratios. In the second sets, separately cast polyurea sheets were adhered using ultrathin polyurea adhesive with similar gradations. Cubic foam samples were submitted to quasi-static loading up to densification and impact loading at 7J. The static and dynamic stress-strain curves were accompanied by full-field digital image correlation analysis, revealing the contributions of the density gradation and layering interfaces to the overall deformation. While the primary outcomes include insights into the mechanistic processes responsible for the mechanical behavior, the natively bonded density-graded polyurea foams provide an exciting platform to explore additional mechanics of elastomeric foams.

324 11:00 am MM

Shock Response of Polyurea Foams

Paul Kauvaka, Chemistry (U)

The suitability of cellular solids for a specific energy absorption application, whether packaging or sports gear padding, depends on their dynamic mechanical behaviors under impact loadings. The latter is imperative not only to simulate real-life loading conditions but also to interrogate the realistic response of the material, contributions of the geometry, and determination of prominent deformation mechanisms. This research aims to extend the application domain of polyurea elastomeric foams through a mechanistic understanding of their response to loading scenarios at moderate impact velocities. Recent research focused on either leveraging quasi-static stress-strain response to forecast the impact efficacy of these foams or submitting the foam pads to low-velocity impacts. Hence, the approach here is to develop a small-scale shock tube to release a projectile into polyurea foam plugs with speeds exceeding 50 m/s. The shock tube was mounted vertically to reduce the logistical impact of the setup. The impact velocity was controlled by adjusting the pressure in the driver (high pressure) section of the tube. The impact-induced deformation was captured using a high-speed camera. The velocity-time profiles were used to calculate the stress, while the high-speed images were analyzed using digital image correlation (DIC) to report the evolution of strains and inertia stresses. Samples were also examined post-deformation using the scanning electron microscope to assess the induced structural damage. The outcomes of this research extend the property map of polyurea elastomeric foams, gearing them closer to transition into realistic sports protective gear applications.

325 11:00 am NN

3D Printing and Mechanical Characterization of Reinforced Honeycomb Structures

Anil Singh, Mechanical Engineering (M)

The advances in additive manufacturing are axiomatic, allowing the production of components economically and efficiently. Nonetheless, 3D printing of reinforced polymer

matrix composites remains challenging due to the drastic differences between the properties of the constituents. Such a dichotomy is exaggerated when the polymer matrix is an elastomer and the reinforcing phase is a ceramic. This research aims to demonstrate the feasibility of additively manufacturing glass micro-balloon reinforced rubber-like resin using stereolithography 3D printing of ordered structures with hexagonal and cylindrical unit cells. In addition to printing with neat rubber-like resin, the ultraviolet curable resin was reinforced with glass micro-balloons with a nominal diameter of 10 μ m at weight ratios of 5%, 10%, and 20%. After optimization of the printing process, six samples of each unit cell geometry and reinforcement ratio were additively manufactured. All samples were conditioned in ambient conditions for two weeks and then submitted to quasi-static and impact loading. In the former, the samples were compressively loaded up to densification while collecting digital images for full-field strain analysis using digital image correlation (DIC). In impact tests, the samples were loaded by dropping a 950g mass from a height of 1m while recording the force-time history and deformation response using high-speed photography. Analysis of quasi-static and dynamic stress-strain curves, as well as the local strain contour maps from the DIC analyses, revealed the interrelationship between the local deformation mechanism and the global mechanical behavior of these 3D printed composite materials. This research paves the road for hierarchical structures with tunable behavior under a wide range of loading rates.

Session G-8

Engineering and Computer Science 6

Friday, March 3, 2023, 11:00 am

Montezuma Hall

326 11:00 am OO

Water Tunnel Flow Visualization: Endwall Effects on Vortices Over an Airfoil

Charles Duddy, Aerospace Engineering (U)

The objective of this research is to observe the effect endwalls have on the flow over an airfoil in a water tunnel. Analysis is achieved by attaching syringes to a pump that feeds dye through cavities inside of the airfoil, which then exits into the stream through small channels placed at various lengths along the suction side of the airfoil. The dye exits into the stream at a velocity such that its momentum allows the dye to take the shape of the flow over the airfoil – this velocity is calculated using jet in crossflow. Comparative analysis will be performed between the experimental results, and simulation from computational fluid dynamics. Expected results are vortex interactions such as horseshoe vortices over the airfoil at the endwalls, which break down towards the center of the airfoils span.

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327 11:00 am PP

Trajectory Learning and Generation Based on Gaussian Mixture Model

Jennifer Hong, Aerospace Engineering (U)

A dataset of trajectories is necessary to study aircraft mobility and to plan maneuvers, however generating and recording trajectories from real data sets is impractical due to challenges with cost and feasibility. Instead trajectories can be generated. Previously, random mobility models have been used as a cheap way to generate trajectories, however they are required to be designed for particular vehicles or applications. Another setback is the need to estimate and test many parameters to create an accurate model. A Gaussian Mixture Model allows past data to be used to generate trajectories without knowing specific parameters for the aircraft.

The goal of this research is to develop a Gaussian Mixture Model to learn and generate aircraft trajectories. The training sample for the model was generated based on a given distribution of turn radii so it could be compared to the data generated by the model. The first sample of generated trajectories was used to train the model to cluster given trajectories. A second sample was shown to the model to be grouped based on the clusters it had previously defined. In the future this model could be used to generate realistic trajectories based on a small sample of real trajectories.

328 11:00 am QQ

Water Table Experiment: Supersonic Nozzle Design and the Hydraulic Analogy

Jason Ruiz, Aerospace Engineering (U)

Shock wave interactions pose challenges in various commercial, industrial and military design applications, due to mitigation in engineering performance during operations. Shock waves introduce changes in energy, pressure, temperature, density, and velocity. The forming of shock waves contribute to the development of possible wave drags, external surface drags and drop in propulsive capabilities. Visualizing high-speed aerodynamics can open a door to contribute in advanced research by creating a controlled experiment in shock wave propagation. With the use of the hydraulic analogy, a direct relationship of fluid mechanics to gas dynamics, can help visualize the interaction of this phenomena. Shallow water theory is applied to directly relate the Froude number of water or also the gravitational speed, to the Mach number in fluid air. Hydraulic jumps are then used to characterize shock wave propagation in various experimental settings. The experimental results are then validated against the computational data of Ansys Fluent. To control this experiment, a 2D supersonic de Laval nozzle was designed by the Methods of Characteristics. The nozzle was then manufactured by a hot wire CNC foam cutter located at the San Diego State University machine shop. Manufacture and operation of a water table to simulate high speed flow is drastically less expensive than building a high speed wind tunnel. This low-cost provides hands-on

opportunities for future classes at SDSU dealing with the study of high speed flow or fluid mechanics, another application of study for the course's teachings. It is important to the aerospace community as a whole because it implements low-cost, yet efficient methods for analysing the characteristics of shock waves. Using the water table obtains accurate data for these flows, while implementing hands-on experiments and analysis. The experiment concluded the visualization of shock waves forming on various wedges with the use of the hydraulic analogy by testing Froude numbers ranging from 2 - 2.5. Future work involves applying a hydrogen bubble generator to further visualize supersonic characteristics on test subjects ranging in geometry roughness.

329 11:00 am RR

Adaptive Vector Fitting for Order Estimation of Transfer Functions from Measured or Simulated Network Parameters

Andria Lemus, Electrical Engineering (M)

Depending on which software and measurement tools that they have available, electrical engineers may need to extrapolate the waveforms which reveal if a high-speed electrical device will have unexpected voltage levels, ripple, or other power and signal integrity issues. Vector fitting is an algorithm commonly used in CAD software packages to speed up this process by curve-fitting known data to a rational function. This ongoing research examines how to make the CAD software interface more user-friendly for the engineer by generating one required parameter, the model order of the rational function, which is typically tuned through iteration.

330 11:00 am SS

Motor Controls of a CubeSat within an ACDS Test Bed

Jarred Sampayan, Aerospace Engineering (U)

Cube Satellites (CubeSats) are becoming more common. This research project develops one sensor and one controller component of a CubeSat. The goal is to test the spacecraft controls in an Attitude Determination Control Systems (ADCS) test bed. The Inertial Measurement Unit (IMU) has been hard coded and tested to run on the CubeSat CPU. Four motor wheels have been programmed with a Roboclax and tested to run and re-orientate the CubeSat within the ADCS test bed. The test bed uses magnetorquers to readjust the CubeSat, where the IMU will recognize its disturbance and operate the motor wheels to readjust back to their original position. Python was the primary language for coding the IMU and Roboclax/ Motor Wheels. Motor wheels have a higher degree of accuracy when compared to thrusters, magnetic tourquers, and control moment gyros. This project report accumulates a semester's worth of progress for a research course at San Diego State University, AE499.

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331 11:00 am TT

Multiple Beam Antenna Design using Folded Rotman Lens and U-Slot Loaded Patch Antennas

Gabriel Duran, Electrical Engineering (M)

Beamforming allows a signal to be steered in different directions without the need of mechanically rotating an antenna. There are several ways to implement a beamformer, one of them being the Rotman Lens, which uses focal theory to direct a beam in multiple directions. This Rotman Lens is designed to function at a center frequency of 2.6 GHz with a 600 MHz bandwidth. The 8x8 structure allows it to steer beams in 8 different directions with a +/- 45° range. To reduce physical size, the lens has been folded in half. The radiating element used is a U-Slot patch antenna with a center frequency of 2.63 GHz. This geometry was chosen due to its wider bandwidth compared to a standard patch antenna. Ongoing work will aim to widen the bandwidth.

332 11:00 am UU

Design of a Multiple Beam Wideband Antenna Using 8x8 Butler Matrix Beamformer for 5G NR Bands

Joseph Tallo, Electrical Engineering (M)

A wideband Butler matrix beamformer is combined with a 1x8 linear array consisting of wideband U-slot antennas on conventional microwave substrate. The resulting eight beams allow beamforming between +56 to -56 degrees. A 19.86% bandwidth was achieved for the U-slot antenna. A peak realized gain of about 15.97 dBi was observed at the center frequency of 2.62 GHz. This design can be used for 5th generation new radio (NR) frequency bands N7, N38, N41, and N53.

Session G-9

Physical and Mathematical Sciences 6

Friday, March 3, 2023, 11:00 am

Montezuma Hall

333 11:00 am VV

Modeling the Spatiotemporal Distribution of HIV in the Brain

Audrey Oliver, Computational Science (M)

In standard clinical practice, only plasma viral load and CD4 counts are measured to keep track of disease status and progression in Human Immunodeficiency Virus (HIV)-infected individuals. However, viruses reside in the brain, causing neurocognitive disorders and an obstacle to a cure, despite virus control in plasma with antiretroviral therapy. Therefore, tracking the virus distribution across different brain compartments is essential for disease management in HIV-infected individuals. In this study, we first performed a correlation network analysis of RNA in the brain with plasma

and CSF (Cerebrospinal fluid) to identify whether plasma or CSF viral loads can infer the viral burden in the brain. Secondly, we performed a correlation network analysis of viral RNA among different brain regions to identify the brain's essential regions related to viral burden within the brain. Thirdly, we built a mathematical model that explains the spatiotemporal distribution of HIV in the brain using the essential brain regions obtained from our correlation analysis. Our model was validated using data collected from the brain of the simian immunodeficiency virus (SIV)-infected macaques. We analyzed the model and performed parameter sensitivity to get insights into the distribution and replication of HIV throughout the different brain regions.

334 11:00 am WW

Functional data analysis of lung CT histograms to characterize COPD severity

Maggie Zhai, Statistics (M)

Chronic obstructive pulmonary disease (COPD) is a debilitating disease that causes difficulty breathing and is the third leading cause of death worldwide. Although diagnosis often relies on pulmonary function testing, recent studies have shown that biomarkers computed from lung computed tomography (CT) can further characterize disease. However, these biomarkers reduce entire lung CT histograms to two simple quantile measurements, potentially ignoring valuable information across the lung distribution. We hypothesized that the entire lung CT distribution can be used to further characterize COPD. In this HIPAA-compliant and IRB-approved study with a waived requirement for written informed consent, we retrospectively extracted lung histograms from CT images acquired at full inhalation (inspiratory), normal exhalation (expiratory), and their deformably registered subtraction (attenuation difference map [ADM]) across 8889 patients from the COPD Gene Phase I cohort. Considering the histograms as multivariate functional data, we applied multivariate functional principal component analysis (MFPCA) for dimension reduction. MFPCA scores were then clustered into groups using k-means, with the number of clusters visually selected using a scree plot. Multiple linear regression was then performed to study the relationship between clusters and 5-year change in forced expiratory volume in one second (FEV1) while controlling for demographic and clinical information (i.e. age, sex, race, smoking status, pack-years, baseline FEV1, and Global Initiative for Chronic Obstructive Lung Disease [GOLD] stages for COPD severity). MFPCA of lung CT histograms resulted in 7 components that explained >95% of total variation. Five clusters were selected as a result of the K-means clustering. Histogram means within each cluster captured changes in mean attenuation, histogram variance, and lung volume. A subset of histograms exhibited bimodal behavior. Inspection of the corresponding CT images suggested bimodality is a manifestation of mosaic attenuation in the lungs, indicative of disease. Regression results indicated clusters were significantly predictive of FEV1 progression ($p < 0.01$). FEV1 change was significantly different for 8 of the

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10 cluster comparisons. Our results show that utilizing MFPCA on lung histograms allows us to cluster patients into COPD severity groups based on CT imaging alone. Combining this information with other clinical factors can provide new insights into COPD diagnosis and prognosis.

335 11:00 am XX

The Effect of Human Mobility on the Time-Dependent Reproductive Number of COVID-19

Samantha Hall, Biostatistics (M)

The time-dependent reproductive number, R_t , representing the average secondary infection at any specific time, is an important epidemiological metric in determining the transmission trend of infectious diseases. With the emergence of SARS-CoV-2, the virus causing the highly contagious Coronavirus disease (COVID-19), there has been an emphasis on accurately estimating the reproductive number to help public health officials assess the effectiveness of intervention policies. However, the current methods for estimating the reproductive number have failed to account for human mobility throughout a region, which greatly impacts the spread of a disease. In this study, we will introduce a method of computing from the data, incorporating human mobility. Using our method on the COVID-19 case data collected from Nepal during the first wave of pandemic (March 2020 to September 2020), we highlight the effect that human mobility has on the reproductive number of COVID-19.

336 11:00 am YY

Physics Informed Neural Networks for Ultrasonic Guided Wave propagation in solid media

Thomas Stone, Computational Science (M)

Ultrasonic Guided Waves (UGWs) are particular elastic waves that propagate in media with specific geometries, typical of many aerospace, civil and biomedical structures. Due to their properties of wide range coverage and interaction with the entire cross-section, UGWs are a very advantageous a Non-Destructive Evaluation (NDE) method technique that can be used to inspect defects in solid material. There are various methods to simulate UGWs such as the Global-Local (GL) method approach which can be used to predict scattering in complex structures. GL Most methods, though, rely on finite difference or finite elements schemes which can be computationally expensive, especially to simulate UGWs propagation over a broad frequency range and interaction with complex damages. In this research project we explore a new method to model UGWs in solid media with Physics Informed Neural Networks (PINN). PINNs are a new type of machine learning method which solve Partial Differential Equations (PDEs) through stochastic processes. The PINN model can be

used as a continuous time model which creates a data-efficient spatio-temporal approximator for the UGW propagation in solid media. The fundamental framework and challenges of its implementation are presented, as well as preliminary results/simulation. In the future, PINNs UGWs can be used to efficiently simulate inspections in complex structures and generate data for Structural Health Monitoring and prognosis.

337 11:00 am ZZ

Visualization and Analysis Using R for Imperial Valley Traffic Incidents Data

Felix Santillanes, Mathematics (U)

The theme of Hackathon 2022 was to solve health problems in communities using big data and technologies. This project focused on car crashes reported in the county of Imperial Valley and tried to find solutions for different issues related to traffic incidents with the help of statistical tools. Exploratory data analysis was conducted to perform an initial investigation of data and visualize it. Common factors driving car incidents were found including intersections where most crashes occur and the weather conditions of the crashes. In addition, a Steamlit app was developed that shows a map of the Imperial Valley with marks where the most common places have had crashes. With this work, we were planning to help our community, by suggesting putting regulation signs at the places marked. This project allowed our team to learn a new programming language, R, and analyze and use data to improve our problem-solving skills.

338 11:00 am AAA

Modeling the Risk of SARS-CoV-2 Infection Causing COVID-19

Sai Karthik Pulagam, Applied Mathematics (U)

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) caused the COVID-19 pandemic, drastically changing our lives. There remain threats of re-emergence of the novel strain of the virus that may bring more catastrophes. Evaluating the risk of SARS-CoV-2 infection is essential to control the spread of viruses in a community. In this study, we develop a mathematical model to predict the risk of SARS-CoV-2 infection upon contact with an infectious individual. We validated our model using experimental measurements in ferrets. We used our model to identify the risk of successful virus transfer from infected and susceptible individuals and to evaluate how the risk can be lowered using intervention policies.

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Session G-10

Physical and Mathematical Sciences 7

Friday, March 3, 2023, 11:00 am

Montezuma Hall

339 11:00 am BBB

Potential Candidate for the First High Inclination Circumbinary Planet

Christopher Martin, Astronomy (M)

Most stars in the Universe do not exist in single systems like our Sun; most exist in binary systems. Binary systems contain two stars that are gravitationally bound to one another. These systems can contain planets that orbit both stars, which are known as circumbinary planets. To date, only 17 circumbinary systems have been discovered. A candidate for a circumbinary planet was announced in 2014 using data acquired by the NASA Kepler space telescope. The binary star system is known as KIC 8610483. The planet was discovered by observing the gravitational influence on the host stars' orbits because it does not transit. The planet creates eclipse time variations, which are slight changes in the stars' orbital periods. These variations allow us to derive certain properties of the planet. At the time the planet was announced, the orbital inclination of the planet could not be determined. Now that we have additional data from the Transiting Exoplanet Survey Satellite (TESS) mission, we have the potential opportunity to get a more constrained estimation of the orbital tilt. This discovery is significant because we will be able to determine if this planet, like every other circumbinary planet, has a low inclination, or if it is a new kind of planet with high inclination. We know that these high inclination planets are theoretically possible, but they have never been detected.

340 11:00 am CCC

A Search for Circumbinary Planets in Short-Period Binary Stars Using Kepler Mission Data

Margo Thornton, Astronomy (M)

Binary star systems, which are pairs of stars that orbit each other, are very common. Roughly 50% of sun-like stars belong to such a system. A total of 17 out of the 5200+ confirmed exoplanets orbit both stars of a binary. We refer to these as circumbinary planets. To date, all circumbinary planets have been found in binary stars with orbital periods greater than a few days. Whether this is because it is harder to find them around shorter-period stars, or because such planets don't exist, is unknown. Using archival data from NASA's Kepler mission (2009-2013), we carefully re-examine the known short period eclipsing binary systems to search for circumbinary planets. The search process involves detrending the data to eliminate any confounding variations due to instrumental artifacts or actual stellar variability so we can detect planetary

transits; a transit is a dip in the observed brightness of the system caused by the planet eclipsing the stars. The transit signature of a short-period binary is very different from that of a single star and current detection methods will not work in finding such a transit. In a short-period binary, the stars are so close to each other that they are tidally distorted and are almost always eclipsing, so the background light continuously varies – and by a large amount. This makes planet detection very difficult. Using improved detrending and detection techniques, we will undergo a systematic search for planets in short-period eclipsing binaries, which has not been carried out and published before. We hope to discover circumbinary planets, but if we do not detect any, that implies that they do not exist. While in some way disappointing, this would help confirm theories of close-binary star formation where the shrinking of the binary star's orbit disrupts and ejects any planets.

341 11:00 am DDD

Precise Age for the Binary HD 21278 in the Young Alpha Persei Cluster

Christopher Danner, Physics (M)

We present a study of the double-lined spectroscopic binary HD 21278 in the young Alpha Persei open cluster. HD 21278 was chosen for this project because the primary star in the binary is rapidly evolving. This means the characteristics of the star are changing, which makes it easier to get a precise age estimate as long as its mass is known. We analyzed new spectroscopic data from the Nordic Optical Telescope and reanalyzed archived KPNO spectra to derive precise radial velocities for the binary. Interferometric data was taken using the CHARA Array at Mount Wilson to measure the sky positions of the two stars and the angle of inclination of the approximately 2 milliarcsecond orbit. Using the radial velocities and the inclination angle, we determine the masses of the two stars to be $4.526 \pm 0.070 M$ and $2.818 \pm 0.063 M$ and, using the masses, we find the age to be 101 ± 6 Myrs. Since all stars that were born in the cluster were born at the same time, the age for the binary can be applied to any stars that were also born in the cluster. Finally, we will use the age estimates to revisit calculations of the initial masses of the massive white dwarfs thought to be escapees from the Alpha Persei cluster. This is interesting because the white dwarfs are near the maximum mass that white dwarfs can have, and will tell us about the threshold between stars that become supernovae and stars that become white dwarfs.

342 11:00 am EEE

A Search for Circumbinary Planets Using Eclipse Time Variations

Benjamin Pieczynski, Astronomy (M)

Circumbinary Planets (CBPs) make up only a small fraction of all known exoplanets, to date only 23 of these planets have been discovered out of ~5,200 known exoplanets. A comprehensive understanding of planet formation in binary

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systems depends on the discovery of more CBPs for population analysis. The Transiting Exoplanet Survey Satellite (TESS), provides the best chance for detecting a significant number CBPs. While direct transits of the exoplanet provide the best opportunity for discovery of a CBP, their detection is difficult due to shallow transits, starspots from both stars and transit times and light curve shapes dependent on the motion of the binary. Using Eclipse Timing Variations (ETVs) we can detect the presence of a 3rd body in an Eclipsing Binary (EB) system. This is accomplished by measuring the changes in the timing of the system's primary and secondary eclipses over time. With millions of sources available from TESS we are in the process of determining potential CBP candidates using the ETV method. It is expected that the large sample size from TESS should produce several CBP candidates. Here, we outline our methodology and provide an update on our progress of identifying CBP candidates.

343 11:00 am FFF

Sensitivity analysis of shell-model interactions

Vladimir Bautista, Astronomy (U)

We carry out sensitivity analysis of nuclear shell model interactions in the p-, sd-, and pf-shells. We also analyze the most important linear combinations with respect to standard schematic forces such as pairing, quadrupole-quadrupole, etc.. Despite the very different mass regions, we find similar behaviors pointing towards underlying principles.

344 11:00 am GGG

Robust Redetermination of the Andromeda Galaxy Nova Rate

Will Burris, Physics (U)

The nova rate for the Andromeda galaxy (M31) is redetermined from a long-term (1995-2016) survey for novae in M31 as part of the Research-Based Science Education initiative. Over 180 nights of observation at Kitt Peak, Arizona, 40 novae were discovered and 222 were confirmed. 203 of these novae formed a sample within a consistent 20' x 20' field centered on the nucleus of M31 and 50 form a sample within a larger 36 x 36' field. Consistent with other work, novae in M31 are more associated with the bulge of the galaxy than the disk. A Markov Chain Monte Carlo simulation of the spatial coverage of M31, the observing frequency, and M31 novae properties determines a nova rate for the galaxy to be $40^{+5-4} \text{ yr}^{-1}$. Comparing the infrared luminosity of the Milky Way to M31 gives a galactic nova rate of $28^{+5-4} \text{ yr}^{-1}$. These are considerably lower than previous attempts to determine the nova rate.

345 11:00 am HHH

Mass-Radius Relation of Supermassive White Dwarfs

Alejandro Rivera, Physics (U)

Following the lifespan of a low-mass star similar to the sun, it ejects its material leaving behind a dense white dwarf at its core. We study the light output of two supermassive white dwarfs near the Chandrasekhar limit, the maximum mass a white dwarf can have, by characterizing its total flux using a spectral energy distribution (SED). With the SED determined we can utilize star models to redetermine the effective temperature of the white dwarf and combine that with empirical values for distance to arrive at a more accurate depiction of the radius. By having better estimations of the radius and previous mass values it allows us to compare the theoretical mass-radius relation to and test our current understanding of the internal physics of supermassive white dwarfs. The internal physics of white dwarfs consists mainly of degeneracy at the core creating an electron degeneracy pressure allowing the star to remain in hydrostatic equilibrium, preventing the star from collapsing. This research can uncover surprising physics at the core of the stars challenging expectations for the internal makeup within.

SDSU

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Abstracts of Presentations

Session H

SDSU | San Diego State
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Session H-1

Behavioral and Social Sciences 10

Friday, March 3, 2023, 1:00 pm

Montezuma Hall

346 1:00 pm A

“Minimizing the Number of Barriers”: how agencies pivoted to address food insecurity in San Diego County during the COVID-19 pandemic

Courtney Smith, Exercise Physiology and Nutritional Sciences (M)

Background: Household food insecurity (FI) is the limited or uncertain availability of nutritious and safe foods or ability to acquire foods in socially-acceptable ways. FI is an ongoing issue in the United States (U.S.), heightening with the COVID-19 pandemic. Over 40% of food-secure individuals in the U.S became food insecure following the COVID-19 outbreak, with Black, Asian, and Hispanic individuals being disproportionately affected. Addressing FI is important for preventing disparities in diet-related illnesses. Understanding the ways agencies adapted and evolved their services to address FI during this major health crisis can inform future capacity-oriented approaches to reduce FI and health disparities.

Objective: Elucidate how local agencies in San Diego County addressed FI in response to the COVID-19 pandemic and the role of multi-level sources of existing capital (i.e., assets) in their response.

Methods: Guided by the Socioecological Model and a capacity-oriented approach, the research team conducted in-person, semi-structured interviews with the key informants at stakeholder agencies addressing FI across San Diego County. In 2019, key informants at 10 agencies completed interviews and eight of these agencies completed follow-up interviews later with pandemic-specific questions. The research team reviewed and discussed each transcript to generate an initial codebook, which is currently being iteratively applied to all transcripts by student researchers in NVivo. The research team meets regularly to discuss coding and identify emergent themes. Analyses are ongoing.

Results: Key informants at 16 stakeholder agencies (food banks, government agencies, community centers, etc.) completed interviews. Agencies leveraged existing human and social capital by providing flexibility and adaptability of their services (increased food pantry hours, in-home food deliveries, virtual assistance). Existing across-agency partnerships made it possible for individual agencies to continue to provide a holistic approach (providing COVID-19 vaccinations) that expanded the availability and accessibility of services to better address FI and related factors during the COVID-19 pandemic.

Conclusions: Within-agency and across-agency partnership capacities relating to flexibility, adaptability, and holistic approaches allowed for agencies to pivot post-COVID-19 pandemic to better address FI among low-resource communities. Future research should consider the long-term programmatic and food security implications of these agency service adjustments during COVID-19.

347 1:00 pm B

No Safe Place to Go: Perceptions of Safety in Public Restrooms in Downtown San Diego

Lahiru Kodituwakku, Public Health: Health Promotion and BEHs (M)

People experiencing homelessness (PEH) are especially vulnerable to infectious diseases and related comorbidities. The spread of infectious disease in these populations can be prevented with access to adequate sanitation resources and facilities. Public restroom facilities are essential for meeting sanitation needs, particularly for PEH. With recent increases in homelessness nationwide, urban areas have been impacted the most. The population of PEH in Downtown San Diego (DTSD) has increased steadily since the onset of the pandemic in 2020, with a ratio of new to formerly homeless individuals at 13 to 10 as of October 2022.

PEH face significant safety concerns, stigma, and discrimination as they exist in hostile public spaces. Prior research indicates that public restroom infrastructure is often lacking in providing safety and security for LGBTQ+ individuals, women, and people with disabilities. People have issues with facilities lacking doors or locks, adequate lighting or ventilation, and general upkeep, often citing these as reasons for bathroom avoidance or open defecation. Bathroom avoidance is associated with health conditions including bladder and kidney infections. Open defecation is linked to outbreaks of Hepatitis A and Shigella.

Considering these health risks, the current study utilizes mixed-methods to understand the association between bathroom features and perceptions of safety in public restrooms in DTSD. Data on features were collected as part of an assessment that verified the location of facilities and collected new information regarding health and safety features present in facilities. Perceptions of safety were measured through a survey of PEH (n=54) and through community-generated reports through the “Get it Done” (GID) app. The survey asked PEH about their experiences of accessing sanitation facilities and how safe the presence of certain features made them feel. Broader community views on safety were assessed through GID, which allows users to submit reports to the city about non-emergency problems. From the larger citywide dataset, reports related to public restrooms in DTSD were isolated for analysis.

The presentation will showcase preliminary findings and discuss critical implications for increasing safe access to basic sanitation services for PEH.

348 1:00 pm C

The Urban Sustainability, Livability, and Equity Commuter Mapping Project

Arman Ogandzhanyan, Urban Studies, Urban Planning, Design, and Management (U)

Under the direction of Dr. Bruce Appleyard of San Diego State University, the Urban Sustainability, Livability, and Equity (SLE) research team, supported by the Faculty Student Mentorship Program (FSMP) conducted a study with individuals in

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southern areas of San Diego. The approach taken to study these dynamics involved conducting cognitive/image mapping exercises with individuals, based on principles set forth by Kevin Lynch's "Image of the City" (Lynch, 1960).

This research uniquely captures the experiences of different individuals. Principally, we were able to learn about how those that use various forms of transportation perceive the environment of their daily lives. Specifically, to conduct our research we went out into the field to ask individuals to draw maps of their surroundings on their daily routes, which were marked with symbols to identify landmarks. From our review of the maps, we found that those who take public transportation are often more aware of their surroundings. They take note of their peculiarity, size, distance, familiarity, and usually have a specific "like" or "dislike" per sighting.

This work can ultimately help promote a better quality of life for the average person by using the tacit knowledge of their environment in order to improve the real world we live in. Through increased access to transportation services and a greater universal urban landscape, we create better ways to meet the average person's most critical needs, the home territories and lives of all can be improved.

349 1:00 pm D

Exploring the association between public restroom discrimination and demographics among San Diegans experiencing homelessness

Rafael Chavez, MPH - Epidemiology (M)

Background: Public restroom/resource access is a human right that should be available to everyone without discrimination or judgment. Many populations in the United States have experienced discrimination based on their demographics alone. The Project for Sanitation Justice (PSJ) conducts community-partnered research to understand and visualize public restroom access to drive action towards more just and equitable decision-making around public restrooms in San Diego County. This presentation will discuss findings from PSJ's social survey of San Diegans experiencing homelessness about their public restroom access experiences and related health behaviors, and will identify associations between restroom use discrimination and demographics pertaining to marginalized populations.

Methods: A total of 115 participants' responses were analyzed using Microsoft Excel and SPSS. Participants were recruited and interviewed in person by the PSJ team between April-August of 2022 at Pacific Beach and Downtown San Diego using the social survey administered through Qualtrics. The survey focused on themes regarding feeling discriminated against or judged when trying to access public resources such as restrooms, showers, drinking water, washing clothes, washing hands, hygiene, and health/medical supplies.

Results: Among the 115 participants, demographic trends in our data indicate that people that identified as currently experiencing homelessness, living with a disability, part of the LGBTQIA+ community, male, White, and Black or African

American, self-reported higher rates of discrimination when accessing restrooms. When accessing a shower, drinking water, washing clothes, washing hands, getting hygiene products, and getting health/medical products, there were higher self-reported rates of discrimination among those that identified as currently experiencing homelessness, male, Black or African American, and White.

Conclusion: Demographics such as currently experiencing homelessness, living with a physical disability, being part of the LGBTQIA+ community, being African American, and being White were significant factors for feeling discriminated against when trying to access public restrooms and resources, coinciding with existing literature. More research is needed to fulfill the gaps and bring awareness to take action against public restroom discrimination.

350 1:00 pm E

Understanding the Everyday Lives of the Houseless Through Cognitive Maps: A Human-Centered Analysis of Their Home Territories and Needs

Aidan Skillingstad, Urban Studies (U)

Problem: How do the houseless view their world? What are their most important places? What barriers exist? What are the important things that make up what could be considered their homes? These, and many other questions, are what we worked to address by having houseless individuals draw cognitive/image maps of their daily lives.

Research Strategy: In response, this research reports the findings of human-centered cognitive/image mapping exercises with houseless individuals in San Diego and Los Angeles, based on principles set forth in Kevin Lynch's "Image of the City" (Lynch, 1960). Specifically, this study asked houseless individuals to draw maps (on blank pieces of paper) of their surroundings and daily routines, which were marked with symbols to identify important locations. We then had them mark the important locations on printed maps so we could then geo-code this information.

Findings: From our review, we have found 13 recurring patterns. One of them is that the houseless often travel in regular routes throughout their day, sometimes using transit or bicycling, but often on foot. This speaks to the need for services to be close to where the houseless live to support their mobility restrictions. Some participants were employed, with some choosing to work to collect recyclables or to help clean floors, streets, or shops they frequented. Parks and alleys were marked as places of importance as they offered safe spaces to congregate and travel through. Additionally people need safe storage, adequate toilet access, & better relationships with law enforcement.

Takeaway for Practice: This work can ultimately help promote better quality of life for the houseless by improving the design and planning for shelters and services. Through better access to services and opportunities and better ways to help them meet their most basic needs, the lives of the houseless can be justly improved.

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351 1:00 pm F

Fear Mapping: How people view senses of safety around the SDSU campus differently

Jaqueline Appleyard, Public Administration (U)

Problem: How do people view their world in terms of safety? What areas stand out? These, and many other questions, are what we worked to address by having individuals draw cognitive/image maps of the SDSU campus environment.

Research Strategy: In response, this research reports the findings of human-centered cognitive/image mapping exercises with houseless individuals in San Diego and Los Angeles, based on principles set forth in Kevin Lynch's "Image of the City" (Lynch, 1960). Specifically, this study asked individuals to draw maps (on blank pieces of paper) of their surroundings and daily routines at SDSU, which were then marked with symbols to identify important locations. We then had them mark the important locations on printed maps so we could then geo-code this information.

Findings: From our review, we have found that there are gender differences in how people view the safety of the SDSU campus environment. This speaks to the need for better design and security to create a safer campus environment.

Takeaways for Practice: This work can ultimately help promote better quality of life for individuals by improving the design and planning for creating a campus environment that feels safer and more secure.

Session H-2

Behavioral and Social Sciences 11

Friday, March 3, 2023, 1:00 pm

Montezuma Hall

352 1:00 pm G

Decreasing Grabbing Behaviors: How Preparing a Student's Environment Prior to Instruction Can Affect Their Behavior

Claire Dietrich, Master's in Education, Special Education: Autism (M)

This study evaluated the effectiveness of using Behavior Skills Training (BST) to reduce grabbing behaviors. BST was used to train classroom staff on antecedent and consequence strategies for the reduction of grabbing behaviors. The sole participant was a 6th grade student who engaged in grabbing behaviors including grabbing classroom staff's hair, clothes, masks, and/or accessories. The student's behavior hindered her ability to participate in small and whole group instruction and required her to need 2:1 staffing support. The student's behaviors were tracked via partial interval recording with each interval being 30 seconds across 10 minutes. Throughout the seven-week intervention period, the range and frequency of the

grabbing behaviors decreased from 20-90% during baseline to 0-45% during intervention. Results indicated that the student's grabbing behaviors reduced enough to where she was able to participate in classroom lessons and receive 1:1 staff support. Findings suggest that BST for classroom staff may be an effective strategy for reducing grabbing behaviors in school aged children with autism.

353 1:00 pm H

Investigating the Influence of Lab Communications on Student Science Identity and Belonging

Chelsea Malicdem, Psychology (U)

Students in research labs are developing their educational and career interests. This academic development for students is supported through a mentor-mentee relationship. Faculty research mentors are particularly suited to guide students as they are beginning their scientific journey. This mentor-mentee relationship requires communication between the faculty and the student mentee. Data suggests that faculty use different mechanisms of communication in their research lab (e.g., email, Zoom, Slack/Discord, in-person). Less is known about how the frequency of communication between faculty research mentors and their student mentees influence student experiences and outcomes in science. Given that communication is essential for mentees to feel supported, I investigated whether the frequency of communication between faculty mentors and student mentees in research labs influence the extent to which students feel like they are part of the scientific community. I hypothesize that students who are mentored by faculty that communicate more often are more likely to have a greater sense of being part of the scientific community (measured by student self-reported science identity and belonging uncertainty). To investigate my research question, I examined data from 45 research labs. First, we asked faculty research mentors how often they communicate with their team. We categorized their responses into four categories (monthly, bi-weekly, weekly, daily) which allows us to assess the frequency of communication in the lab. Second, we surveyed student mentees in each of these faculty members' labs to measure students' self-reported science identity and belonging uncertainty. To examine whether greater frequency of communication between the faculty mentor and the student mentee was associated with greater science identity and lower belonging uncertainty among students, we regressed students' science identity and belonging uncertainty (separately) onto the frequency of communication indicated by the faculty. Analyses did not yield a significant association between faculty research mentor frequency of communication and science identity, $F(1, 212) = 2.32, p = .129, R = .10$, nor belonging uncertainty, $F(1, 211) = 0.72, p = .394, R = .05$. In my presentation, I will discuss the implications of these findings, including the importance of focusing on the quality of communication between faculty mentors and students.

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354 1:00 pm I

The Role of Faculty Recruitment Preferences in Students' Scientific Identity

Charlie Gallegos, Psychology (U)

Undergraduate research experiences (UREs) offer students the opportunity to get firsthand experience in science research, explore their career interests, and develop many skills. In the research lab, students are mentored by and work closely with faculty. But before this mentor-mentee relationship, students must meet a set of requirements determined by faculty offering lab positions. Faculty get to choose which students enter the lab based on their own set of criteria. This process is like a job interview, where questions fall within the realm of skills, traits, and achievements. Because of this, not all students have an equal opportunity of participating in and accessing the benefits of UREs. Data from 58 research labs indicate that 52% of faculty place particular importance on academic accomplishments (e.g., high test scores and GPA) when deciding which students to recruit. These academic metrics may be indicators that these faculty believe that innate abilities and intelligence determine success in science research. Prior evidence indicates that when faculty believe that innate abilities and intelligence will determine success, students' science identity can be undermined. Therefore, in this project, I investigated whether students who are participating in UREs with faculty who prefer recruiting students with greater academic accomplishments are less likely to feel a part of the scientific community than students who are in UREs with faculty who do not place importance on academic accomplishments when recruiting students. I hypothesized that when faculty preferred academic qualities, their students would report a lower sense of scientific identity. To test this hypothesis, I compared the self-reported science identity of students who were either in research labs led by faculty who indicated that they preferred academic accomplishments, or in research labs led by faculty who did not indicate that they preferred academic accomplishments. An independent samples t test indicated that students mentored by faculty who did not indicate a preference for academic accomplishments ($M = 5.41$, $SD = 1.00$) felt a greater science identity than students mentored by faculty who did indicate a preference for academic accomplishments ($M = 5.17$, $SD = 1.13$), $t(275) = 1.84$, $p = .066$, $d = .22$.

355 1:00 pm J

The role of faculty research lab websites on students' motivation to pursue STEM

Sofija Markovic, Psychology with an Emphasis in Industrial/Organizational Psychology (U)

In science, technology, engineering and mathematics (STEM) fields, the messages that student research assistants receive from their faculty research mentors play a critical role in influencing students' experiences in STEM. For example, faculty research mentors convey important messages about the norms and values of STEM, which are likely to impact the way that students think about STEM and their motivation to

pursue STEM. Research lab websites often serve as students' first exposure to the public-facing messages that faculty convey about the norms and values of STEM. Through these lab websites, students gain an initial understanding of a research lab's microculture, and what they can expect about a lab's values and purpose. Therefore, it is important to evaluate the messages that faculty transmit through their websites in order to determine if they are good predictors of a students' experiences and outcomes in research labs. My research project aims to investigate whether STEM faculty convey messages about collaboration and friendliness in their lab (i.e., if they include communal language) and about their research helping society (i.e., if they include prosocial language) through their lab websites, and whether these communal and prosocial messages influence students' motivation to pursue STEM. To address this research question, I examined 90 research lab websites from 3 different universities and coded them for their levels of communal language and prosocial language. These faculty websites were part of a larger research project where we also surveyed over 500 students who were participating as research assistants in those same labs. To assess students' motivation to pursue STEM, we measured students' prosocial purpose beliefs, their sense of belonging in STEM, and their interest in STEM careers. I hypothesize that students will be more motivated to pursue STEM if they are participating in research labs where faculty mentors convey communal and prosocial messages to a greater extent. To test my hypothesis, I will conduct a regression analysis to investigate the relationship between faculty mentors' communal and prosocial messages and students' motivation to pursue STEM. This research has implications for understanding messages that faculty convey about STEM through their lab websites.

356 1:00 pm K

COVID-19: The Learning Environment and its Impact on SDSU Students' Stress and Well-being

Muna Farah, Public Health (U)

The COVID-19 pandemic created unprecedented issues in mental health across college students worldwide. Without knowing what was certain about the pandemic, students had to familiarize themselves with the new reality of online learning. College students felt vulnerable, as some of them lost their financial security due to layoffs, did not have access to Wi-Fi or technology to attend class virtually, and did not have a safe space to take exams. Although there is research surrounding the transition from in-person to online learning, there is a lack of data on the understanding of students' reactions and feelings towards the transition from remote online learning to an in-person learning environment. This includes missing data on stress levels in the academic environment, social interactions, and impacts on their sleeping schedule. We conducted a cross-sectional study where we recruited a total of 104 college students at San Diego State University to investigate if mental health issues (e.g., stress) increased during the transition from online to in-person learning. A web-based questionnaire was administered to all participants where they answered questions

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online on their mobile devices or laptop/computers. Participants were also asked to identify their preferred method of learning, their sleeping schedule, if they felt overwhelmed, etc. Data was collected through Google Forms then analyzed using SPSS software. Overall, we found that students responded to high levels of stress when associated with online learning in comparison to in-person learning. Students also reported increased issues related to mental health developed during the COVID-19 pandemic restrictions, which are currently affecting their learning productivity, traditional, and in-person learning environment.

357 1:00 pm L

Not All Classrooms Have Four Walls: The Impact of Traveling Abroad on Intercultural Communication Competence

Andy Huizar, Health Communication (U)

This study seeks to understand the relationship between traveling abroad and intercultural communication competence. Intercultural communication is more valuable than ever in the global village, especially as restrictions were lifted after COVID-19 lockdown. The ability to communicate effectively, regardless of cultural differences, is not something that every human naturally possesses. Traveling abroad is linked to higher intercultural communication competence as exposure leads to awareness and culture sensitivity. The researchers used SONA, an online research management program, to administer a survey containing questions regarding traveling abroad experience and intercultural communication competence. The survey reached almost 2,000 participants, completed by 309, as data was collected from undergraduate (95.5%) and graduate students (4.5%) at San Diego State University, with higher frequencies among first- and second-year students. The researchers included questions in the survey evaluating travel experience among participants, followed by scale items to assess the individual's intercultural competence. The survey allowed students to skip questions they did not feel comfortable answering as a standard of ethics to protect research participants. In response to the results, the researchers were able to interpret the data through a correlation test on SPSS, to determine the association between traveling abroad and intercultural communication competence. There was no association between travel abroad and intercultural competence, explained by a weak negative Pearson's r correlation of $r = -.077$. Although the research hypothesis was not supported, this study provides a foundation for future inquiry. Intercultural competence is a necessity for future generations, as it aligns with diversity and inclusion principles. Findings from this survey pave the way for additional studies and experimental designs that may better capture the true relationship between travel abroad and intercultural competence among students in higher education.

358 1:00 pm M

Making The Grade: Examining The Racial-Ethnic Differences In ADHD's Impact on Academic Performance

Avery Cardosi, Sociology (M)

For years, diagnosis rates of Attention Deficit/Hyperactivity Disorder (ADHD) have continued to rise, presently making it one of the most commonly diagnosed neurodevelopmental disorders in American youth. Previous studies have examined how the cognitive deficits, impaired executive functions, and behavioral issues associated with ADHD negatively impact the academic performance of diagnosed adolescents. Past literature has also asserted that many racial-ethnic minority groups continue to be under-diagnosed with ADHD in comparison to their White peers, and those who are formally diagnosed often face significant barriers to care and treatment as a result of factors relating to their minority status. The inequality in ADHD diagnosis and treatment rates among youth has substantial implications for differences in the disorder's impact on the academic performance of diverse racial-ethnic groups. Using the Fragile Families and Child Wellbeing Study ($n = 2,566$), I estimate a series of ordinary least squares regression models to examine race-ethnic differences in ADHD's impact on academic performance on a standardized grade point average at age 15. My findings suggest that the negative relationship between ADHD diagnosis and G.P.A. is more pronounced among White adolescents compared to Black and Hispanic youth. Additionally, my findings indicate that potential mediator variables such as medication, special education service utilization, and grade retention do not substantially explain the differences in ADHD's impact on G.P.A. The results presented in this paper imply that ADHD has a less clear impact on the grades of Black and Hispanic/Latino children than White children, potentially because youth of color face discrimination and structural inequality on the basis of their race/ethnicity that their White peers do not. Due to the negative impact of many complex factors associated with a racial-ethnic minority status, the effect of ADHD on minority children's G.P.A.s may be less evident than on those of White youth, and instead more clearly linked to other variables such as household income or home environment.

Session H-3

Behavioral and Social Sciences 12

Friday, March 3, 2023, 1:00 pm

Montezuma Hall

359 1:00 pm N

Developing a Sentence Comprehension Task: A Pilot Study

Kaitlan Nguyen, Speech, Language, and Hearing Sciences (U)

There exists language-based disparities in the identification of Developmental Language Disorder (DLD), a high incidence child language disorder (Bishop et al. 2017). Despite their

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prominent population worldwide, there continues to be a lack of knowledge and resources to answer how DLD affects Vietnamese-speaking children.

This present study focuses on creating and piloting a new assessment tool that will improve the accuracy of diagnosing DLD within the Vietnamese-speaking population. Our aim is to develop a Vietnamese Sentence Comprehension task to include passive and active sentences varying in either length or difficulty.

Following our review of Leonard and colleagues' (2013) stimuli, seven out of the ten tested stimuli per demand difficulty were selected due to compatibility between English and Vietnamese grammatical structures. Passive sentences were added as an additional potential indicator of DLD, as has been shown in other languages. Next, picture stimuli adaptations were made and the target sentences were pre-recorded. Pilot participants chosen from Hanoi and San Diego included three monolingual children and one bilingual child, ages 4-6, and three bilingual adults in their 20s. Adults were included to determine the feasibility of the task for children. Participants were presented with the task via PowerPoint through zoom or in-person. A practice task was administered first to familiarize participants with the main task, which tested their abilities to listen to pre-recorded sentences and accurately choose the picture that matches the target sentence. Scores of 0 or 1 were given based on correctness. After discussing discrepancies, the overall mean for each level of demand was calculated and compared to the Leonard study.

The results showed that the monolingual children performed slightly better than the bilingual children at the Vietnamese SC pilot task. Both groups of participants seemed to struggle with the passive structure compared to the active, indicating that the passive sentence structure is more difficult to comprehend for children in the study.

Post pilot, no modifications were needed as results aligned with the findings of the Leonard study (2013). The task protocol and administration were finalized to launch with typically and atypically developing Vietnamese-speaking children in the United States and Vietnam.

360 1:00 pm O

The relationship between attention and sentence comprehension in aphasia

Olivia Lorentz, Speech, Language, and Hearing Sciences (U)

Stroke is the leading cause of serious long-term disability in the United States (Virani et al., 2020). When a stroke damages portions of the brain that are responsible for language, it can result in aphasia, an acquired language disorder that impairs communicative abilities across expressive and/or receptive language modalities. In addition to language impairments, research has also found that neural trauma can affect a variety of cognitive skills including attention (Murray, 2012), memory (Caplan et al., 2013), and executive functions (Fridriksson et al., 2006).

While aphasia is traditionally defined as a language-specific disorder, a wide body of literature suggests that deficits in

attention may play a role in auditory comprehension difficulties (Hula & McNeil, 2008). Specifically, deficits in engaging, orienting, and focusing attention have been argued to contribute to language comprehension difficulties. Of interest in the current project, is whether 1) individuals with aphasia experience deficits in selective attention and 2) whether those deficits interact with auditory sentence comprehension. To measure attention in aphasia, we used the Attention Network Test (ANT; Fan et al., 2002), which has been used successfully to assess the integrity of three subtypes of attention (alerting, orienting, and executive control) in neurotypical healthy populations and in people who have experienced a stroke (LaCroix, Tully, & Rogalsky, 2020). To measure sentence comprehension, we used the SOAP (Subject-relative, Object-relative, Active, and Passive, Love & Oster, 2002), which has been validated as a sensitive measure of syntactic comprehension abilities in individuals with aphasia. This study included two groups of participants: 13 people with aphasia (PWA) and 11 age-matched controls (AMC). Correlational analyses will be used to assess the relationship between attention and sentence comprehension. We predict that compared to AMC, PWA will show significant impaired attentional abilities in alerting, orienting, and executive control. Additionally, we predict that reduced attentional abilities will correlate with lower scores on the SOAP. The implications for characterizing the relationship between attention and language in aphasia will be discussed.

361 1:00 pm P

Cross-Linguistic Interactions during Word Retrieval in Bilinguals with Aphasia: An Eye-Tracking Study

Chris Rodriguez, Speech, Language, and Hearing Sciences (U)

Parallel activation of multiple languages in bilinguals can result in facilitation or interference interactions during word retrieval. Cross-Linguistic Interference (CLI) occurs when word representations interfere with one another across languages. Little is known about the word retrieval processes in bilinguals with stroke induced aphasia (BWA). Here, we study how BWA are affected by CLI.

An eye-tracking and picture word interference task was used to determine the accuracy, reaction time (RT), and word activation in BWA and age-matched controls (AMC) when distracted with items known to cause CLI. Eight AMC and three BWA completed the task. Participants named pictures in Spanish, while ignoring distractor words. Gaze data were collected every 20ms for three conditions: False Cognate (FC), Identity (ID), and Unrelated (UR). In the FC condition, the target picture and distractor text overlap cross-linguistically in spelling and sound (e.g., English/Spanish: Plum-Pluma. "Pluma" translates to "feather"; "ciruela" translates to "plum"). In the ID condition, the target picture matches the distractor text, leading to facilitation. In the UR condition, the target picture and distractor text are unrelated. We hypothesized that BWA would have more difficulty overcoming interference from the non-target language, and from distractors in general, compared to unimpaired bilinguals.

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Results showed that BWA did not fixate on the target picture as quickly, accurately, or consistently as AMC. AMC also exhibited a larger separation in their eye fixations between target pictures in the FC condition compared to other conditions between 1260 and 2280 ms post stimulus onset (i.e., after having named the picture, mean RT=1002ms), suggesting post-response processing is modulated by CLI in AMC but not BWA. Preliminary behavioral results indicated significantly slower RTs for BWA compared to AMCs. There was an interaction effect of condition and group on accuracy. Significantly more errors occurred in FC in BWA compared to AMC, while no difference was observed in ID or UR between groups. The expected facilitation effect (UR vs ID) was seen in both groups. Overall, BWA struggled with all naming conditions and relied heavily on ID cues, reflecting challenges in word retrieval in the presence and absence of cross-linguistic overlap.

362 1:00 pm Q

Linguistic and Non-Linguistic Visual Processing in Aphasia

Marlene Chavez Corona, Speech, Language, and Hearing Sciences (U)

Background: Aphasia is an acquired neurogenic language disorder, typically following a stroke in the left hemisphere of the brain. Successful communication requires interaction between implicit unconscious and explicit conscious processing, with people with aphasia (PWA) often showing intact implicit processing without showing explicit competence [1]. This may be related to a problem with the interaction between the two systems. While aphasia is known as a disorder specific to language, there is growing evidence that PWA also have impairments in other cognitive functions. This study investigates this question through assessing the performance of people with aphasia and typical controls on linguistic and non-linguistic versions of a visual perception task. The research questions (RQs) are whether there is a difference in the speed at which PWA and typical adults can detect: RQ1) real words and RQ2) non-linguistic stimuli.

Method: Participants were screened for adequate hearing, vision, and cognition. All participants completed a presence/absence judgment task with visual stimuli presented amongst interfering (masking) stimuli at varying exposure durations. Presentation began with longer durations that were easy to see and were then systematically reduced until chance performance occurred. Stimuli included real words (RW) and strings of non-linguistic symbols (NL). Visibility thresholds, reflecting the point at which participants were no longer aware of the presence of visual information, were determined based on the exposure duration at which each participant consistently showed chance performance on the task.

Results: To date, data from 2 PWA show an average threshold of 60 ms for RW stimuli and 80 ms for NL stimuli. Five typical controls show an average of 55 ms for RW stimuli and 35 ms for NL. Data collection is ongoing.

Conclusion: Data to date suggest that PWA show higher detection thresholds than typical controls for both RW and NL

stimuli. This suggests that PWA have impairments that span linguistic and non-linguistic domains. Further data collection is ongoing to add confidence to this conclusion.

References: [1] Tyler, L. K. (1992). The distinction between implicit and explicit language function: Evidence from aphasia. In A. D. Milner, M.D. Rugg (Ed.), *The neuropsychology of consciousness*. Academic Press, Inc

363 1:00 pm R

Informed consent: research studies and people with aphasia

Jesse Di Carlo-Wagner, Speech, Language, and Hearing Sciences (M)

Cognition and Language in Aphasia Lab (CLAL): Aphasia Accessible Language (AAL)

Aphasia is an acquired language disorder that impairs language expression and comprehension. People with aphasia (PWA) face significant challenges in providing truly informed consent for healthcare and research participation, including the discussion of risks, benefits, and alternatives (Stein & Brady 2006). Brady and colleagues (2012) noted that modifications to research documents, such as consent forms, can increase reading comprehension and allow PWA to fully participate in the decision-making process. Participants' ability to provide truly informed consent is a paramount part of the research process. We are addressing some of these concerns by working toward:

Revising forms: Reconstructing a Research Participant Consent Form by reducing the volume of complex language and modifying the presentation format to facilitate understanding.

Education: Creating a "Clinician Manual" to train lab members on practices that foster equitable communication with PWA.

Research Article Summaries: Condensing research articles from past studies into infographics that will make our research accessible to PWA and the larger community.

We created four drafts of the SDSU Focal Acquired Brain Injury Repository consent form, which is a main avenue into participant engagement with four labs in our School. Each draft contained different adaptations, including changes to font sizes, bolding, capitalization, inclusion of clipart/photography graphics, additional spacing, adding colors, underlining, and highlighting, among others. We then made additional changes based on feedback from two PWA and our larger lab group. This process led to a final revised consent form that will be used moving forward once it receives IRB approval. The insights gained will next be applied to remaining lab consent forms and Research Article Summaries that will provide content of varied accessibility levels for participants with aphasia, family members, and the general public.

This presentation will present the issues involved in facilitating informed consent for PWA and discuss the materials we have created. We will provide examples of the documents we have constructed thus far, including the Consent Form, Clinician Manual, and Article Summary, as well as excerpts of the feedback taken directly from meeting with PWA. Finally, we will

(U) = Undergraduate; (M) = Masters; (D) = Doctoral

discuss methods for continuing to challenge communication barriers for PWA in all settings.

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Session H-4

Biological and Agricultural Sciences 11

Friday, March 3, 2023, 1:00 pm

Montezuma Hall

364 1:00 pm S

Bench to Bedside Phage Therapy for Severe Pneumonia in Cystic Fibrosis

Tiffany Luong, Cell and Molecular Biology (D)

Multidrug resistant (MDR) *Pseudomonas aeruginosa* infections are the leading cause of morbidity and mortality in cystic fibrosis (CF) patients. There is renewed interest in studying bacterial viruses known as bacteriophages (phages) as antimicrobial agents because they can infect MDR *P. aeruginosa*. However, the outcomes of phage therapy to treat MDR pneumonia are unknown. In this study, a 75-year-old male CF patient was admitted to the emergency room with severe lobar pneumonia. Given his clinical presentation and assessment, he was administered renally-adjusted colistin, ceftazidime, and bronchodilators. Antibiotics were discontinued for 5 days after drug-induced acute kidney injury developed. Phages were then formulated, produced, and purified at SDSU using our developed rapid phage purification protocol. Following FDA approval, intravenous phage treatment was initiated as antimicrobial salvage therapy for multi-strain MDR *P. aeruginosa* pneumonia. The patient received twice daily intravenous 2-phage cocktail 2 hours after ciprofloxacin for 15 days. Phage treatment was well-tolerated with no adverse events reported. After 4 days of phage treatment the patient was discharged and outpatient therapy was maintained at the dosing schedule. To monitor health outcomes and study the temporal dynamics of phages in the lung, we assessed clinical events (forced expiratory volume (FEV1), forced vital capacity (FVC), quantitative computed tomography (qCT)), blood, urine, and sputum microbial counts, and lung metagenomes. Clinically, FEV1, FVC, and qCT scans suggested improvements in overall lung function. FEV1 improved to the highest level it has in 8 years. Metagenomics revealed significant reduction in *P. aeruginosa* and amplification of phages in the lung. Follow-up in vitro analysis of anti-phage serum neutralization found that differential anti-phage neutralization prevented lytic activity in the lungs of one of the treatment phages, and in time the

second phage. Phage resistance emerged after 23 doses and phage-mediated strain-resolved dynamics of the lung microbiome showed selection of antibiotic sensitive isolates. Combined, these results suggest phage pressures altered the pathogen's phenotype in the lung driving it to a more clinically manageable antibiotic-sensitive variant. Within two weeks of hospitalization, we identified, purified, and administered phages to save the patient's life. Such insights will help pave the way toward successful clinical trials.

365 1:00 pm T

IBD Project: Isolating and Characterizing Phages from the Gut Virome

Mariel Rosales, Microbiology (U)

Inflammatory bowel disease (IBD) is an umbrella term for diseases involving gut inflammation. Major diseases that fall under this class include Crohn's Disease (CD) and Ulcerative Colitis (UC). The prevailing hypothesis suggests that dysbiosis of the gut microbiome is the gateway to such inflammatory diseases. However, the cause of dysbiosis is unknown.

Our Inflammatory Bowel Disease work is focused on identifying the bacteriophages that act as possible predators targeting specific bacterial members of the gut microbiome and causing dysbiosis. As part of this project, we have isolated Enterococcal bacteria from patient fecal samples. Using enrichment methods, we have identified mixtures of phages that prey on these Enterococci. We are analyzing the genomes of the phages in order to better understand the interactions between the phages and their bacterial hosts and the genetic factors that mediate these interactions. Our hope is that this work will illuminate the effects of phages and how they modulate members of the gut microbiome, and the consequences for IBD patients. The importance of the project includes understanding the diseases of IBD as well as advancing our knowledge of phage-host dynamics within the human gut.

This student research has been made possible thanks to LSAMP, NIDDK RC2, and CERVAVID.

366 1:00 pm U

Phage therapy for pan-resistant *Achromobacter* infections in cystic fibrosis patients

Hamza Hajama, Cell and Molecular Biology (D)

Microbial resistance to antibiotics is rising across the globe, especially in individuals with chronic illnesses. Over their lifetime, cystic fibrosis (CF) patients develop chronic antibiotic-resistant bacterial infections in their airways and lungs, among other organ systems. These infections become progressively more recalcitrant to treatment. We are addressing the treatment of *Achromobacter xylosoxidans* infections. *A. xylosoxidans* is a Gram-negative, antibiotic pan-resistant opportunistic pathogen that colonizes immunocompromised individuals and CF patients. Phage therapy is being tried as an experimental last resort treatment for these infections, especially in patients that cannot be treated with the current drugs-combinations of CFTR modulators and correctors

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(e.g., Trikafta)—used for about 90% of adult CF patients.

We have treated two patients with cocktails of two or three phages, with positive outcomes. We are analyzing the dynamics of bacteria and phages during treatment, and analyzing what allows some phages to replicate better within human lungs than others. We are also analyzing the evolution of phage resistance versus antibiotic sensitivity during the course of phage therapy, with the goal of driving down the numbers of *Achromobacter* bacteria in the lungs.

367 1:00 pm V

Phage-host dynamics under hypoxic conditions

Jorge Villanueva, Biology Cell and Molecular (U)

Multi-drug-resistant bacterial pathogens present one of the largest global health threats, causing 1.3 million deaths annually. The broad use of antibiotics has contributed to the emergence of drug resistance, calling for a desperate need for alternative antimicrobial therapies. Bacteriophages are viruses that specifically infect bacteria and are a leading candidate for treating antibiotic resistant infections. Like all viruses, they are dependent on their host cells, which are highly influenced by environmental factors such as oxygen, temperature, pH, and many others. Phage-host dynamics inside human body are poorly understood, making it crucial to characterize phages under clinically relevant abiotic conditions. Recently, previous data suggest that hypoxia dampens *P. aeruginosa* phage PAKP1 replication. In this study, we examined the phage-host dynamics of another *P. aeruginosa* phage PYO2 under hypoxic (14% O₂, 5% CO₂) and ambient (21% O₂, 0.054% CO₂) conditions through bacterial and phage growth, adsorption, one-step kinetics and cell saturation assays. Under hypoxia, the *Pseudomonas aeruginosa* strain PAO1 bacterial growth rate declined, which correlated to a decrease in bacteriophage PYO2 replication over time. However, at a single cell level, there was an increase in phage binding rate but no change in phage progeny release per cell. These results suggest PYO2 possess environmental flexibility to infect and propagate in both hypoxia and normoxia unlike previous reports with PAKP1. Collectively, this suggests that certain phages are capable of infecting bacteria across a wider environmental range. On a broader perspective, characterizing the aptitude of phages across environmental conditions is an important part in selecting candidates for phage therapy.

368 1:00 pm W

Improving Shelf Life of Bacteriophage Pharmaceuticals

Viktorija Voragen, Biology (U)

The rise of antimicrobial resistant (AMR) bacteria has prompted a resurgence of bacteriophage (phage) therapy to treat AMR infection. For clinical usage as biological agents, they are formulated in phosphate buffered saline (PBS), but their shelf life in PBS remains limited at clinically relevant concentrations. To determine shelf life of any pharmaceutical product, long term stability studies are carried out until formulations fail at

maintaining predetermined storage specifications. Current stability studies are limited as phages are relatively fragile viruses sensitive to inactivation by UV light, desiccation, protein degradation, etc. Thus, phage products are highly prone to concentration decays over days to weeks. This study aimed to increase phage shelf life to periods of 6 months to years using excipients, which are inactive human-compatible ingredients added to base formulations to increase stabilization potential. Commonly used excipients to stabilize biologics are sugars, salts, and polymers such as polyethylene glycol (PEG-8000). We formulated various PBS solutions containing excipients of 0.14-1.0 M sucrose, 1E-6M – 1E-8M PEG, 5% glucose, and 0.9% saline. These solutions were tested on *Pseudomonas aeruginosa* phages PYO2, LUZ19, and PAK_P1. All concentrations of sucrose, glucose, and PEG failed at maintaining PAK_P1 stocks at 109 PFU/mL and even contributed to accelerated degradation as early as 7 days. In our PBS only control, PAK_P1 degradation began after 19 days. However, 0.9% NaCl maintained concentrations at 109 PFU/mL for a period of 120 days. LUZ19 was stable at 109 PFU/mL for 120 days in all excipient conditions, except for glucose. There was no difference between stability in excipient conditions and PBS. PYO2 was stable at 109 PFU/mL for 160 days in all excipient conditions and PBS only control, except for NaCl. Generally, these results demonstrate that commonly used stabilization excipients were generally not successful in increasing the shelf-life of phages products. Therefore, our ability to extend the shelf life of phages remains to be a major challenge.

369 1:00 pm X

The dynamics of phage infection and disruption of microfluidic biofilms

Jennifer Melendez, Biology-Emphasis Cellular and Molecular Biology (U)

Biofilms are a complex community of microorganisms that adhere to a wide range of surfaces, including medical devices such as catheters and implants, and on living tissues. They are a major contributor to chronic infections in healthcare environments which are challenging to treat, leading to high morbidity in patients. Microorganisms in biofilms are safeguarded by a matrix of extracellular polymers that acts as a physical barrier against external insults such as the host immune response and antibiotics. The efficacy of antibiotics is further reduced by the spread of antibiotic resistance among clinically relevant pathogens. Virulent bacteriophages (phages) are viruses that infect, replicate and kill bacteria by lysing the cell to release viral progeny. This makes virulent phages as viable antibiofilm agents. However, the dynamics of phage-biofilm interactions remain largely unexplored outside the confines of static biofilms grown in petri dishes and well plates. In this study, we developed a microfluidic platform to grow and establish bacterial biofilms under dynamic fluid flow. We were able to cultivate a diverse array of bacterial biofilms including *Pseudomonas aeruginosa* and *Staphylococcus aureus*. We selected *P. aeruginosa* strain PAO1 as a model biofilm for further characterization and phage experimentation.

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Here, we showed that *P. aeruginosa* PAO1 microfluidic biofilms grown in minimal M9 medium exhibit greater levels of heterogeneity and are more perturbed by phage infection compared to biofilms cultivated in nutrient-rich LB. We also reported a dose-dependent relationship in biofilm disruption with *P. aeruginosa* phages PYO2 and E215 at 14 PFU/mL and 18 PFU/mL. Results also underscored PYO2 a more potent antibiofilm phage compared to E215. Lastly, we demonstrated that phages from as few as 1 to 10 particles can infect biofilms and propagate to high abundances upwards to 17 PFU/mL. Phages were also able to persist within the biofilm despite the high turnover rate from fluid flow within the microfluidic system. Collectively, our study demonstrates a proof-of-concept for adopting microfluidic biofilm models to assess phage antibiofilm activity and infection dynamics under non-static conditions.

Session H-5

Biological and Agricultural Sciences 12

Friday, March 3, 2023, 1:00 pm

Montezuma Hall

370 1:00 pm Y

The Effect of Pro-Inflammatory Stimulus on Chromatin Accessibility and Gene Expression in iPSC-derived Cardiac Progenitor Cells

Nneka Bandele, Child and Family Development (U)

This study is currently being conducted in the Frazer Lab at UC San Diego, which utilizes iPSCORE, a collection of iPSCs derived from the skin fibroblasts of 222 individuals that have been extensively characterized through WGS, transcriptomic, and epigenetic sequencing assays. Currently, we are examining the effect of IFN γ on chromatin regulation and gene expression in iPSC-derived cardiovascular progenitor cells (iPSC-CVPCs) through ATAC and RNAseq analysis. We also plan to investigate the microbiome-derived metabolite, trimethylamine N oxide (TMAO), antibiotic doxycycline, and the cancer drug Imatinib using this same experiment design. The overarching goals of these studies are to identify gene regulatory networks contributing to cardiac diseases that can potentially be targeted therapeutically.

371 1:00 pm Z

Studying the effect of Small Molecule Drug on Alagille Syndrome Patient's Cells Derived Spheroid and Organoids

Aya Aljaber, Biology (U)

Alagille syndrome is a rare genetic disorder caused by a mutation in the notch ligand gene JAG1, which leads to lower activation of the Notch2/Sox9 signaling axis. The global reported incident is 1 in about 30,000-40,000 births, yearly. Furthermore, the survival rate without a liver transplant is less than 30% by 18.5 years old. The Jag1/Notch2/Sox9 signaling is

widely involved in developmental events, including germ layer specification, axis formation, and organogenesis. The failure of JAG1/Notch2 activation causes intrahepatic biliary paucity (no or less liver duct formation), liver cirrhosis, slow development/mental growth retardation, cardiac ventral septum defects, weight loss, jaundice, and many other birth defects. Several studies have shown that the Notch2/Sox9 signaling is a key player in liver duct development.

In ALGS patients, the notch signaling is failed to activate the Notch2 downstream gene regulatory network (GRN), resulting in no or less expression of Sox9 in a Notch2-dependent manner. The project focus on studying the molecular mechanism of Notch2 signaling activation in hepatocyte cells (HepG2) and heterozygous hepatocytes (HepG2-Jag1+/-). The goal is to identify a Notch2 agonist and its clinical validation to regenerate the bile network in ALGS patients to target the bile paucity in liver. A small molecule drug (NoRA1) is being used to study its effect on bile duct regeneration in-vitro and in-vivo model systems. The results indicate that NoRA1 activated Notch2 signaling and increased Sox9 expression in WT-HepG2 and Jag1+/- cells (in vitro). Moreover, NoRA1 has shown an increase in the expression of Sox9 in zebrafish liver with mutant JAG1 (in vivo) (Zhao et al, 2022).

Additionally, NoRA1 also augmented the Sox9, and Hes1 expressions in mice liver. In spheroid, NoRA1 rescued MDR1 (Bile Canaliculi marker) level in a Jag1+/- spheroid which was decreased due to Jag1+/- knockout spheroid compared to untreated group (figure.4). Thereafter, the MDR1 expression remarkably reduced in double heterozygous (Jag1+/- and Notch2+/-) mice liver. At the last, results suggested that NoRA1 has Notch2 agonist therapeutic potential, leading to duct regeneration in ALGS patients. Currently, we are focusing to validate its clinical aspect in organoids model and triggering duct regeneration in ALGS patients.

372 1:00 pm AA

Aerobic Activity is Impaired by Vaping

Sama Mikhail, Microbiology (U)

Vaping and e-cigarettes are popular with young adults due in part to the perception of harm reduction compared to traditional cigarette smoking. Vaping offers a safer alternative to cigarette smoking but still can promote pathological changes that diminish the health and lifestyle activities of frequent users. Aerobic exercise improves cardiovascular health, but the influence of physical activity upon vaping-associated pulmonary injury (VAPI) is poorly understood. The long-term goal of this study is to assess the impact of aerobic exercise upon VAPI. Cohorts of male (n=4) and female (n=4) C57BL/6 in four treatment groups consisted of: 1) no exercise, no vape; 2) no exercise, vape; 3) exercise, no vape; and 4) exercise and vape. Physical activity on voluntary running wheels was measured four days per week by tracking the number of wheel revolutions per evening. Vape aerosol exposure was performed using an automated inhalation apparatus (SCIREQ InExpose) equipped with JUUL pens loaded with commercially purchased Peach Ice flavored juice (ORGNX; zero nicotine) for 4 hours per day and 5 days per week. Results demonstrate that exercise performance

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is reduced by vape aerosol exposure after 4 weeks compared to the running-only cohort. Both sexes initially show increased exercise performance with acclimation to the running wheels within the first few weeks with female mice consistently running approximately 2 miles more than corresponding males 7.33 versus 9.25 miles for females versus males, respectively. Variability between individual mice was evident, but vaping led to a substantial decrease in distance run for both females and males after 4 weeks 13% and 12.5% lower, respectively. These findings demonstrate that vaping impairs aerobic exercise capacity with sex-specific differences in outcomes. Ongoing studies will determine the mechanistic basis for aerobic exercise's impact upon VAPI using a combination of molecular, histologic, and functional analysis. In conclusion, females appear initially more resistant to VAPI than males, but this advantage may be lost with prolonged exposure.

373 1:00 pm BB

Modeling Defects in Extravillous Trophoblast Differentiation in the setting of Trisomy 21

Sydney Olfus, Biology (U)

Background: Trisomy 21 (T21) pregnancies are known to have a higher risk of miscarriage due to defects in trophoblast, the epithelial cells of the placenta. Within the placenta, trophoblast stem cells (TSC) differentiate to form either multinucleated, hormone-producing syncytiotrophoblasts (STB), or invasive extravillous trophoblast (EVT) involved in vascular remodeling and establishing blood flow to the placenta. To date, only STB differentiation defects have been investigated in the setting of T21 placentas, and also modeled using T21-affected human embryonic stem cells (hESC), using a protocol established in our lab. However, only limited studies of T21-affected EVT have been done, due to a lack of an optimal EVT differentiation protocol. Our lab has recently established hESC-derived TSC, with a significantly improved EVT differentiation of these cells. In this study, we utilized this newly-established protocol to investigate T21-affected EVT.

Methods: Three T21-affected and two disomy hESC lines were converted to TSC, by a 4 day treatment with bone morphogenetic protein 4 (BMP4) and WNT inhibitor IWP2, and then transitioning the cells into TSC media. Subsequently, EVT differentiation of the hESC-derived TSC was performed, using a recently-optimized protocol. EVT differentiation was assessed by morphology, as well as flow cytometric analysis for surface expression of EGFR (a TSC marker) and HLA-G (an EVT marker).

Results: T21-affected hESC showed similar morphology and surface EGFR expression level during their transition into TSC, when compared to disomy hESC-TSC, with over 80% EGFR positivity. However, when EVT differentiation was initiated, the morphology of T21-affected cells was significantly different: T21-affected EVT showed an ovoid morphology with slower cell growth, and did not display the elongated morphology that is characteristic of normal EVT. T21-affected EVT also showed 8.7 fold-change lower surface expression of HLA-G by flow cytometry, when compared to disomy-hESC-derived EVT.

Conclusions: Our results show reduced EVT surface marker

expression in T21-hESC derived EVTs. This is the first report showing an abnormal EVT phenotype in T21-affected trophoblast derived from hESC. Additional characterization of EVT invasive capacity, secretome, cell proliferation, and marker expression by qPCR are required to assess formation and functional abnormality of this cell type.

374 1:00 pm CC

Upregulation of CFTR by Combinatorial Inhibition of miRNA and NMD

Jackson Kubal, Cell/ Molecular Biology (U)

Cystic Fibrosis (CF) is an autosomal recessive genetic disease affecting approximately one in 3,000-4,000 Caucasians, making it the most common life-threatening disease among Caucasians.¹ The disease is characterized by a mutation in the Cystic Fibrosis Transmembrane Regulator (CFTR) gene, which leads to either a defective or nonexistent transmembrane chloride ion transporter protein.² For patients harboring mutations that cause defective protein there are currently therapeutic options capable of alleviating the symptoms of the disease and prolonging life expectancy.³ However, the efficacy of the therapy is dependent upon the presence of sufficient CFTR protein in the cellular transmembrane. Patients harboring a nonsense mutation currently have no clinical options and patients harboring a mutation leading to reduced CFTR expression experience limited therapeutic relief.³ Increasing the amount of CFTR mRNA transcripts that make it to protein is, therefore, a necessary parameter for patients harboring a nonsense mutation and a therapeutically relevant achievement for patients harboring other types of CFTR mutation.

Nonsense mutations present in CFTR mRNA are degraded by Nonsense-Mediated Decay (NMD) proteins before translation can occur. By inhibiting the NMD-pathway, researchers have been able to increase the amount of mRNA transcript that makes it to protein in patients harboring a nonsense mutation.⁴

Recent studies have also demonstrated that CFTR mRNA is negatively regulated by microRNAs (miRNAs).⁵ MicroRNAs are a class of small, non-coding RNAs that bind to sequences within the 3'UTR of mRNA and inhibit translation.⁶ Researchers demonstrated that inhibiting CFTR-specific miRNAs leads to an increase in both CFTR mRNA and protein.⁷

In our study, we plan to use a novel, combinatorial approach aimed at inhibiting both miRNA and NMD-mediated CFTR regulation. This will be done by first characterizing the effects of different miRNA inhibitors on CFTR mRNA/protein levels. Then, we plan to implement the miRNA inhibitors in conjunction with NMD knockdown and observe a synergistic rise in CFTR protein.

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375 1:00 pm DD

Wnt and RSPO effects on Human Induced Pluripotent Stem Cells to identify the effects of chromosomal instability

Sakshi Pradhan, Bioinformatics (M)

Background: Chromosomal instability results in tumors or may promote tumor progression by increasing the rate of genetic aberrations. It has been proven that chromosomal instability can arise as a consequence of improper mitosis or spindle checkpoint activity. The Wnt family of signaling proteins participates in multiple development events during embryo genesis and has also been implicated in adult tissue homeostasis. Wnts are secreted glycoproteins that bind to frizzled seven-trans membrane span receptors, which may be coupled to heterodimerize G proteins. The R-spondin (RSPO) family of proteins has been implicated in the regulation of WNT signaling. RSPOs are used to understand the functional roles not only in the biological processes but also in determining the molecular mechanism of the WNT pathway.

Methods: By using the iPSC H1 cell line, I learned to maintain the cell line and passage them to keep them healthy. Several morphology assays were learned during my time. The major one was to identify proper stem cell colonies and start maintaining them by passaging them every 4 days to keep the cell healthy with dissociating agents like Versene, Accutase, and Tryple express. After getting a sufficient number of cells seeding them into a 6-well plate and growing them to 70% confluences. After reaching the level start the treatment for 24 hours with three different agents: No treatment, Wnt + RSPO treatment, and Viacal buffer treatment. After 24 hours of treatment dissociate the cells and perform the RNA extraction protocol which will lead to performing RT-qPCR for the three treatments. The results of RT-qPCR will show us the expression of the target gene. The main goal is to send the

three treatments for single-cell RNA sequencing and check for chromosomal instability.

Results/Discussion: I learned of various techniques used for maintaining stem cells and growing them. The expected results are the formation of chromosomal instability in the three treatments based on the 24 hours time span. The prediction is the WNT + RSPO will show effects in the formation of the H1 stem cells line and could result in instability.

Funding: The research was supported by The California Institute for Regenerative Medicine (CIRM).

376 1:00 pm EE

Derivation of human induced trophoblast stem cells from umbilical cord-derived mesenchymal stem cells from patients with preeclampsia

Geronimo Salcedo, Biology with an emphasis in Cellular and Molecular Biology (U)

Studying pregnancy complications requires renewable cell model systems. Our lab recently developed a disease-in-a-dish model system to study a hypertensive pregnancy disorder called preeclampsia (PE) using patient umbilical cord mesenchymal stem cells (UC-MSC)-derived induced pluripotent stem cells (iPSC). PE is characterized by abnormal formation or function of placental cells, called trophoblast. We converted the MSC-derived iPSCs into trophoblast stem cells (TSC), and found that PE-affected iPSC-TSC showed abnormal trophoblast differentiation and response to environmental stressors, when compared to healthy iPSC-TSC. A more recent publication demonstrated that a transient fibroblast intermediate generated during reprogramming to iPSC can directly generate induced trophoblast stem cells (iTSC). However, there is no assessment of the ability of these iTSC to model disease, such as PE. Therefore, we propose to derive iTSC from the same healthy and PE-affected UC-MSCs, comparing these to previously-derived iPSC-TSC, in order to perform in-depth comparison of the two methods. We used UC-MSCs derived from placentas of PE and non-PE patients, and reprogrammed them using standard Yamanaka factors (OSKM). On day 8 post-transduction, reprogramming intermediates were transitioned onto mouse embryonic fibroblast (MEF) feeder layers with human trophoblast stem cell (hTSC) media, and cultured under 5% oxygen, following the recently published protocol. Cell characterization was performed by morphological assessment and by flow cytometry to measure surface expression of hTSC markers. Soon after the transition into hTSC media, we noted significant morphological changes of reprogramming intermediates, with cuboidal epithelial-like morphology. These cells further formed distinct hTSC-like colonies after several passages. Flow cytometric analysis showed increased expression of an early trophoblast marker, ENPEP, by passage 10. Our characterizations suggest that iTSC resembles hTSC and could be useful in modeling disease. Our next step is to determine whether the iTSC derived from PE-patients have a similarly-abnormal phenotype when compared to both iTSC derived from healthy patients, and the previously-established iPSC-TSC, in order to identify the best in vitro model system to study PE-affected trophoblast.

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Session H-6

Biological and Agricultural Sciences 13

Friday, March 3, 2023, 1:00 pm

Montezuma Hall

377 1:00 pm FF

Utilizing CRISPRi interrogation of host-microbe interactions to identify stimulants of animal development

Morgan Farrell, Cell and Molecular Biology (D)

A large body of research has worked to understand host-microbe interactions in the human body, and we've discovered that a dysbiosis of the microbial community can lead to disease. Due to these immense impacts, both positive and negative, the importance of understanding these interactions is vital. However, studying the mechanistic underpinnings of how microbes communicate with their host still has many challenges. One mechanism that microbes use to communicate and interact with eukaryotic hosts are outer membrane vesicles (OMVs) which are produced by many different species of bacteria including human pathogens and marine bacteria. These vesicles have been shown to transfer toxins, genetic material like DNA or virulence factors as well as lipids, proteins, and small molecules. An interesting candidate to investigate OMVs is the *Roseobacter* clade of bacteria due to their prevalence in marine ecosystems. *Roseobacter* often colonize marine biofilms and are a known inducer of settlement in several marine invertebrates. An emerging model to study host-microbe interactions is the marine tubeworm *Hydroides elegans*, which develop responses to one bacterial cue at a time and is the only model that requires bacterial products to stimulate its metamorphosis and growth. Understanding the factors that induce metamorphosis can give us a direct link to how microbes are interacting with eukaryotic organisms. How I will explore this interaction is to interrogate genes associated with OMVs including lipopolysaccharides (lpsC) and exopolysaccharides (exoP) to determine if these pathways are involved in the induction of metamorphosis. To do this I will employ CRISPR interference (CRISPRi) technology which utilizes a dead Cas9 protein to inhibit the expression of my target gene without making any edits to the genome. The results of this study will help characterize the unknown mechanism of how *Roseobacter* clade bacteria induce metamorphosis in *Hydroides*. OMVs have been shown to be prevalent in the human body and future applications of this research could use OMVs to deliver specific cargo in human microbial systems as a therapeutic avenue.

378 1:00 pm GG

The effect of the reproductive axis on the gut microbiome

Laura Sisk-Hackworth, Cell and Molecular Biology (D)

Laura Sisk-Hackworth, Varykina G. Thackray, Lillian Sau, Jada Brown, Ivy Tam, Aishwarya Ramesh, Scott T. Kelley*. *These authors contributed equally to this work.

Background: Puberty is a critical period in human development with lasting impacts on health and disease development. Studies have shown that sex-specific differences in the human intestinal (gut) microbiome emerge during puberty and last into adulthood. This is important, as many sex-specific aspects of physiology that are linked to the gut microbiome develop during puberty, like reproduction and metabolism. However, the mechanism for how these sex differences develop is unknown. One likely factor is the hypothalamic-pituitary-gonadotropic axis (reproductive axis), which greatly alters host physiology in adults. Methods: To decipher the role of the reproductive axis in the maturation of the gut microbiota, I conducted an experiment with the hypogonadotropic (hpg) mouse model, so named due to a mutation in the gene that encodes gonadotropin-releasing-hormone (GnRH). GnRH triggers the reproductive axis to start puberty, so mice with two copies of this mutation do not go through normal puberty and do not develop functioning gonads (hpg mutants), while mice without this mutation go through puberty as normal (hpg wild-types). I collected samples from mutant and wild-type adult male and female mice mouse along sections of the intestinal tract: the ileum and cecum. From the contents and lining of these sections, I extracted DNA and sequenced the ubiquitous bacterial 16S rRNA gene to identify the bacterial taxa present. Hypothesis: I hypothesize that hpg mutant mice will have an altered gut microbiome compared to hpg wild-type mice. Results: Analysis of the microbiome of both the intestinal contents and intestinal lining of the ileum and cecum has revealed that adult hpg mutant mice have an altered gut microbiome compared to wild-type mice. Conclusion: The hpg axis is important in the development of the gut microbiome.

379 1:00 pm HH

β -Glucuronidase Activity in the Gut Microbiome: Relationship to Sex and HPG Axis

Shawn Ogen, Cell and Molecular Biology (M)

The gut microbiome is composed of trillions of microorganisms that play a large role in host health and disease. There is evidence that the composition of the gut microbiome differs depending on sex. In the gut microbiome, there are specific microbes that contain β -Glucuronidase enzymes. These enzymes deconjugate host-derived molecules, such as sex steroids and bile acids, and deconjugate external compounds, such as xenobiotic conjugates. The goal of this research is to determine whether sex or Hpg axis affects glucuronidase activity in the gut microbiome. Fecal samples were collected from four groups of mice: female and male wild type mice that undergo puberty, and female and male *Gnrh1hpg* mutant mice that do not. We also used bioinformatics analysis of genomes in our gut bacterial culture collection to identify those with potential β -Glucuronidase activity. Glucuronidase and Bradford assays will be performed on fecal samples and bacterial cultures, and statistical analyses (ANOVAs) will be used to detect differences in activity in murine fecal samples and bacterial cultures. It is evident that there are sex-related differences in the composition of the gut microbiome, however the reasons for these differences, and the impact of these differences on the host is not yet understood. One

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possible mechanism involves sex steroids that enter the gut and are deconjugated by specific bacteria, changing the overall composition of the gut microbiome. Testing for β -Glucuronidase activity in these samples will allow us to compare activity levels related to sex and Hpg axis, giving us a better understanding on the mechanism of how sex and sex steroids influence the gut microbiome. In future research, this could allow for the development of sex-specific treatment options, depending on β -Glucuronidase levels of a patient.

380 1:00 pm II

Commensal Bacterial Adherence to the Intestinal Epithelium of *C. elegans*

Kayla Poirier, Microbiology (U)

Wild nematodes are naturally associated with bacteria in their intestinal tract, making them excellent models for host-microbe interactions. *Caenorhabditis elegans* are considered an ideal model organism for microbiome research due to similarities between their intestine and polarized intestinal cells in mammals. Additionally, the worms are fully transparent, which is especially beneficial to visualize bacterial adhesion in their intestine. Many adhering bacteria are beneficial to the gut because of their ability to attach to specific cells and help develop host defense. Additionally, they can outcompete with pathogenic microbes to create an ideal niche in the intestine. We have identified wild nematode isolates from around the world colonized with bacteria that directionally adhere to the intestinal epithelium. One of these adhering bacteria is *Lelliottia jeotgali*.

To better understand the effect of *L. jeotgali* on host fitness, we performed reproductive lifespan and brood size assays. We found that there was no effect on *C. elegans* fitness when animals were monocolonized with *L. jeotgali* when compared to the same *C. elegans* strain without bacteria colonization. This data suggests that *L. jeotgali* is a commensal-like bacteria of the microbiome. Additionally, we conducted a proliferation assay to observe how the bacteria grow and persist in the intestine. We observed that after worms are briefly exposed to *L. jeotgali*, the number of bacteria increase over time, suggesting that it can proliferate in the lumen.

We believe that the capacity of *L. jeotgali* to adhere to the *C. elegans* intestine is due to the presence of a novel plasmid that contains genes encoding for fimbriae, adhesions, and a Type IV secretion system. We cured *L. jeotgali* such that it does not contain this plasmid and we found that it does not have any adhering properties. Our next step is to see if this plasmid is sufficient to confer binding by mating *L. jeotgali* with the plasmid to a related non-adherent bacterial strain, *Lelliottia amnigena*, and seeing if this bacterial species gains adherence in vivo. Altogether, this research presents an opportunity to better understand adhering commensal microbiome bacteria in the context of a whole intact animal.

381 1:00 pm JJ

Investigating Infection Resistance against the bacteria *Bordetella atropi* among wild strains of nematodes through Genetic Mapping

Sandra Lee, Biology (U)

Genetic mapping is a valuable tool for determining the location of an allele on a chromosome that is responsible for a given phenotype. This tool provides helps identify a specific mutant gene in a population that may provide a benefit or burden to an organism. We discovered that a natural bacterial pathogen, *Bordetella atropi*, of the nematode *Oscheius tipulae* can infect the animal's intestine and use filamentation (long threads) to spread between host cells. Here, we have found through infection of a panel of wild isolates of *O. tipulae* that there is a range of natural resistance and susceptibility to *B. atropi* infection. The wild strain of *O. tipulae* that had the most resistance against the intracellular bacteria was designated JU457, which showed a less than 2% infection rate, compared to a greater than 70% infection rate seen in wild-type *O. tipulae*. These divergent infection phenotypes will allow us to use genetic mapping to identify the resistance gene in this JU457 strain. Overall, researching this resistance against bacterial infection in nematodes could reveal conserved paradigms regarding how humans combat and resist bacterial infections.

In order to map JU457 resistance to *B. atropi*, we performed a mating experiment to verify it can mate with a susceptible strain. We found that males of JU457 were capable of mating with hermaphrodites of CEW1, which will allow us to mate the strains and challenge their F2 progeny on the pathogen. In order for the mapping to work, we needed to verify that JU457 survives better than CEW1 when infected with *B. atropi*. We indeed discovered that JU457 worms survived the infection. By contrast, all of the CEW1 worms were susceptible to the infection and died off. This confirmed that JU457 not only shows less infection than wild-type animals but in fact survived *B. atropi* infection better. Based on these observations, we strongly believe that the JU457 strain is more resistant to this bacterial infection, allowing us to use genetic mapping to identify a resistance gene to intracellular bacterial infection.

Session H-7

Physical and Mathematical Sciences 8

Friday, March 3, 2023, 1:00 pm

Montezuma Hall

382 1:00 pm KK

Deconstructing Constructivism: Modeling Causal Relationships Among Constructivist Learning Environment Factors and Student Outcomes in Introductory Chemistry

Haley Palm, Chemistry (M)

Constructivist approaches to teaching chemistry courses have been adopted as a way to improve student outcomes and

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satisfaction, but little research has been done to empirically examine the processes of constructive learning in the context of undergraduate science, technology, engineering, and mathematics (STEM) education, especially in chemical education. To fill this gap, this study tested a structural equation model that describes the causal relationships between the role of an instructor as a facilitator, the role of individual cognitive construction of chemical concepts, and the role of social interaction with classmates on content knowledge, achievement outcome, and student satisfaction in introductory-level chemistry courses, after considering prior math ability. Over two-thousand participants were recruited from diverse higher-education institutions that have different student demographics and locations (e.g., Hispanic serving institution on the West Coast, research universities in the Midwest) and the model was tested for invariance across groups. The results indicated that constructivist learning environment factors of instructor and individual cognitive construction do appear to have significant influences on student satisfaction and academic outcomes, while the influence of social interaction with classmates are only indirectly significant on student satisfaction and academic outcomes via individual cognitive construction. The finding led to dispel some common myths associated with constructive approaches (e.g., overemphasis on peer interaction might not be a balanced approach as often students at a similar level of content knowledge often do not move further than exploration) and to have a better understanding of constructive learning practices and its effectiveness, thus, instructors can confidently carry their teaching practice or improve it aligned with constructive approaches.

383 1:00 pm LL

Hydrogen evolution activity differences of chiral molecules intercalated molybdenum disulfide

Jackie Johnson, Chemistry (M)

Metallic molybdenum disulfide (1T-MoS₂) has gained traction over the years as a prominent hydrogen evolution (HER) catalyst. Recent literature has shown that 1T-MoS₂'s HER activity may be further improved by confining guest species near 1T-MoS₂ active sites. About two decades ago, a new phenomenon was discovered that relates the electron's spin to the handedness of chiral molecules and is denoted as chiral induced spin selectivity (CISS) effect. In this work, we hypothesize that CISS effect should also influence 1T-MoS₂'s HER catalytic activity. To understand this correlation, we aim to intercalate chiral organic molecules between layers of 1T-MoS₂ and understand how the chirality of these guest molecules changes the catalytic performance of 1T-MoS₂. We used a facile one step hydrothermal method to synthesize 1T MoS₂ with R and S methylbenzylamine (MBA) as the intercalant. Techniques such as circular dichroism and Raman spectroscopy were employed to verify the orientation of the MBA and the phase of MoS₂, respectively. Overpotentials equal to 332 and 400 mV vs. RHE were measured for R-MBA and S-MBA intercalated 1T-MoS₂, respectively, compared to an overpotential of 219 mV vs. RHE measured for 1T-MoS₂.

In conclusion, the decline in HER activities of 1T-MoS₂ were observed when chiral organic molecules are intercalated, probably resulting from blocking of HER active sites from the organic molecules. However, interestingly, R and S-MBA intercalated 1T-MoS₂ showed distinguishable HER activity, indicating the possible influence of CISS in changing catalytic activity of 1T-MoS₂.

384 1:00 pm MM

TD-DFT Studies of Monofluorinated Sterically Optimized Fluorescent Nucleoside Analogues

Vayle Vera Cruz, Chemistry (U)

Small fluorescent nucleoside analogues (FNAs) have been well investigated, meanwhile larger FNAs are at the forefront of research. Their role in the labeling and probing of biomolecules is apparent throughout literature, but in DNA/RNA studies, FNAs must minimally perturb the structure and follow similar hydrogen bonding schemes to canonical base pairs in order to preserve their structure. Previous studies on the synthetic FNA 8-diethylamine-tricyclic cytosine (ABN) have peered into its unique photophysical behavior as a bright single molecule FNA and its turn on effects when base paired. While an efficient fluorophore, ABN is inherently bulky, which is undesirable for in vivo applications. The ethyl groups at the 8-position can be scaled down to lessen the steric hindrance of ABN when inserted into oligonucleotides and still retain their push-pull fluorescence characteristics. Additionally, biological conditions in DNA can induce photo oxidation which will degrade synthetic nucleosides. One way to address the risk of this process for ABN would be to synthesize derivatives with fluorine at different positions on the fused rings to prevent degradation of carbon-hydrogen bonds. Here I present the results of DFT and TD-DFT studies (including B3LYP and aug-cc-PVDZ) into two smaller alternatives to ABN; Azetidino-ABN and 8-Dimethylamine-tricyclic cytosine. These studies include comparing the HOMO-LUMO band gap between distinct fluorinations of both derivatives. A focus is placed on decreasing the HOMO-LUMO band gap, modeling fluorescence pathways, maintaining a HOMO-LUMO gap within range of the canonical nucleobases, and maintaining a red shifted UV-Vis spectra with greater brightness than ABN.

385 1:00 pm NN

High throughput experimentation exploring the Chan-Lam reaction

Rachael Read, Chemistry (U)

High throughput experimentation (HTE) allows for a large number of reactions to be run simultaneously, therefore making it an excellent tool for screening and optimization. We focused on running Chan Lam reactions that involved the use of a variety of organotrifluoroborate compounds, copper catalysts, ligands, amines, and solvents. Our goal was to form nitrogen-carbon couplings between the amine and the organotrifluoroborate. Time and temperature were the two conditions that remained constant across all reactions. The following

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poster explores the adaptation of HTE to test hundreds of small scale reactions in order to discover which ones result in the desired product and the optimal conditions for those given reactions. A selection of reactions were then performed at a larger scale to confirm their validity.

386 1:00 pm OO

Using Electrochemistry to Study the Effects of Electron Donor and Withdrawing groups on Ruthenium Water Oxidation Catalysts

Carlamarina Osuna, Chemistry (U)

Greenhouse gas emissions' contribution to global warming demands the transition to sustainable sources of fuel. Hydrocarbon-based fuels continue to be the primary energy source in the world. Hydrogen gas is an attractive alternative due to its high energy density and its non-polluting factor. Current methods of hydrogen gas production are energy intensive and produce CO and CO₂ as byproducts. Water oxidation catalysts (WOC) are a promising option to produce hydrogen gas in the absence of hydrocarbons.

A previous WOC developed by Sun demonstrated promising catalytic activity. The catalyst produced a turnover number (TON) of 8300 using sacrificial oxidant testing at 0.114 mM of catalyst but demonstrated poor electrochemical activity at pH = 1.1. Our group at SDSU recently published a WOC that demonstrated higher activity in both sacrificial oxidant testing and in electrochemistry. Here, we evaluate the effects of electron donor (EtO-) and electron-withdrawing (-NO₂) groups on the 4' position of the published catalyst [Ru(terpy)(phen-SO₃)] using sacrificial oxidant testing and cyclic voltammetry to benchmark our catalyst.

We found that functionalizing the terpyridine with the ethoxy (EtO-) group shifts the onset potential to a lower value at pH = 7. The potential value for the ethoxy analog was 0.608 V, whereas the nitro (-NO₂) substituent shifted the onset potential more positively to a value of 0.8 V. The sacrificial oxidant testing was performed at pH = 1. The ethoxy analog consumed all the sacrificial oxidant in 0.4 hours with a 95% conversion yield and TON of 2240. The nitro analog only reached 47% conversion over the span of 12 hours and had a TON of 1108.

Thus, functionalizing our WOC with an electron-donating group demonstrated better electrochemical activity in both acidic and basic mediums and better sacrificial oxidant testing results. The electrochemical data also showed that the Ethoxy was active at pH = 0.43 and pH= 1.1. This demonstrates that the ethoxy analog is stable and favorable in acidic mediums because proton reduction was facilitated.

387 1:00 pm PP

Controlling Defect Concentration in Graphitic Carbon Nitride for Improved HER Efficiency

Melanie Weed, Chemistry (U)

Hydrogen fuel is essential for the future of sustainable energy, as it generates electricity with only heat and water as byproducts. Typical synthesis methods of H₂ gas are energy

intensive and require the use of fossil fuels. Therefore, the photocatalytic hydrogen evolution reaction (HER) is ideal for producing H₂ which is driven by solar energy. Graphitic carbon nitride (g-C₃N₄) is an inexpensive and non-toxic 2D semiconductor material that can be exploited as a photosensitizer in photocatalytic reactions. Bulk g-C₃N₄ is not an efficient photocatalyst for HER, as it does not obtain the proper bandgap. Inducing defects into the structure of g-C₃N₄ is an alternative modification strategy to enhance the photocatalytic HER performance over the g-C₃N₄ catalyst. We compared HER performance of defective g-C₃N₄ with non-defective g-C₃N₄ to prove the process of inducing defects improves catalytic performance. The defective g-C₃N₄ was characterized and confirmed by FT-IR and Raman spectroscopy. A further investigation of defect concentration as it relates to catalytic activity was executed. Experimental results show that defect plays a critical role in photocatalytic HER over g-C₃N₄ catalysts. In future work, we plan to intercalate transition metal single atom catalysts into the defective carbon nitride complex, producing larger binding sites for the metal. This new catalyst will allow for future applications in carbon dioxide reduction.

Session H-8

Health Nutrition and Clinical Sciences 4

Friday, March 3, 2023, 1:00 pm

Montezuma Hall

388 1:00 pm QQ

Effects of using the Step2Bed on forces, muscle activity, joint angles, and transfer time in older adults

Jacqueline Erdkamp, Kinesiology Pre-Physical Therapy (U)

Background and Objectives: Falls are a serious public health issue among older adults and using assistive equipment may lead to increased safety in the home. The Step2Bed (S2B) is an adjustable step stool with a handrail that can be used to increase safety during bed entry and exit. The purpose of this study was to compare bed entry and exit time, muscle activation, joint angles, and ground reaction forces (GRF) of older adults with and without the use of the S2B. We hypothesized that using the S2B during bed transfers would result in decreased transfer times, GRF, co-contraction, required range of motion and movement variability when compared to without the S2B.

Methods: Thirty-five participants (mean age=70.9) transferred on and off a plinth under three conditions: using the S2B with handrail (S2B+H), using the S2B without handrail (S2B-H), and without using the S2B (control). Each condition was repeated 3 times and trial order was randomized. Trials were video-recorded to calculate ingress and egress durations. GRF were collected via force plates, electromyography collected muscle activity and joint angles through electro-goniometers. A repeated-measures ANOVA was used to compare these

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outcomes across conditions.

Results: Egress time was significantly less while using the S2B+H (2.1s) compared to control (2.9s) ($p < .001$). Ingress time was lowest with S2B+H, but not significantly. S2B+H and S2B-H trials resulted in smaller shear forces and vertical forces compared to control (all $p < .026$). Center of pressure excursion and displacement in anterior-posterior and medio-lateral directions were lowest in S2B+H, but not significantly. Knee range of motion, angle velocity and variability were significantly less during S2B+H compared to control (all $p < .003$). Co-contraction between the plantarflexors and dorsiflexors was lowest when using the S2B+H in comparison to control (all $p < .043$).

Conclusions: Lower range of motion and GRF while using the S2B+H suggests that it helped to decrease the effort required during bed egress compared to control. Decreased transfer duration, movement variability and co-contraction while using the S2B+H suggests that it provides stability and increased safety while transferring out of bed.

389 1:00 pm RR

Cigarette smoke exposure effects on diaphragms susceptibility for ventilator-induced diaphragm dysfunction

Simon Pierce, Kinesiology - exercise science generalist (U)

The purpose of this project is to investigate the consequences of smoke exposure on the diaphragm weakness that is developed during prolonged mechanical ventilation (MV) in mice. While MV can be a lifesaving clinical practice, extended periods of time on MV can lead to atrophy and contractile dysfunction of the diaphragm, known as ventilator-induced diaphragm dysfunction (VIDD). The hypothesis is that smoking will lead to an acceleration in myofiber oxidative stress, as well as increased protein breakdown in the diaphragm, which speeds up the rate at which mice develop VIDD. Wild-type, adult (12 weeks old) mice ($n=8$ per group) will be either exposed to cigarette smoke (CS) daily for 2 months or non-exposed. After the 2-month CS exposure, MV will be performed in mice for either 2 hours, 6 hours, or not ventilated as the control, using a small animal ventilator. After doing so, angiotensin converting enzyme 2 (ACE2), and angiotensin II type 1 receptor (AT1R) activity in diaphragm myofibers will be measured. These will be tested because plasma Angiotensin II (Ang II) is expected to increase, enhancing AT1R activity in the diaphragm, accelerating VIDD during MV. Following the in vivo MV, ex-vivo diaphragm force contractility, muscle histology changes, cytokine levels, and Ang II signaling will be measured. While there has been research to suggest that CS exposure leads to muscle contractile dysfunction before developing lung disease, there isn't any research that investigates diaphragm weakness that is developed from CS exposure during MV. The end goal of this research is to clarify the mechanism of diaphragm weakness that comes from MV in smokers. This information can be used to better understand and possibly minimize the effects of VIDD. At the moment of submission, the MV system has been tested, and the first group of mice are soon subject to MV.

390 1:00 pm SS

Effects of smoking on locomotor muscle adaptations to chronic electrical stimulation

Lloyd Marshall, Kinesiology (Exercise Science Generalist) (U)

This project will investigate whether exposing mice to tobacco smoke for 2 months, which leads to muscle capillary density regression and impairs fatigue resistance in mice, will interfere with muscle adaptations to exercise training. Cigarette smoking inhibits the production of several growth factors in muscles, including VEGF, a growth factor that stimulates capillary formation between muscle fibers. The regression of capillary bed in muscle is one of the main reasons muscle fatigues faster in mice exposed to cigarette smoke. Also, there is an effect of smoking on muscle function. It has been shown that exercise training has a very potent effect in increasing capillary bed in muscle (Delavar, et.al, 2014). Although there are other studies that show exercise training interferes with the inflammatory effects of smoking on muscle, it is not known whether exercise training can mitigate the effects of smoking on in vivo fatigue, capillaries, and muscle adaptation to training. The hypothesis is that exercise training decreases the pro-inflammatory signaling of smoking in muscle, blocking decreases in VEGF expression in muscle. Wild-type mice ($n=8$ per group) will be subjected to in vivo muscle contractions in one leg by electrically stimulating the distal peroneal nerve. The contralateral leg will be used as a non-stimulated control. The effects of repetitive contractions protocol in vivo on muscle cross-sectional area, capillarity, and ex-vivo intact muscle force will be evaluated. In addition, effects of 2-month smoke exposure will be investigated in another group mice after protocol of electrical stimulation. Results from this project will help understand whether beneficial effects of exercise training are affected by chronic smoking.

391 1:00 pm TT

Movement Strategies for Tactile Detection in the Little Finger

Wylianne Pangan, Kinesiology (Pre-Physical Therapy) (U)

Human fingers have a sensitive and accurate sense of touch and are useful in discriminating patterns in the surfaces of objects. When we use our fingers to feel the objects around us, we may use different movement strategies to gain a better understanding of what we are feeling. For example, we can choose which finger to use, or how to slide our fingers across a surface in different directions. In this project, we measured how well people could use the little finger to feel microscopic features on a glass surface. The effect of moving fingers in the anteroposterior (AP) and mediolateral (ML) directions were compared and analyzed by measuring the participants' proportions of correct responses and the average amount of force applied on the surface. A total of 27 participants were analyzed here. During each trial, two glass plates were presented, one of which had a small feature (2, 6, or 10 microns tall) and the other which did not. Each participant moved their little finger across both plates and pressed a button to indicate which of the plates they thought had the feature on it. They felt each feature 23 times in a randomized order. Overall,

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participants were more accurate at detecting the feature during the AP direction, and they pressed down harder during the ML direction. These results suggest that pressing down too hard on the surface can make it more difficult to feel the stimulus. Moreover, the combination of differences in direction and sensory sensitivity may influence the participants' performance and perception of touch. Ultimately, these findings help us understand how we can move to optimize our sensory sensitivity.

392 1:00 pm UU

Validation Of Augmented K-Tape With 3d-Printed Strain Sensors For Measuring Low Back Movement And Muscle Activity

Audrey Lee, Bioengineering, Biomechanics Specialization (M)

Lower back pain (LBP) is one of the most prevalent health conditions that also results in physical, emotional, social, and financial burdens¹ and one of the leading causes of disability worldwide². Treatment of LBP commonly involves a combination of directed physical therapy (PT) in a clinic and assigned at-home exercises. Adherence and correct performance of these at-home exercises are critical for improving outcomes^{3,4,5}. Patients have stated that the main factor affecting adherence and correct performance of at-home exercises is clinician feedback^{6,7,8}. Thus, having a means to monitor at-home exercises for treatment and telerehabilitation services has the potential to improve correct performance of home exercises and exercise adherence for optimal treatment and recovery.

Even with the advances in wearable devices, many devices are limited to laboratory environment, bulky and rigid sensors, and/or constraining wiring. To address this problem, our study team has developed Graphene Kinesiology Tape (K-Tape), which is a low-profile wearable sensor, designed to be worn throughout the day, in a person's natural environment, and that interferes minimally with activities. The K-Tape sensors includes graphene strain gauges that are 3-D printed into a wearable kinesiology tape. The properties of the graphene material are useful for measuring skin strain and other physiological parameters such as body movement and muscle activity.

The purpose of the proposed research is to develop a lower back use case for the K-Tape sensors, to measure lumbar spine posture and movement, muscle activity, and muscle strain. Our central hypothesis is that measures with K-Tape sensors will provide data comparable to muscle activity, muscle strain, and kinematics in the low back when compared to the gold-standard, motion capture system and electromyography. This study will validate the K-Tape sensors for the low back use case, which could ultimately be used to assist clinicians with remote assessment low back movements and muscle activity to help support physical therapy treatment of people with low back pain and for injury prevention, including monitoring home exercises.

393 1:00 pm VV

Oral Health and Hygiene Behaviors and Oral Cancer Knowledge, Attitudes, and Perceptions: A Scoping Review

Alana Lopez, Health Behavior (D)

Growing evidence of oral health and hygiene behaviors and periodontal disease in the disease pathway and survival benefits of early stage diagnosis of oral cancer warrants a better understanding of this relationship, if any. The purpose of this scoping review was to determine what is known, and identify gaps in knowledge about the relationship between oral health and hygiene behaviors on perceptions, knowledge, beliefs, or attitudes related to oral cancer among minority populations. We conducted an electronic database search in July 2022 using PUBMED, SCOPUS, and CINAHL, and reviewed corresponding gray literature. Authors developed a data collection form to systematically extract information from included articles on study population and setting, oral health behavior measures, oral cancer knowledge, beliefs, attitudes, and perceptions measures, and general findings. This review identified 9 relevant studies conducted in the United States (66%), Australia (11%), United Arab Emirates (11%), United Kingdom (11%). In terms of measurement of behaviors, the articles in this review all focused on dental service utilization, with 89% measuring realized access to dental services, while 22% measured perceived access to these services. While all studies assessed participant knowledge of oral cancer risk factors, only 33% assessed awareness of oral cancer, and only 22% included measures of oral cancer-related attitudes. Additionally, all studies included, to some extent, racial/ethnic minority populations. However, only 44% focused exclusively on these populations. In terms of article quality evaluation, using Strengthening the Reporting of Observational Studies in Epidemiology criteria, article ratings averaged 17.1 out of a possible 22 total points. The overall findings of these studies suggest low levels of oral cancer knowledge and awareness, and variable dental service utilization. In terms of oral cancer knowledge, attitudes, or perceptions, measurement approaches were heterogeneous, suggesting a need for consistent measures of these constructs. Study quality was similarly variable, but many of these largely cross-sectional studies lacked psychometrically sound instruments and sufficient methodological detail for replicability. Overall, these findings suggest the need for more rigorous study designs, measures, and inclusion of diverse populations to better understand the relationship between oral hygiene behaviors and oral cancer knowledge, attitudes, and perceptions.

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Session H-9

Health Nutrition and Clinical Sciences 5

Friday, March 3, 2023, 1:00 pm

Montezuma Hall

394 1:00 pm WW

The Cancer Health Equity Collaborative: Does it effectively support cancer related stakeholders in the San Diego region?

Leanne Locano, Public Health (U)

The Cancer Health Equity Collaborative (CHEC), supported by the UC San Diego Moores Cancer Center, seeks to foster networking and improve access to cancer prevention, detection, treatment information and resources among underserved communities. From July 7th to July 29th, 2022 we queried CHEC members using a brief on-line survey created using Qualtrics, followed by a virtual interview that was scheduled with 10 participating organizations over a 2-week period. The purpose of our assessment was to understand and evaluate the effectiveness of CHEC among participating stakeholders. The collaborative consists of 39 organizations. Among these, 24 participated in the online survey (62% response rate). Ninety five percent (95%) of respondents agreed that CHEC's mission aligned with their own organization's goals and CHEC supports important community needs related to cancer. Eighty three percent (83%) of participants strongly agreed that CHEC meets the objective of sharing cancer-related resources and tools to better inform stakeholders and the community. Sixty six percent (66%) of respondents stated that they share CHEC resources with others. One organization reported sharing information with as many as 1,000 individuals. Among those that participated in the on-line survey, 10 participated in the virtual interviews. One hundred percent (100%) of those interviewed reported that CHEC has in some way positively supported their organization by providing resources, networking opportunities, and necessary cancer information. Overall, our assessment concluded that CHEC is effective in providing access to information for cancer stakeholders in San Diego and has benefited organizations through facilitating networking, sharing resources, and educational presentations. Results highlight the importance of participating in CHEC in order to gain a comprehensive and an all-encompassing perspective on cancer.

395 1:00 pm XX

How Do Latine Parents Interpret and Respond to the U.S. Household Food Security Survey Module? A Qualitative Cognitive Interviewing Study

Edgar Doolan, Exercise Physiology and Nutritional Sciences (M)

Background: Food insecurity disproportionately affects the U.S. Latine population—particularly households with children—as measured by the USDA's Household Food Security Survey Module (FSSM). This survey tool was originally developed among rural white women, but has since been translated into

Spanish for use with Spanish-speaking households for national monitoring purposes. Though commonly used in this way, the FSSM has never undergone formal cognitive interviewing and may not fully capture the food insecurity (FI) experiences of U.S. Latine households, particularly those with children.

Objective: The objective of this community-based qualitative study was to use cognitive interviewing to explore how U.S. Latine caregivers understood, interpreted, and responded to FSSM survey items and how well quantitative FSSM responses captured participants' self-reported FI experiences.

Methods: Trained student researchers conducted in-depth, semi-structured, exploratory cognitive interviews with rural, urban, and suburban Latine caregivers (n = 62) experiencing varying degrees of FI in three states—California, New York, and Texas. The three-site research team used qualitative analysis to compare FSSM items to cognitive interviewing data on item interpretation, patterns of responses, and emic perspectives. In addition to exploring item-by-item responses, the team identified cross-cutting emergent themes.

Results: Participants stated that FSSM items were clear and rarely reported translation problems. However, some participants indicated being confused by items and suggested wording changes. Emergent themes across multiple items suggested that quantitative FSSM responses may underestimate FI. First, some participants responded “Never” to questions about not having enough money for food due to reliance on food assistance programs and food pantries. In addition, FSSM items about adults reducing or skipping meals appeared to be interpreted as either double-barreled or emotionally difficult, as some participants answered “Never” to these items but then described eating significantly less. Last, the FSSM's limited response options did not appear to reflect participants' experiences, contributing to differences between the current FSSM responses and the nuanced explanations participants shared when asked.

Conclusions: FSSM validity could be improved by including items capturing strategies used for coping with FI and by providing more acceptable response options that reflect the cultural and personal experiences of U.S. Latine caregivers.

396 1:00 pm YY

Legacy Speakers Project: Improving the bilingual workforce for Equity in Clinical Trials and Care Delivery

Alexis Abundis, Master of Public Health, Health Management and Policy (M)

Limited English proficient (LEP) patients, or patients that speak English less than “very well” are routinely excluded from important research and clinical trials due to language barriers. A lack of minorities in research like vaccine studies and cancer therapeutics could be improved by ensuring this growing population is integrated. One upstream solution is by incorporating trained bilingual researcher assistants (BiRA) capable of providing culturally and linguistically appropriate study support. Just as including diverse patients in studies, including BiRA can contribute to better research participation

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in existing research studies with LEP patients. Our goal is to inform the development of a program to increase inclusion of LEP participants in research and to decrease disparities due to language barriers by identifying barriers and facilitators current research assistants or associates (RAs) experience when interacting with LEP participants. We recruited 14 undergraduate and graduate SDSU students and conducted key informant interviews. We collected data about their experiences to identify what type of training and knowledge they would like. We are analyzing their responses and are presenting our study design and preliminary results to inform the development of our intervention.

At the end of our project, we will have the critical elements needed to develop a novel training program to help the growing diverse workforce has the capacity to use their language skills to maximize their ability to work with language diverse populations to improve health and health equity.

397 1:00 pm ZZ

Impact of Health Disparities and Prostate Cancer Among African American Men

Kendal Ruffin, Psychology (U)

African American men are at higher risk of prostate cancer (PCa) compared to Non-African American men. This study identified health disparities such as socioeconomic status, education, and access to healthcare that may explain why African American men are more susceptible to this disease as well as what is being done to mitigate these barriers. A search was conducted to explore literature regarding health disparities African American men face pertaining to PCa. These articles were found using PubMed/MEDLINE, CINAHL, PsycINFO, and ERIC. Key search terms included: prostate cancer, African American men, screening, and health promotion. Year constraints were not used in the search. Reference lists were used to identify other sources from core articles. In this literature search, 35 articles were identified based on relevant titles. After reviewing each abstract, 15 articles were not relevant to the topic of interest and were discarded from the review. 20 articles were selected for a thorough review. The selected articles identified the health disparities and barriers contributing to the lack of knowledge and inaccurate beliefs pertaining to prostate cancer in African American men. Several studies indicated that African American men were less knowledgeable about the importance of early screening for PCa detection, despite African American men being at higher risk for PCa than men of other racial/ethnic groups. Studies identified the need for educational programs and interventions to encourage African American men to make more informed decisions regarding PCa screenings for early detection. Results showed a growing need for healthcare providers to encourage conversations with African American men regarding the important pros and cons of PCa screening. In summary, many African American men were unaware of their increased risk of PCa and did not have the knowledge to make informed decisions regarding early detection screening.

398 1:00 pm AAA

Biodegradable Whey Protein Films Loaded with Biosynthesized ZnO Nanoparticles

Jessica Davis, Nutritional Sciences (U)

Incorporating nanoparticles into biodegradable films is a promising approach to enhance film qualities such as mechanical strength. These nano-sized materials can serve as fillers in film-forming matrices and thereby strengthening the films. Besides an improved mechanical strength, such bionanocomposite films may also exhibit good barrier properties and antimicrobial activities. The conventional nanoparticle synthesis techniques are often energy intensive or require toxic chemicals, which limits the application of nanoparticles in food products.

Therefore, the goal of this study is to explore protein-mediated biosynthesis of ZnO nanoparticles (ZnO-NPs) and their applications in whey protein isolate (WPI) films. Biosynthesized ZnO-NPs were incorporated into WPI films at 1.35% and 2.7% of the protein weight by the solvent casting method. Percent light transmittance, color difference, mechanical strength, water vapor permeability, Fourier-transform infrared (FTIR) spectroscopy, and antimicrobial activity of the WPI films were assessed. Data were analyzed by one-way analysis of variance and Tukey's honestly significant difference test. All the WPI films exhibited a transparent and colorless appearance except the WPI film incorporated with 2.7% ZnO-NPs, which resulted in visible aggregates and significantly decreased percent light transmittance ($P < 0.05$) over the visible light range. The addition of ZnO-NPs did not significantly affect tensile strength, elongation at break, elastic modulus, and water vapor permeability of the films ($P > 0.05$). All films displayed similar FTIR profile including the characteristic amide A, amide I, amide II bands. A graduate increase in amide A signal was observed in response to an increased ZnO-NPs concentration suggesting that the ZnO-NPs likely interacted with WPI via hydrogen bonding. The addition of ZnO-NPs significantly increased the beta-sheet content while decreased random coils ($P < 0.05$). This indicated that the ZnO-NPs changed the native structure of the WPI. The WPI films loaded with ZnO-NPs presented improved resistance against the gram-negative *E. coli*. In summary, we successfully used WPI to catalyze biosynthesis of ZnO-NPs during the film forming process and observed enhanced antimicrobial activities. This presents a nontoxic and eco-friendly technique for synthesizing food grade nanoparticles.

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399 1:00 pm BBB

The Impact of Consuming Two Cups of Fruit Daily on Body Composition and Cardiovascular Biomarkers

Sarah AlHenaidi, Food and Nutrition (U)

Research has demonstrated how fruit, rich in phytochemicals and phenolic compounds, may benefit cardiometabolic health, cognition, and motor function; however, consumption amongst American adults falls below the recommended intake of two cups per day. Many studies have investigated single fruits on the proposed outcomes, but clinical studies investigating a multi-fruit intervention are lacking. The primary aim of the current study was to investigate whether fruit, consumed in amounts recommended by the dietary guidelines for Americans, would improve body composition and cardiovascular biomarkers. It was hypothesized that significant improvements in these outcomes would be observed. A total of 40 healthy males and females 30 to 70 years of age who report typically eating less than 2 cups equivalents of fruit per day were recruited to participate. Using a randomized crossover study design, eligible participants completed two 8-week trials: 1) 2 Cup (2C) equivalents of fruits per day; or 2) restricted fruit (RF) (limited intake to less than ½ Cup equivalents of fruits from a provided list only). An 8-week wash-out period occurred between trials. Anthropometrics, body composition, blood pressure, and cardiovascular biomarkers, were assessed at baseline and 8 weeks post-intervention for each trial. A significant main effect for time was observed for insulin levels, where concentrations were lower during the RF trial compared to the 2C trial. Insulin resistance ratios were significantly lower during the RF trial compared to the 2C trial. Insulin resistance ratios were significantly lower at the 8-week follow-up than at baseline, regardless of trial. Consuming two cups of fruit for 8 weeks did not significantly impact cardiovascular biomarkers, and body composition; therefore, the adequacy of the dietary guidelines for Americans for consuming two cups of fruit daily was not validated in the current study. Future research should continue to investigate the effects of whole fruit on the proposed outcomes under more tightly controlled conditions and with more sensitive measures to better establish a recommended dosage for fruit.

(U) = Undergraduate; (M) = Masters; (D) = Doctoral

SDSU

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Abstracts of Presentations

Session I

ABSTRACTS

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Session I-1

Behavioral and Social Sciences 13

Friday, March 3, 2023, 3:00 pm

Montezuma Hall

400 3:00 pm A

Investigating canonical and noncanonical sentence comprehension cross-linguistically: Does a universal subject relative processing advantage exist?

Preeti Rishi, School of Speech, Language, and Hearing Sciences (D)

Sentence comprehension is a complex process. Researchers have attempted to identify universal parameters that constrain language comprehension cross-linguistically by investigating subject (SRC) and object relative clause (ORC) comprehension. One hypothesized parameter is a universal processing advantage for SRCs over ORCs, which has been supported by research involving languages that exhibit head-initial relative clause structures (e.g., English). However, findings are much less consistent in confirming a universal SRC advantage within languages with head-final relative clause structures (e.g., Mandarin). The purpose of the current study was to test the universality of the SRC advantage and investigate canonical and noncanonical sentence processing in Mandarin (canonical: actives and ORCs; noncanonical: passives and SRCs) and English (canonical: actives and SRCs; noncanonical: passives and ORCs). Nineteen older Mandarin-English bilinguals (Meanage=77, SDage=4, Rangeage: 70-86; 11 female) were administered the English SOAP (A Test of Syntactic Complexity) sentence-picture matching task and an adapted Mandarin version (M-SOAP) to test comprehension of actives, passives, SRCs, and ORCs across both languages. Paired t-tests revealed no difference in performance of SRCs and ORCs in Mandarin. However, participants performed significantly better on English SRCs over ORCs [$t(17) = 5.584, p < 0.0001$, Cohen's $d = 1.694$]. Results from a 2x2 repeated measures ANOVA yielded significant main effects of language [$F(1, 17) = 40.084, p < 0.0001$] and canonicity [$F(1, 17) = 32.628, p < 0.0001$], and a significant language \times canonicity interaction [$F(1, 17) = 20.842, p < 0.001$]. Participants performed worse on noncanonical (accuracy=71%) than canonical (accuracy=87%) sentences, and this effect was driven by a significant noncanonical-canonical difference in performance in the non-dominant English language [$t(17) = 5.609, p < 0.001$, Cohen's $d = 1.256$]. With many participants achieving high scores in their dominant language, the performance difference on Mandarin canonical and noncanonical sentences remained insignificant. However, closer examination revealed performance variability where lower M-SOAP scores were associated with lower noncanonical relative to canonical scores ($r=-0.68, p=0.001$). These findings provide evidence against a universal SRC processing advantage and demonstrate that sentence processing is driven by the canonicity of sentences.

401 3:00 pm B

Accuracy and Productivity of Articles in Spanish with Spanish-English Bilingual Children

Karina Galvan-Rodriguez, Speech, Language and Hearing Sciences (U)

Background: Previous research on productivity of tense and agreement in English monolingual toddlers has established this measure as a valid indicator of a child's emergent grammar (Hadley & Short, 2005). Recent work has also extended this validity to English monolingual preschoolers (Gladfelter & Leonard, 2013) and has established that Spanish-English bilingual preschoolers reflect a different pattern of English morpheme acquisition compared to their monolingual counterparts (Potapova & Pruitt-Lord, 2019). However, no such productivity measure exists in any language other than English. In order to accurately characterize the emerging language abilities of bilingual children, both languages must be assessed (Bedore et al., 2010). Given the lack of non-English productivity measures, this study will investigate one potential grammatical structure that may contribute to a productivity measure in Spanish: articles. Definite and indefinite articles in Spanish follow grammatical rules that require agreement in both gender and number with the nouns they accompany. This system results in opportunities for children to demonstrate knowledge of gender and number in Spanish in various contexts. This study will examine the accuracy and productivity of articles in the language samples of 32 Spanish-English bilingual preschool-aged children.

Methods: Spanish language samples for 23 typically-developing preschool-aged children and 9 children with Developmental Language Disorder (DLD) between the ages of 4 and 6 form the data for the current study. Language samples were collected by trained research assistants, using age- and culturally-appropriate toys. All language samples were 15 to 20 minutes in length and consisted of play-based prompts and a narrative story retell task. From these language samples, we will examine children's percent accuracy of articles and determine the number of unique instances in which articles were used to calculate productivity of articles.

Expected Results: We expect the children in this sample to demonstrate high accuracy of articles, given their prevalence in Spanish grammar. However, we expect typically developing children to demonstrate a higher productivity score compared to their DLD peers, as this pattern has been established in previous research. This study will provide unique information as to how articles and productivity can be used in the assessment of Spanish-English bilingual children.

402 3:00 pm C

The Effects of an Immersion Experience on Children's Bilingual Language Abilities

Beth A Woll, Speech, Language, and Hearing Sciences (U)

Background: Despite common misconceptions, raising a bilingual child in the United States isn't necessarily an easy process. In fact, according to Wong Fillmore (2000), most children raised in bilingual homes in the United States are

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English dominant or English monolingual, having little or no expressive language abilities in the minority language. One strategy used by some parents to encourage language development in the minority language is to spend long stretches of time in a country where that language is dominant. This project will explore the impact of a 6-week intensive Spanish immersion experience in Cartagena, Colombia for two English-dominant preschool children thus far raised in a bilingual home environment in the United States. We hypothesized that the children's Spanish language skills would grow because of the immersion experience and that the percentage of Spanish spoken in the child's environment would predict growth.

Method: We administered four language assessments (receptive and expressive vocabulary, morphosyntax and semantics, and narrative languages skills) in English and Spanish as a baseline. During the immersion experience, we used the LENA devices to record samples of the subjects' language environment ($n=12$ recordings) to explore which languages were being used and track detailed information about words used by the adults and children in the subjects' environment. Upon return from the experience, the same four assessments were administered to track change.

Results: Children's English (L1) skills remained stable in most areas with some evidence of growth in vocabulary. Spanish expressive abilities did not increase, but there was evidence of growth of Spanish receptive language skills. Children's spontaneous use of Spanish words correlated with the percent of Spanish used by adults in their language environment.

Conclusion: Immersion experiences don't necessarily inhibit growth of children's native language. These experiences lead to changes in family language use in the home and there was evidence of improvement in receptive skills and some emerging expressive language skills. The LENA devices allowed us to observe how changes in the children's daily routines led to changes in their language environment. A longer period of immersion may be necessary to observe growth in expressive language skills.

403 3:00 pm D

Spanish-English Bilingual Children's Accuracy and Productivity of Verbs in Spanish

Emillie Cuevas, Speech, Language & Hearing Sciences (U)

Background: Grammatical productivity has been shown to offer advantages over using only accuracy-based measures for young children (Hadley & Short, 2005). This measure yields significant group differences between monolingual children with typical language and peers with Developmental Language Disorder (DLD; Gladfelter & Leonard, 2013), thus suggesting that productivity is a valid tool to be used for young preschool-aged children who are developing their early language skills (Hadley & Short, 2005). To date, no such measure of productivity exists for languages other than English (Potapova et al., 2018). In order to accurately characterize the emerging language abilities of bilingual children, both languages must be assessed (Bedore et al.,

2010). This study will investigate children's use of the past tense in verbs, as this represents one structure that may contribute to a Spanish grammatical productivity measure. In Spanish grammar, verb conjugation is a complex system that requires agreement in tense, grammatical mood, person, and number. Given this system, children's use of the past tense offers a unique opportunity to examine the kinds of verbs they use and contexts in which they produce the past tense. This study will examine the accuracy and productivity of the past tense in the language samples of 32 Spanish-English bilingual preschool-aged children.

Methods: We will examine the Spanish language samples of 23 typically-developing preschool-aged children and 9 children with DLD between the ages of 4 and 6. Language samples were collected using age- and culturally-appropriate toys and were 15 to 20 minutes in length. From these language samples, we will examine children's percent accuracy of past tense verbs and determine the number of unique instances in which these verbs were used to calculate productivity of articles.

Expected Results: We expect all children in this sample to demonstrate a high accuracy of the past tense. In addition, we expect typically developing children to demonstrate a higher productivity score compared to their DLD peers, as this pattern has been established in previous research. This study will provide unique information as to how verbs and productivity can be used in the assessment of Spanish-English bilingual children.

404 3:00 pm E

Does cognate status affect performance in a Spanish semantic assessment in bilingual children?

Hannah Lim, Speech Language and Hearing Science (U)

There is a shortage of assessments designed to measure language and literacy among Spanish-English bilingual students. In order to address this issue, we developed items for a new semantic matching task: (palabras en parejas/PEP) intended to measure oral language skills in Spanish. This assessment was developed as a progress monitoring tool for tracking growth in Spanish oral language ability for children in TK/PK-3rd grade (Connor, 2019). When this assessment is paired with the pre existing English assessment, it is able to give teachers a more detailed look into children's language skills which will ideally lead to better differentiated literacy instruction for bilingual students.

During the development of items, researchers scored each word using an adapted version of the Crosslinguistic Overlap Scale for Phonology (COSP; Kohner et al., 2004). The COSP was designed to measure the degree of phonological overlap in initial sound, number of syllables, vowels, and consonants. However, there are multiple ways of identifying cognates (Potapova, et al., 2016). Adaptations were made due to the fact that children would both see and hear words in our assessment so we needed to take into account both phonological and orthographic overlap. Additionally, the COSP uses English as the "base" language to determine cognate status; however, we were developing an assessment in Spanish. We adapted the

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tool to use Spanish as the base language when determining cognate status.

The PEP assessment was then administered to 120 students in California and New York. Reliability on the adapted version of the COSP was high ($>.90$) suggesting feasibility of use of this new version. Bivariate correlations between item accuracy and average cognate score revealed that there was a negative correlation ($r=-0.193$, $p=.09$). This suggests that items that had words that were Spanish-English cognates were more difficult for children to respond to in Spanish than items that did not have form/meaning overlap.

405 3:00 pm F

The ERP response to semantic classification in an object recognition megastudy

Sofia E. Ortega, Psychology (U)

The neural mechanisms involved in recognizing and classifying the thousands of complex visual objects we encounter every day are not fully understood. Previous researchers have examined the processing of other categories of stimuli (e.g., visual words, auditory words, and sign language stimuli) in so-called “megastudies” by including a large number of participants and a huge sample of stimuli. The current study brings the megastudy approach to the investigation of the temporal dynamics of visual object recognition using event-related potentials (ERPs). The primary goal was to engage meaning-based neural representations as participants viewed color pictures of 1000 different objects. EEG was collected from 52 participants engaged in a go/no-go semantic categorization task where they responded with a button press (“go”) to occasional objects (10%) that were “kitchen” items but withheld responding (“no go”) to the remaining items (90%). Here we report on differences between ERPs to common real objects and non-real objects (e.g., abstract shapes, fictitious things, and manipulated images of real objects), objects rated high and low in familiarity, and objects that depicted animals and tools. We found that animals elicited a greater anterior negativity while tools elicited a greater posterior negativity during the N300 and N400 time epoch. Also, ERPs to non-objects generated a larger anteriorly distributed negativity in the N400 epoch than familiar objects. Finally, objects rated as less familiar produced more negative N300 and N400 activity than more familiar objects. We also contrasted these comparisons with those reported last year using the same stimuli but a different task (object decision). In that study there were similar ERP effects to those reported above for object familiarity and real vs. non-real objects. However, in the animal versus tool comparison only the posterior N300/N400 effect was seen in object decision suggesting that the anterior negativity in the current study reflects the task-dependent semantic demands of categorization that are not accessed during object decision.

406 3:00 pm G

Alterations in Olfactory Network Connectivity During Odor Identification are Related to CSF t-Tau Levels

Conner Frank, Clinical Psychology (D)

Abundant evidence suggests that olfactory processing is affected by early Alzheimer’s Disease (AD) neuropathology (Murphy, 2019). To further understand functional correlates of olfactory disruptions, this study used independent components analysis (ICA) to identify functionally connected olfactory networks and analyze changes in network connectivity during odor identification. 36 older adults completed structural and functional MRI at 3T during which subjects were presented with odorants using an olfactometer and asked to identify odorants from multiple choices. 50 components were identified using the Group ICA of fMRI Toolbox (GIFT) and sorted by task-relatedness. The highest task correlation was observed for a component in the left and right inferior frontal gyrus (IFG), right superior temporal gyrus, right precuneus, right superior medial gyrus, and left piriform cortex (PC). Changes in network connectivity during successful and unsuccessful odor identification (hits/misses) across the whole brain were analyzed using general linear modeling (GLM). The effects of age, ApoE 4 status, sex, and cerebrospinal fluid amyloid beta 42 and t-Tau levels on network connectivity differences were evaluated using linear regression. Increased t-Tau levels were associated with greater connectivity among the right medial temporal gyrus, right IFG, left insular cortex, left PC, left amygdala, and bilateral hippocampus and parahippocampal gyrus during misses. This may suggest that greater network coherence, especially between frontal-parietal memory networks and olfactory processing regions in the inferior frontal and temporal lobes during incorrect odor identification, may indicate greater tau deposition in the early stages of AD. Supported by NIH grant # R01AG062006-04 from the NIA to CM.

Session I-2

Behavioral and Social Sciences 14

Friday, March 3, 2023, 3:00 pm

Montezuma Hall

407 3:00 pm H

The Association Between Resting Blood Pressure and Sensitivity to Social Pain: a Preliminary Study

Nicole Abaya, Psychology (M)

Social pain, the negative subjective experience following real or perceived damage to social connection, is a common and impactful experience with health ramifications. However, individuals differ in their sensitivity to experiences of social pain. Recent evidence suggests sensitivity to social pain may vary according to a cardiovascular factor that also modulates sensitivity to physical pain: resting (tonic) blood pressure. Those with higher resting blood pressure display lower sensitivity

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to physical pain. We recently extended these findings to the domain of social pain, but the mechanisms by which the link exists remain unknown. In this ongoing preliminary study, we investigate a neural pathway by which resting blood pressure and sensitivity may be linked. The sample includes 15 individuals aged 19-37 years old ($M_{age} = 24.13$, $SD = 4.79$), with 13 (87%) female participants, recruited from the San Diego community. Resting blood pressure (BP) was measured before participants were scanned using a 3T Siemens Magnetom Prisma MRI scanner. In the scanner, participants completed a virtual ball-tossing game, Cyberball, to simulate an experience of social pain through exclusion. Following the scan, participants completed the Need Threat Scale (NTS) to assess sensitivity to social pain during the exclusion round of Cyberball, and personality questionnaires that assess trait-levels of sensitivity to social pain (Mehrabian Sensitivity to Rejection Scale; Fear of Negative Evaluation). Associations between resting BP and responses to the NTS will be evaluated with linear regression, adjusting for covariates known to influence resting BP. Similar to previous research, we expect to find that resting BP will be inversely associated with individual differences in sensitivity to Cyberball (i.e., higher scores on the NTS, and greater activity in the dACC and AI to exclusion vs. inclusion). If an association between resting BP and individual differences in social pain sensitivity to Cyberball is found, we will test whether dorsal anterior cingulate cortex (dACC) and anterior insula (AI) activity to Cyberball accounts for the association. Results may have implications for cardiovascular disease, the leading cause of death worldwide.

408 3:00 pm I

Innocuous warm stimuli affect subjective experience and neural response to emotional images

Maritza Garcia, Psychology with emphasis in Neuroscience (U)

At the end of the day, we may look forward to the comfort of a steamy shower, the feeling of our pet warming our lap, or being wrapped in the embrace of someone we love. All of which, are defined in part, by a strong sensation of warmth that offers relief and pleasure. Though warmth may not always be social in nature, more recent perspectives suggest warmth may serve as a proxy for social connection in certain contexts. Therefore, we predicted that physical warmth, by itself, would function as a proxy for social connection to reduce threat-related brain activity in response to negative emotional images.

In the current study 41 participants completed an MRI scan as they viewed emotionally evocative images from the International Affective Picture System which were rated as both negative and high in arousal. In a block design, participants held a warm, cool, and room temperature object while viewing the images. After exiting the scanner, participants rated the warmth and pleasantness of the three objects and their subjective emotional experience of viewing the images (i.e., "how aversive/pleasant did you find the pictures during this time?").

As expected, the warm object was rated as warmer and more pleasant than both the cool and room temperature objects. However, in contrast to hypotheses, the warm (vs. cool and

vs. room temperature) object led to increased, rather than decreased, activity in the dACC and AI to the images. Likewise, images were experienced as more aversive when holding the warm object, over both the cool and room temperature objects. Additionally, higher ratings of aversiveness were associated with greater dACC and AI activity to the images when holding the warm object. No association emerged for the cool object.

Though findings do not reflect the expected relationship of physical warmth functioning similarly as social connection, this study nevertheless reveals evidence that peripheral information such as thermal feedback affects threat-related brain activity and affective experience. Results illustrate an opportunity for further investigation of how innocuous thermal information, such as warmth, affects general and focused perception in multiple contexts.

409 3:00 pm J

Early brain connectivity patterns predict later language skills in preschoolers with autism spectrum disorder

Judy Mahmalji, MA in Psychology (M)

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by social communication deficits and restricted and repetitive behaviors. Symptoms of ASD emerge in the first years of life and can be reliably identified during the second year. Although no longer required for an ASD diagnosis, language delays or atypical emergence of language skills are common in children with ASD. Early language abilities are among the best predictors of later functional outcomes in children and adults with ASD. However, little is known about early atypical brain organization in ASD and language abilities in young children with ASD. This study examines links between brain connectivity patterns, especially between brain regions known to support language processing, and language skills assessed in preschoolers with ASD. The current study utilizes functional MRI data acquired during natural sleep, in combination with clinical and behavioral data collected from toddlers and preschoolers with ASD and typically developing (TD) young children participating in the longitudinal SDSU Toddler MRI Project examining early brain markers of ASD. The cohort includes 24 children with ASD (7 female, 17 male) and 17 TD children (6 female, 11 male) who were between 16 and 51 months of age (mean age 28.68 ± 8.8 months) at their first study visit, and between 36 and 68 months (mean age 49.83 ± 11.4 months) at the second study visit (average 21 months between visits). Changes in language abilities were assessed with the ADOS, Mullen, and Vineland. Developmental and language skills were assessed in all (ASD and TD) participants with the Mullen Scales of Early Learning (MSEL). Results indicated that inter-hemispheric connectivity between several canonical language regions is associated with later expressive language skills in children with ASD. Namely, greater connectivity between contralateral language regions (indicating lower laterality or specialization for language) at toddler years was associated with lower language skills at preschool years. Because decreased hemispheric laterality of language function

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(observed among toddlers with ASD in our cohort) is indicative of less mature brain organization, these findings suggest a link between less mature brain connectivity patterns in the first years of life and delayed language skills in preschoolers with ASD.

410 3:00 pm K

The Influence of Race and Gender on Perceptions of Police Officers and Officer Involved Homicides

Elizabeth Delp, Sociology (U)

In the wake of George Floyd's death, United States law enforcement officers and the criminal justice system have been under heightened scrutiny. Given the polarizing nature of public conversations, my research seeks to understand the gender and race patterns of both officer-involved homicides (OIHs) and public opinion on officers. I use a mixed methods approach in which I first document approximately 20 years of race-gender patterns of OIHs and legal outcomes of these deaths using The Fatal Encounters dataset. The qualitative component interrogates opinions of police officers and individuals, hoping to gain an insight on how social characteristics affect a person's beliefs. I specifically performed semi-structured interviews of five individuals of different genders and races and asked them a series of questions regarding how they identify, how they view law enforcement officers, and social causes like the Black Lives Matter movement, and used value coding to organize responses. I found that women in general feel more vulnerable around police officers, but race plays the biggest role in the feeling of vulnerability. My quantitative analysis helps to frame these results, using the risk of OIHs among women and individuals of color, the risk of losing a loved one, and the rare legal repercussions for officers to better understand public opinion. With this data, we are able to take a comprehensive look at what influences opinions and how to better support those who feel the most vulnerable.

411 3:00 pm L

Can Latinos be Racist? Examining Anti-Blackness Among Latinos

Ulises Magallon Estrada, Sociology (M)

While much of the focus on racism is justifiably aimed at understanding how White Americans have historically exercised discrimination against Black Americans, this ignores how other groups can also hold and act on their anti-Black bias. For instance, while Latinos continue to experience discrimination in the United States, they can be also complicit in anti-Blackness through their prejudice and discrimination against Black Americans and Afro-Latinos. It is crucial to understand how Latinos can perpetuate anti-Blackness considering this group is projected to comprise twenty-eight percent of the population by 2060, a significant portion of the United States population. Therefore, this research project aims to further contribute to the understanding of how non-White groups, such as Latinos, can express anti-Black prejudices and attitudes, contradicting the popular notion of "people of color" being united against

racism. Utilizing the 2021 General Social Survey (GSS), I analyzed the responses of Latinos to questions regarding their attitudes towards Black Americans. Based on the results of the regression analysis, I found Latinos were less likely to express anti-Black attitudes than non-Hispanic White Americans. I also found that anti-Black prejudice can be partially explained by factors related to economic competition, and political party affiliation. Individuals who were underemployed or worked in blue collar industries (i.e., construction) expressed more anti-Black prejudice, as did those who identified as Republican. Future researchers should consider employing other methods to better understand anti-Black prejudice amongst Latinos, such as the social distance scale. Further research should also specifically focus on studying the anti-Black prejudice amongst non-Black Latino populations

412 3:00 pm M

Does County-Level Social Dominance Orientation Mediate or Moderate the Relationship between How Multiethnic Counties Are and the Implicit Pro-White Bias?

Mira Torf, Psychology (U)

Previous research has documented that the ethnic diversity of where people live predicts implicit biases. More specifically, the extent to which Black people are automatically evaluated less positively than White people (implicit pro-White bias) has been shown to be weaker in more multiethnic areas (Sadler et al., 2021). However, the concept of social dominance orientation, which is the extent to which hierarchies and inequality among social groups are supported (Sidanius et al., 2017), has not been explored in this area of research. The present study investigated whether social dominance orientation, assessed at the county level, mediated or moderated the relationship between ethnic variety and the implicit pro-White bias. The sample (N = 3,654,627) included 67% of White and 11% of Black participants; it was composed of mostly young adults (M = 28.89) and included more women (62%) than men. A total of 791 counties were included in the analyses. The Race Implicit Association Test, administered through Project Implicit, was used to assess the implicit pro-white bias. The social dominance orientation scale was also administered through Project Implicit. 2010 U.S Census data were used to measure the extent to which various ethnic groups were evenly represented at the county level (ethnic variety). Data were analyzed using multiple linear regressions. The results indicated that county-level social dominance orientation partially mediated the relationship between ethnic variety and the implicit pro-White bias. These findings suggest that, as counties become more multiethnic, preferences for inequality and competitiveness among social groups decreases, which may help reduce the extent to which Black people are automatically evaluated less favorably than White people. There was no evidence to suggest that county-level social dominance orientation moderated the relationship between ethnic variety and the implicit pro-white bias. This study gives further insight

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into one possible mechanism through which the presence of multiple ethnic groups in a context contributes to dismantling the widespread and deeply rooted implicit pro-White bias through the deconstruction of preferences for hierarchical structures in society.

413 3:00 pm N

Examining County-Level Right-Wing Authoritarianism as a Mediating and Moderating Variable in the Relationship Between Minority Representation and the Implicit White = American Effect

Renee Owens, Psychology (U)

Prior research documents that the ethnic diversity of people's environment predicts implicit biases (Sadler et al., 2021). People reared in areas characterized by a higher proportion of Asian Americans (minority representation) have been shown to display a weaker tendency to implicitly view Asian Americans as less American than European Americans (implicit American = White effect) (Devos & Sadler, 2019). We expanded on these findings by integrating the concept of right-wing authoritarianism, that is the degree to which conformity and traditional norms or values are supported (Duckitt & Sibley, 2017). The present study explored the extent to which right-wing authoritarianism mediated and moderated the negative relationship between minority representation and the implicit American = White effect at the county level. Participants (N = 633,696) were on average 28.07 years old (SD = 12.65) and were mostly White (44%) and Asian (34%) Americans. A total of 791 counties were included in the analyses. The Asian-European American identity Implicit Association Test available on Project Implicit was used to assess the implicit American = White effect. Data from the 2010 U.S. Census were used to measure the proportion of Asian residents at the county level (minority representation). The right-wing authoritarianism scale was also administered through Project Implicit. Multiple linear regressions were used to analyze data aggregated at the county level. Results showed that right-wing authoritarianism partially mediated the relationship between minority representation and the implicit American = White effect. As the proportion of Asian Americans increased in counties, the preference for social cohesion and traditional norms decreased, allowing for greater inclusion of Asian Americans into the American identity. Results also indicated that right-wing authoritarianism moderated the relationship between minority representation and the implicit American = White effect. A higher proportion of Asian Americans was associated with increased inclusion of Asian Americans in the American identity, especially in counties with low levels of right-wing authoritarianism. When local norms are already more open to nonconformity and nontraditional values, there might be more acceptance of the increasing representation of Asian Americans. This study provides insight into the role that right-wing authoritarianism plays at the context level.

Session I-3

Behavioral and Social Sciences 15

Friday, March 3, 2023, 3:00 pm

Montezuma Hall

414 3:00 pm O

Effects of Exercise and Choline Supplementation in an Animal Model of Fetal Alcohol Spectrum Disorders

Dylan Keane, Psychology (U)

Prenatal alcohol exposure can disrupt development, leading a range of physical, neuropathological, and behavioral effects referred to as fetal alcohol spectrum disorders (FASD). Despite prevention efforts, FASD is still a global health concern affecting 2-5% of school-aged children in the United States. Individuals with FASD often show alterations in a number of behavioral domains, including hyperactivity and emotional dysregulation. Identification of interventions that reduce the severity of FASD is critical, particularly ones that can improve behavioral outcome. Supplementation with the essential nutrient choline and exercise are both interventions being investigated as treatments of FASD. Given that early choline supplementation may enhance neural plasticity, it is possible that the dual intervention of choline and exercise may produce more benefits than either alone. Thus, the present study examined the effects of choline supplementation and exercise on open field activity and anxiety-like behaviors in subjects exposed to developmental alcohol. From postnatal day (PD) 4-9 (third-trimester human equivalent), Sprague Dawley rat pups were given ethanol (5.25 g/kg/day, 11.9 v/v) via intragastric intubations; controls were given sham intubations. From PD 10-30, subjects received subcutaneous injections of choline chloride (100 mg/kg/day) or saline. Subjects were then given access to a voluntary running wheel or static control wheel from PD 22-32. Subjects were tested in an activity chamber for 60 minutes a day during the dark cycle from PD 35-38. Preliminary data suggest that each intervention exerts unique effects on behavior. For example, subjects with running wheel access showed reduced open field locomotor activity compared to non-running subjects. In ethanol-exposed subjects, preliminary data suggest postnatal choline supplementation increased exploration and altered emotional responsivity, as measured by less time spent in the center of the open field. These preliminary data suggest that both exercise and choline supplementation may reduce behavioral alterations in FASD, although each intervention may affect different behavioral domains. Supported by the National Institute on Alcohol Abuse and Alcoholism R37AA012446 and T32AA013525.

(U) = Undergraduate; (M) = Masters; (D) = Doctoral

415 3:00 pm P

Childhood Adversity as a Moderator for Irritability-Related Reward Processing

Hailey Adney, Psychology (U)

Irritability, a common presenting complaint in youths, is a transdiagnostic symptom present in multiple forms of psychopathology and linked with aberrant reward processing. Childhood adversity elevates the risk of psychopathology and is also associated with anomalies in reward processing. While previous studies have examined the relationship between childhood adversity (abuse vs. neglect), irritability, and reward processing separately, it remains unclear how they all interact. Thus, we aim to investigate the relative and interactive effects among these variables. During fMRI acquisition, 45 adolescents (25 females; mean age=14.91, SD=1.89) completed a child-friendly monetary incentive delay task, a paradigm measuring neural reward processing where they hit or missed the target with or without expecting a reward. Childhood Trauma Questionnaire assessed childhood abuse and neglect experiences; Affective Reactivity Index assessed irritability symptoms. Whole brain ANCOVAs evaluated neural patterns associated with reward anticipation and feedback in relation to childhood abuse, neglect, and irritability symptoms. Whole-brain-corrected group-level analyses demonstrated significant Abuse X Irritability X Reward Condition (reward vs. no-reward) X Performance (hit vs. miss) interactions in prefrontal cortices (controlling for neglect, $p < .05$), associated with reward and emotion processing. Among youths whose irritability was low, youths with high abuse showed greater activation to hit vs. miss in the reward condition and miss vs. hit in the no-reward condition, whereas youths with low abuse showed the opposite pattern, indicating a moderating role of childhood abuse; among youths whose irritability was high, such brain activation differences were attenuated, suggesting the presence of irritability diminishes any moderating role of abuse. Interestingly, the differences in activation across conditions were greater when the target was missed, suggesting reward omission may be both an irritability and "threat" probe, and thus more salient. Additionally, for youths with both high irritability and high abuse, there was little difference in neural response across conditions, representing a qualitatively different neural activity pattern. Taken together, our findings suggest that youths with different combinations of irritability symptoms and childhood abuse may have varying profiles of neural reward processing, emphasizing the need for individualized treatment approaches for youths with different symptomatology and histories of abuse.

416 3:00 pm Q

How ACEs and Anxiety Affect One's Social Integrative Needs: A Social Media analysis

Valentina Marr, Psychology (U)

As the world becomes more reliant on technology, social media will continue to flourish. Social networking sites (SNSs) provide a platform where people have full control over what they look like online and can talk to others without being in

unwanted or awkward social situations. People also have the ability to remain anonymous if they choose, which can influence the manner of how they communicate and behave on these sites. A plethora of entertainment, news, and information are readily available, giving one the ability to connect with anyone anywhere in the world at any time of day. Individuals with anxiety and/or history of trauma may feel as if the online world is a safer space for them to express themselves, and engage in controlled conversations. This study assessed whether ACE exposure and state anxiety are associated with maintaining social relationships on social media. College students (N=640) at San Diego State University (Mage= 21.6, SDage= 4.067; 79.5% women) were recruited to complete self-report questionnaires via a Qualtrics link to measure ACEs (Adverse Childhood Experiences), state anxiety (anxiety at the present moment), and social integrative needs (SIN; the role social media plays in seeking/maintaining relationships). A multiple linear regression analysis showed no significance between student's state anxiety, total ACE exposure, and social integrative needs ($p=0.054$) when considered together; however there was significance between state anxiety and SIN ($p=0.017$). There was no significant difference found between total ACE score and SIN ($p=0.437$). When considering each ACE separately, a significant difference was noted only between SIN and ACE #10 on the ACE questionnaire: "Did a household member go to prison?" ($p=0.008$). Lack of familial closeness in childhood may affect a child's socio-relational development, and how social media is used in young adulthood. Future research should further explore the relationship between mental health disorders and SIN.

417 3:00 pm R

ACEs and Academic Engagement among College Students

Kerris Woods, Psychology (U)

Adverse Childhood Experiences (ACEs) have been recognized across several studies to predict academic problems and hinder engagement among students under and over 18. Additionally, ACEs have also been known to disproportionately affect minority or non-White populations. Some research has shown race/ethnic differences in the impact of ACEs on academic achievement, where students of color report higher ACE scores and lower achievement and GPA compared to their White counterparts. However, the research on the relationship between ACEs and academic engagement is limited in these populations and has not been well explored. The present study investigates whether ACEs impact academic engagement among Multiethnic and non-White students. We hypothesize that Multiracial and non-White students with ACEs will report lower engagement in college compared to Multiracial and non-White students that do not have ACEs as compared to White students. Participants (N=929) from San Diego State University completed self-report measures including the ACEs questionnaire and questions associated with academic engagement. A two-way ANOVA indicated that the presence of ACEs (yes/no) do not significantly impact academic

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engagement in Multiracial and non-White students ($p = .431$). A second two-way ANOVA also indicated that ACEs on a 0-4+ scale do not significantly impact academic engagement ($p = .122$), however, the results show that Multiracial and non-White students report lower engagement than White students across all categories, with the exception of three ACEs. The current study's results highlight the racial/ethnic differences in the impact and effect of ACEs on academic engagement among college students.

418 3:00 pm S

Effects of Developmental Alcohol Exposure and Choline Supplementation on Sleep

Jaelyn Hanson, Psychology (M)

Fetal alcohol spectrum disorders (FASD) is an umbrella term used to describe cognitive and behavioral alterations caused by prenatal alcohol exposure. Caretakers often report that children with FASD experience sleep problems. Unfortunately, interventions to improve sleep have not been well studied. Interestingly, supplementation with the essential nutrient choline can mitigate behavioral alterations that are present after prenatal alcohol exposure, such as hyperactivity and spatial learning deficits. Choline is a precursor to acetylcholine, a neurochemical that is also involved with sleep-wake modulation. However, it is unknown whether choline supplementation can improve sleep alterations associated with FASD. Therefore, the present study investigated the effects of developmental alcohol exposure and choline supplementation on sleep using an animal model. Sprague-Dawley rat pups received ethanol (5.25 g/kg/day, 11.9% v/v) or sham intubations from postnatal days (PD) 4-9, a period of development equivalent to the human third trimester brain growth spurt. Subjects received subcutaneous injections with choline chloride (100 mg/kg/day) or saline from PD 10-30. Thus, this study included a 2 (ethanol or sham control) x 2 (choline or saline) x 2 (male, female) design. On PD 32-37, subjects were individually housed to measure sleep-wake behaviors using the PiezoSleep Adapt-A-Base System. Sleep parameters, including sleep time and sleep bout length, during the light and dark cycles were recorded. Subjects that were exposed to ethanol during development slept less during the dark cycle, an effect seen in both sexes, but more robust in males. Moreover, developmental alcohol exposure led to more variability in sleep bout duration. Importantly, choline supplementation mitigated the effects of ethanol on sleep, producing sleep durations that did not differ from that of controls. Choline specifically increased sleep bout duration in ethanol-exposed subjects, suggesting that choline can modify sleep patterns. These results illustrate that alcohol exposure during late gestation can cause sleep disturbances and suggests that postnatal choline supplementation may alleviate sleep problems associated with developmental alcohol exposure. Importantly, this nutritional intervention was administered after the alcohol insult, suggesting that nutritional supplements in children with FASD may improve sleep quality. Supported by AA012446 and T32AA013525.

419 3:00 pm T

Effects of Prenatal Vapor Exposure to THC and Nicotine on Anxiety-Related Behaviors in Adolescent Rats

Liana Manriquez, Psychology (M)

Tobacco and cannabis are commonly used substances among pregnant women, and electronic cigarette use has substantially increased in young adults as a route of administration for these drugs. The risks associated with prenatal exposure to electronic cigarette delivery of tobacco and cannabis products is not well understood. The purpose of this study was to examine the effects of prenatal exposure to tetrahydrocannabinol (THC) and nicotine (NIC), the psychoactive components of cannabis and tobacco, via electronic cigarettes. Pregnant Sprague-Dawley rats were exposed from gestational days 5-20 to one of the 5 treatment groups: THC (200 mg/mL/day), NIC (36 mg/mL/day), combination (NIC+THC), vehicle control (propylene-glycol) via electronic cigarette vapor, or non-vapor exposed control. On PD 40, one offspring sex pair from each litter was tested on an elevated plus maze task to analyze anxiety-related behaviors. The maze contained two open arms and two arms enclosed with plexiglass walls. Subjects exposed to either NIC or THC alone spent significantly more time in the open arms compared to control groups ($p < 0.01$), indicating less anxiety. Surprisingly, behavior among subjects exposed to the combined NIC+THC did not significantly differ from other groups. There were no significant sex differences in anxiety-related behavior among controls; however, females exposed to THC alone exhibited more risk-taking behavior. Our study highlights the potential risks of vaping these drugs via electronic cigarette during pregnancy. These data suggests that prenatal exposure to THC or NIC alone via electronic cigarettes may lead to more risk-taking behaviors during adolescence. Supported by TRDRP 281P-0026

420 3:00 pm U

Interventions for Fetal Alcohol Spectrum Disorders: The Effects of Exercise and Choline Supplementation

Isabel Leon, Psychology (M)

Alcohol consumption during pregnancy can influence neurological development of the fetus, affecting cognitive, emotional, motor, and behavioral function. The range of outcomes related to prenatal alcohol exposure are referred to as fetal alcohol spectrum disorders (FASD). This is a serious public concern, affecting an estimated 2-5% of children in the United States. Despite ongoing public health education efforts, drinking rates among pregnant women have not declined. Therefore, investigating interventions that can improve the behavioral and cognitive effects associated with prenatal alcohol exposure is imperative. Two promising interventions are supplementation with the essential nutrient choline and exercise. The present study used an animal model to determine if postnatal choline supplementation can enhance the effects of exercise on spatial learning and memory of subjects exposed to alcohol during the

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third-trimester equivalent. From postnatal days (PD) 4-9, Sprague Dawley rats were received ethanol (5.25 g/kg/day, 11.9% v/v) or sham intubations. From PD 10-30, subjects received subcutaneous injections of either 100 mg/kg/day choline chloride solution or saline. In addition, on PD 22-32, subjects were given access to a voluntary running wheel or static control wheel. On PD 45-53, subjects were then tested on a Morris Water Maze spatial learning and memory task, in which subjects had to locate a submerged hidden platform in a tank of water using spatial cues. Preliminary data illustrate that choline supplementation, and to a lesser extent exercise, improves spatial learning among ethanol-exposed subjects. Further, ethanol-exposed subjects were more thigmotaxic, suggesting long-lasting increases in anxiety, that were not modified by choline or exercise. These preliminary data suggest that choline administered postnatally, mitigates cognitive deficits, but not emotional dysregulation, in FASD. Supported by the National Institute on Alcohol Abuse and Alcoholism R37AA012446 and T32AA013525.

Session I-4

Biological and Agricultural Sciences 14

Friday, March 3, 2023, 3:00 pm

Montezuma Hall

421 3:00 pm V

Dissecting mechanism for cell-cell boundary crossing by the intracellular bacterial pathogen *Bordetella atropi*

Makaela Levine, Biology (U)

Intracellular bacterial pathogens often use secretion systems to inject an array of effectors directly into host cells to manipulate host cellular processes, thereby facilitating different events of their life cycle. We recently discovered a new intracellular bacterial pathogen, named *Bordetella atropi*, infecting intestinal cells of the nematode host *Oscheius tipulae*. Upon infection, the bacteria form long filaments that spread through multiple host intestinal cells. The filaments also appear to push against the cell-cell membrane boundary when spreading, but physical forces by filaments alone may be insufficient to break down cell-cell membranes. We therefore hypothesize that the secretion system could be a necessary structure for filamentous spreading to occur. We identified several putative secretion systems encoded within the *B. atropi* genome, including one type I, one type II, one type III, and two type VI loci. Among these, we prioritized our focus on type III and type VI secretion systems, as these have been shown to be required for cell-cell spreading of intracellular bacterial pathogens in mammalian systems. Using allelic exchange, we created four knockout strains of these secretion systems: Δ T3SS, Δ T6SS-1, Δ T6SS-2, and the double knockout Δ T6SS-1/2. When these strains were used to infect *O. tipulae*, we found that the Δ T3SS strain failed to infect the epithelium intracellularly, and was only capable of colonizing the lumen, whereas different knockouts of Δ T6SS appear to have a wildtype infection phenotype. These results indicate that the

type III, but not the type VI secretion system, is necessary for *B. atropi* to invade the epithelial cells. We are currently investigating potential effectors of the type III secretion system that could function in invasion and cell-cell membrane breakdown.

422 3:00 pm W

Dissecting the roles of type III secretion system in *Bordetella atropi* infection of a nematode host

Meenakshi Nair, Microbiology (U)

Bordetella atropi has recently been discovered as an intracellular bacterial species that is able to use filamentation to spread between intestinal epithelial cells of a natural host, the nematode *Oscheius tipulae*. Preliminary data suggest that *B. atropi* encodes a functional type III secretion system (T3SS), with knockouts of core components of the putative T3SS results in luminal colonization but no intracellular infection of the host. Type III secretion system is a multisubunit complex that is expressed on the surface of many pathogenic bacteria, including a variety of human intracellular bacterial pathogens such as *R. parkeri*, *B. pseudomallei*, *S. enterica typhimurium*. In these pathogens, T3SS has been shown to directly deliver bacterial effector proteins into the host cell cytoplasm to manipulate them for invasion, survival and replication, as well as facilitating cell-to-cell spreading. In this project, we aim to identify T3SS effectors and elucidate their roles during *B. atropi* infection. By applying a host of bioinformatic tools, including whole-genome motif prediction, prokaryotic secretome prediction (SecretomeP-2.0), and effector prediction (Bastion3) to *B. atropi* hypothetical proteins. We were able to identify several potential effector candidates. These candidates share homology to other known T3SS effectors in other bacterial pathogens, such as those used for host actin manipulation and inhibition of host immune responses. Currently, we are knocking out these candidates using allelic exchange. Ultimately, we will infect *O. tipulae* with these knockouts and perform fluorescence in situ hybridization (FISH) to determine if they play a role in *B. atropi* infection. Additionally, we will use different chemical staining techniques to further elucidate the molecular mechanisms of their functions. The results from this study will extend our understanding of how intracellular bacterial pathogens manipulate hosts that could potentially have therapeutic implications.

423 3:00 pm X

Characterizing the protein composition of *Bacteroides* contractile injection systems

Josefa Rivera Alfaro, Molecular Biology (M)

Bacteroides are present in a large percentage of healthy adult microbiomes in western cultures. They have great potential for uncovering what makes a healthy microbiome for human hosts and what causes gastrointestinal diseases like inflammatory bowel disease (IBD). *Bacteroides* spp. have contractile injection systems (CIS) known to mediate bacterial-bacterial interactions in the gut, but a separate gene cluster encoding a related CIS

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was identified and suspected to be involved in bacterial-eukaryotic interactions. This gene system, named Bacteroidales injection system, or BIS, has similarities to the CIS found in other bacterial species that induce metamorphosis in their eukaryotic partners, making them a symbiotic relationship. To detect BIS production from *Bacteroides cellulosilyticus*, strains with different knocked out genes were created and verified protein absence via western blot confirmation. Effector proteins are commonly injected via these contractile systems and genes encoding potential effectors have also been identified for BIS. To characterize how the BIS elicits host responses through delivery of bioactive effector proteins, these effector genes were inserted into plasmid vectors and assessed for viability in *E. coli* to further study these genes.

424 3:00 pm Y

Identifying the Activities of a Bacterial Effector Protein That Stimulates Tubeworm Metamorphosis

Carl Westin, Microbiology (M)

Bacteria stimulated animal development has been observed in every major taxon of the animal kingdom. Although widespread, this phenomenon is poorly understood. In the wild, many marine metazoans rely on bacterial signals to initiate critical life processes. For example, the marine bacterium *Pseudoalteromonas luteoviolacea* has been found to induce metamorphosis in a species of marine tubeworm known as *Hydroides elegans*. This bacterium utilizes extracellular contractile injection systems (eCIS) known as MACs (metamorphosis associated contractile structures), which are loaded with an effector protein called Mif1 (metamorphosis inducing factor 1) to interact with the *H. elegans* larvae. Previous analyses show that the translocation of Mif1 is both necessary and sufficient to stimulate *H. elegans* metamorphosis.

Mif1 is highly uncharacterized and does not share significant homology with proteins of its kind. However, various enzymatic tests have shown that Mif1 displays enzymatic lipase activity. I hypothesize that the lipase activity of Mif1 is responsible for the initiation of metamorphosis in *H. elegans* larvae. In order to verify that the lipase activity of Mif1 is stimulating metamorphosis in the *H. elegans* larvae, lipase activity of Mif1 must be knocked out. Through the use of a 3D structure prediction software, known as AlphaFold, we were able to further analyze the tertiary structure as well the primary structure of Mif1. This analysis revealed a putative catalytic triad within a specific region of Mif1. Catalytic triads are commonly seen at active sites of lipases and are often responsible for enzymatic activity. By making targeted point mutations to this putative catalytic triad, we will be able to test if this is the source of lipase activity within Mif1. If the loss of lipase activity is verified, the mutated Mif1 protein will then be exposed to competent *H. elegans* larvae, ultimately revealing if the lipase activity of Mif1 is responsible for inducing metamorphosis in *H. elegans* larvae.

Like many host-microbe interactions, the true nature and significance behind the interaction between *H. elegans* and *P. luteoviolacea* has yet to be fully dissected. Should these experiments be successful, it would be the deepest understanding of a bacterial effector protein that stimulates eukaryotic metamorphosis.

425 3:00 pm Z

“Using Alphaproteobacteria to Uncover Novel Stimulants of Tubeworm Metamorphosis”

Cierra Chevalier, Biology (U)

Host-microbe interactions are pervasive, diverse, and strongly influential on a number of biological processes including development; however, the complexity of whole microbiomes makes understanding critical early developmental interactions at a mechanistic level challenging. *Hydroides elegans* undergo metamorphosis when they come into contact with a diversity of bacteria in the wild, but aside from a single example; little is known about the molecular cues in such interactions that trigger *Hydroides* metamorphosis.

Here, we set out to study a broad range of Gram-negative and positive bacteria that are known to trigger *Hydroides* metamorphosis; sending 37 strains representing a range of Gammaproteobacteria, Flavobacteria, Alphaproteobacteria, and Actinobacteria for 16S amplicon rRNA sequencing. We then queried the metamorphosis-inducing capacity of these bacteria via biofilm assays. To determine the nature of inductive cues used by diverse bacteria, we will use biochemical tests using 3 representative strains of *Pseudoalteromonas luteoviolacea*, *Phaeobacter gallaeciensis*, and *Leisingera janus*; which will allow us to indicate whether the inducible factor is protein-based or not.

Evidence of a new metamorphosis induction pathway can be seen by the alphaproteobacteria, in which the inducible factor has a non-protein, heat-stable characteristic of itself. Diverse *Roseobacter* groups attribute metabolic functions that are linked to their material association with phytoplankton, corals, other eukaryotes, mutualists, probionts, and pathogens; the groups ability to induce *Hydroides* metamorphosis displays another effect on the eukaryotic life forms.

Alphaproteobacteria make up approximately 25-28% of wild type biofilm that induce metamorphosis for *Hydroides elegans*. Discovering other inductive mechanisms from other bacteria can broaden our understanding of larval-bacterial interactions not just with *Hydroides*, but with other marine invertebrates who build many marine ecosystems such as corals and urchins. This work also has potential for broad biotechnological uses in understanding bacterial-eukaryotic communication. Because most interactions with bacteria are complex, to understand these complicated interactions future research should include genetic and activity-guided approaches when studying interactions between bacteria and their associated hosts.

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426 3:00 pm AA**Integration of Cancer Genomics to Optimize Treatment Options for Lung Cancer Patients****Meriam Esif, Cellular and Molecular Biology (U)**

Lung cancer is the leading cause of cancer-related death in the United States. Various driver gene mutations are present in non-small cell lung cancer and targeted therapy may be utilized to improve overall survival. The driver gene mutations focused on are KRAS and EGFR. KRAS is the most frequently mutated oncogene, and it has been deemed “undruggable” due to the lack of accessible binding pockets. EGFR, on the other hand, is also a common mutation that represents about 10-15% of lung cancers in the United States. In order to analyze the best treatment options for patients with these mutations, we used lung cancer patients at UCSD who consented to a retrospective analysis in order to determine overall survival on a variety of agents including targeted therapy, chemotherapy, or immunotherapy. The data we are analyzing will lay the foundation for understanding best practices in lung cancer management.

427 3:00 pm BB**HCC organoid model in the Latino population****Valentina Rodriguez, Cell and Molecular Biology (U)**

Liver cancer is the sixth most prevalent cancer and the third most common cause of cancer death in the world. Studies have demonstrated disparities in access to cancer care and outcomes for minority populations, including Latino patients. In San Diego County, liver cancer is an overrepresented malignancy, with mortality rates two-fold higher in Hispanic patients versus non-Hispanic white patients. In our lab, we are developing and refining a three-dimensional model, known as organoids, of the most common type of liver cancer, hepatocellular carcinoma (HCC). These patient-derived organoids are generated from human liver cancer resection and biopsy specimens. This was accomplished by establishing a pipeline in the electronic medical record (EMR) to identify patients who would be potential candidates for tissue donation via the biorepository while ensuring that Latino patients were enhanced in this cohort. Two tissue samples were collected to harvest into organoid cultures and to propagate for drug treatments in vitro to gather data for analysis. We are eager for the future workflow in the EMR that will allow us to identify all patients undergoing liver tumor biopsies at UCSD. For the upcoming academic year, our goal is to increase organoid specimens, while also looking for differences in molecular profiling and responses to different therapies in the Latino and non-Latino HCC populations.

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Session I-5

Biological and Agricultural Sciences 15

Friday, March 3, 2023, 3:00 pm

Montezuma Hall

428 3:00 pm CC**Role of Macrophages in the Development of Ovarian Cancer Stem-Like Cells****Steffy Mathew, Biology (U)**

Ovarian cancer is the most lethal gynecological cancer in the United States, with over 80% of patients relapsing after chemotherapy. Recurrent ovarian cancer may be due to cancer stem-like cells (CSCs) that are drug resistant and capable of long-term self-renewal and reestablishment of tumors. TWEAK, a cytokine enriched in ovarian tumors, may play a role in promoting CSC development and tumor relapse. Preliminary data from our lab indicate that TWEAK enhances CSC development and survival. Additionally, inhibiting TWEAK in combination with chemotherapy significantly prolongs survival and remission in mouse models. An analysis of clinical data from human ovarian tumors found that TWEAK mRNA was highly expressed following chemotherapy. Single-cell sequencing of ovarian tumor samples suggest TWEAK comes from tumor associated macrophages (TAM). Therefore, we hypothesize that TWEAK secreted by TAMs enhances CSC development and relapse potential. To explore this hypothesis, we differentiated monocytes into mature M0, M1, and M2 macrophage populations and confirmed their differentiation by flow cytometry and cytokine secretion. We next compared TWEAK mRNA and found that M0, M1, and M2 macrophage populations all increase expression of TWEAK after exposure to carboplatin relative to vehicle. Moreover, M1 are most resistant to carboplatin. Experiments are underway to test carboplatin treated macrophage populations on CSC development through co-culture experiments with non-CSCs to measure the induction of stem-like features, including spheroid formation ability and expression of stemness genes. By targeting the TWEAK-producing macrophages we hope to identify alternative therapeutic strategies to inhibit CSC development and prevent relapse in ovarian cancer.

429 3:00 pm DD**IDH1 Mutations in Glioma Cells Show Lipid Perturbations****Grace Chao, Cell and Molecular Biology (D)**

Isocitrate dehydrogenase 1 (IDH1) catalyzes the NADP⁺-dependent conversion of isocitrate to α -ketoglutarate (α -KG) in the cytosol and peroxisomes. Mutations in IDH1 drive a variety of cancers, most notably gliomas and glioblastoma, and lead to production of D-2-hydroxyglutarate, an oncometabolite, and also prevent its normal activity, leading to decreased α -KG and NADPH. Catalysis of isocitrate by wild

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type IDH1 yields the primary source of NADPH in peroxisomes, which are intracellular organelles found in virtually all eukaryotic cells. Peroxisomes are involved in α -oxidation of very long chain fatty acids, α -oxidation of phytanic acid, degradation of H₂O₂, and biosynthesis of ether lipids. Peroxisomes are a crucial organelle involved in lipid processing reactions which require NADPH. Because lipid biosynthesis is dependent on IDH1-derived NADPH, we hypothesize that cells expressing mutant IDH1 have dysregulated lipid levels due to NADPH deficiency. We predict that these dysregulated lipid levels may affect organelle morphology due to the known interface of lipid metabolism and controlling Golgi morphology. Our lab has generated stable cell lines expressing wild type IDH1 with two IDH1 mutants and R132Q in U87MG glioma cells. Using transmission electron microscopy, we demonstrate that R132Q IDH1 mutant cells have disrupted organelle physiology compared to cells with wild type IDH1 activity. In addition, both R132H and R132Q mutations exhibit retained lipid droplets and membrane abnormalities. Additionally, we demonstrate significant oxidative lipid degradation in R132H and R132Q in a lipid peroxidation study. Both these studies help us characterize the intracellular consequences affected by mutant IDH1-driven tumors.

430 3:00 pm EE

The Role of Nuclear Factor κ B-inducing Kinase (NIK) in Ovarian Cancer Relapse

Cassidy Lucht, Cell and Molecular Biology (M)

The NF- κ B pathway plays a crucial role in immune response, cell inflammation, and cell death and survival, which is why it is such an important pathway to study in regards to ovarian cancer development and progression. Previous studies have shown the effects of this pathway and its relation to cancer stem-like cells that remain quiescent during remission and begin to proliferate again post chemotherapy and eventually reform tumors. This pathway is activated in one of two ways: the non-canonical or the canonical pathway, and it is pertinent to know which proteins in these pathways may be important to target when looking at relapse. One of the proteins of interest is Nuclear Factor κ B-inducing Kinase (NIK), which I hypothesize is required to maintain ovarian cancer stem-like cells in the classical NF- κ B pathway. I will assess NIK's role in regards to chemoresistance and quiescence post chemotherapy by utilizing inducible CRISPR knockouts in the different ovarian cancer cell lines, OVCAR8, OVCAR4, OV90, and CaOV4 in order to knock out the NIK protein post-chemotherapy. I will then be able to look at the downstream effects of this knockout through both an in-vivo and in-vitro model to see if knocking out NIK proteins will result in less tumor growth post-relapse. I will do this through both a spheroid assay and through the use of a mouse model, which I expect will both show a less chemoresistant phenotype once NIK is knocked out.

431 3:00 pm FF

Creation and validation of inducible ShRNA ovarian cancer lines to study the role of NF- κ B in adhesion and metastasis

Katelyn Shelby, Biology - Emphasis in Cellular and Molecular Biology (U)

Among epithelial ovarian cancers, high grade serous carcinoma (HGSOC) is the most common histological subtype. Despite the initial response to surgical debulking and platinum/taxane-based chemotherapy, relapse occurs in about 80% of patients. NF- κ B is a transcription factor family that has been shown to have increased activity in chemotherapy resistant tumors of the ovary, breast, and prostate. Both classical and alternative NF- κ B subunits RelA and RelB, respectively, are essential for tumorigenesis in ovarian cancer. Previous studies in the House Lab have shown NF- κ B transcription factors, RelA and RelB, regulate unique processes that enable HGSOC progression. Using ovarian cancer cell line OV90 expressing shRNAs against RelA or RelB or non-targeting control, we discovered a role for NF- κ B in adhesion. Additionally, an in-vivo mouse model of metastasis revealed that knockdown of RelA or RelB in OV90 reduced metastatic potential compared to the shRNA non-targeting control. Taken together, we hypothesize that NF- κ B transcription factors, RelA and RelB are important in adhesion and metastasis in HGSOC. In order to test this hypothesis, I have contributed to the generation and validation of ovarian cancer cell lines CaOV4 and OVCAR8 with doxycycline-inducible hairpins for the knockdown of these transcription factors. The generated lines are currently being used for cell-based adhesion assays in order to test the roles of RelA and RelB in the adhesion of cancer cells to various extracellular matrix (ECM) proteins found in metastatic tissues. Understanding the role of these transcription factors in adhesion may help us identify better targets to prevent ovarian cancer metastasis.

432 3:00 pm GG

Kinetic characterization of wild-type DNA polymerase epsilon (POLE) and cancer-associated mutations

Brittany Bermoy, Chemistry (D)

Human DNA polymerase ϵ (POLE) is responsible for leading strand synthesis of new DNA during genome replication. POLE replicates with high fidelity due in part to its ability to proofread via exonuclease activity. Mutations in polymerase ϵ have been found in many types of cancer including uterine corpus endometrial carcinoma and glioblastoma. Limited studies have been carried out investigating these mutations, leaving a gap in understanding their role in the cancers associated with them. Characterizing these underlying mechanisms helps to better understand how each mutation affects rates of nucleotide incorporation, genetic maintenance via DNA repair, and leads to an overall increased knowledge of these cancers. Using pre-steady state kinetics, we first characterize the rates

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of nucleotide incorporation of the wild-type polymerase ϵ . Then, we compare the rates of nucleotide incorporation of mutant polymerases, focusing on cancer-related mutations which often occur in the exonuclease domain. Based on the dynamic structure of this enzyme and the location of the mutations in the exonuclease domain, we hypothesize that the P286R and V411L mutations will result in overall decreased rates of nucleotide incorporation and also decreased fidelity from disruption of exonuclease activity. To investigate these mutations, we start with purifying wild type POLE to react with dNTPs using rapid chemical quench and fluorescent labeled DNA primer. This allows nucleotides to be incorporated in as few as 3 milliseconds and the resulting reactions are imaged by polyacrylamide gel electrophoresis. A single nucleotide incorporation product is quantified and graphed to obtain kinetics. After the characterization of wild type POLE, the mutants are investigated using the same method. By studying the consequences of these mutations, we can better understand how these mutations may drive tumor formation.

433 3:00 pm HH

Synthesis and Evaluation of AdSS Bisubstrate Inhibitors

Madison Cho, Chemistry/Biochemistry (M)

Normal cells in almost all tissue express and utilize methylthioadenosine phosphorylase (MTAP) enzyme that plays a major role in the salvage pathway of adenine. However, most cancer cells lack MTAP and utilizes adenylosuccinate synthetase (AdSS) as their sole source for adenine. AdSS is a key enzyme in the de novo biosynthesis pathway in converting IMP to AMP. By synthesizing a line of bisubstrate inhibitors based on AdSS active site, potential enzymatic drug therapy maybe created. Using several known inhibitors, hydantocidin and hadacidin, our inhibitor will contain two important inhibiting motifs. The N-hydroxyl-N-formyl motif from hadacidin, a mimic of aspartic acid, is connected through a linker to a 1,4-disubstitued-1,2,3-triazolo-nucleoside, a mimic of the IMP pocket of the enzyme, forming a bisubstrate inhibitor. The linker that connects the two substrates are varied in length of hydrocarbon. The goal of this experiment is to determine which compound best inhibits AdSS. This poster will show the design and synthesis of these compounds.

Session I-6

Business Economics and Public Administration/
Education 1

Friday, March 3, 2023, 3:00 pm

Montezuma Hall

434 3:00 pm II

Examining Research on the Relationship Between Student Attitudes and Performance in Chemistry Courses

Erica Sisouphanthong, Biochemistry (U)

Many different complex factors play a role in a students' overall performance in STEM classes and exams. Students' preconceived feelings about a topic, themselves, and the classroom have previously been shown to potentially affect student performance. This study aims to summarize existing research on how undergraduate students' attitude towards chemistry specifically can impact their performance on such assessments. We will also be exploring how these feelings might vary among different groups of undergraduate students.

Affective topics in Chemical Education are used in instruments intended to measure construct(s) relating to moods, feelings, and attitudes. Instruments in education and psychology are defined as sets of questions or standards used to measure human psychological constructs that cannot be directly measured unlike physical phenomena. Our research examined various instruments that are Affective in nature, specifically those focused on the Attitude component, and how those instruments evaluated as well as played a notable role in student achievement. Attitude refers to a set of emotions, beliefs, and behaviors toward a particular object, person, thing, or event.

The methods we used relied heavily on the use of CHIRAL, the Chemistry Instrument Review and Assessment Library, which is a repository of psychological and educational assessments and instruments in Chemistry intended to help educators and researchers find and assess instruments and assessments. Our process involved analyzing the CHIRAL database of instruments for all papers that include instruments that were coded as "affective" and "use", meaning the authors actually use the instrument to answer some sort of research question. We were then able to narrow down this extensive list to a more manageable amount for analysis based on which were most closely related to our research question. From the final instruments we chose, we then read those through the lens of our research question. Our results showed that those who had more limiting attitudes towards chemistry to start with oftentimes had lower overall performance.

Overall, we concluded that there is a relationship between undergraduate students' positive attitude towards chemistry and performance in those courses. Therefore, chemistry instructors should consider how student attitudes may develop or change during their courses.

(U) = Undergraduate; (M) = Masters; (D) = Doctoral

435 3:00 pm JJ

The Relationship between One's First Language and Second Language Writing

Natacha Garbe, Liberal Studies with an Emphasis in Elementary Education Major (U)

Traditionally, in applied linguistics, the first language (L1) was considered to present a barrier in the process of learning a second language (L2). Over the past decade, however, a considerable body of research has developed under the banner of translanguaging which calls this assumption into question. From this perspective, the L1 can be recruited in various ways in the process of learning an L2. Against this backdrop, this research project set out to examine the use of the L1 in the L2 writing process. The data set consisted of fifty interviews with multilingual writers on their writing processes in their second language. The participants were asked a number of questions on their perceptions of their writing processes. First, through otter.ai, an artificial intelligence platform, voice recordings of the interviews were transcribed. We then performed discourse analysis on all references to participant L1s. Specifically, the analysis revealed the participants' stances toward the use of their L1s in their L2 writing.

These stances clustered into three categories: A). One's L1 as a hindrance in L2 writing. The participants who expressed this stance stated that they avoided their L1s, reminiscent of traditional discourses in language teaching. B). One's L1 as an advantageous resource. The students falling in this group pointed to different ways they used their L1. Some, for example, said that since their L1 vocabulary and thought processes were more expansive and better developed, they would first outline their ideas in L1 and then translate their work into English. and C) One's L1 is unrelated to L2 writing development. Students who exhibited this attitude mentioned that translation did not feel necessary as "feelings" in various languages cannot be appropriately conveyed through means of translation.

The findings show that L2 writers have different, sometimes contrasting, perspectives on their writing processes. The main pedagogical implication is that it is worth explicitly addressing the role of L1 in the L2 writing classroom.

436 3:00 pm KK

College Adjustment Among Latiné Students

Marianna Amato, Child and Family Development (M)

This quantitative study, which has been approved by the SDSU Institutional Review Board, examines the association between gender and family obligations, and their impact on academic and social/emotional adjustment among Latiné students. Additionally, this study will analyze students' perceived support provided by their university/professors. Ultimately, this research aims to empower and support Latiné students' success. Despite young Latiné people being the fastest-growing segment of the U.S. population, only a small percentage of all four-year university students in the United States identify as Latiné. Of those students, only about half will end up graduating from

college. The reasons for low graduation rates are varied, as are the methods used by professors to assist in their student's success. This study will focus on examining potential familial and institutional challenges as well as potential strengths among Latiné college students.

Currently, I am recruiting 200 participants who are between the ages of 18 and 25, identify as Latiné, and are attending Hispanic Serving Institutions (HSIs) in California. This study will assess the following demographic variables: gender, race/ethnicity, living arrangements, GPA, sibling status, etc. In addition, we ask participants about their family experiences as well as their experiences in college. Descriptive statistics will be used to examine the variables of interest. The study seeks to examine associations between family obligations, gender, and academic and social/emotional adjustment. Pearson's correlations will be used to begin examining the associations between these variables.

Additionally, hierarchical regression analysis will be used for mediation analysis, as this study seeks to test whether family obligations serve as a mediator in the relationship between gender and college adjustment. The results I expect from this study are that both genders will significantly be impacted by family obligations, though overall, women's social/emotional college adjustment will be most affected. Additionally, given that these students are attending HSI they are likely to benefit from the resources that these institutions provide. However, I expect women to utilize university resources more than men.

437 3:00 pm LL

Spanish Letter Name and Sound Knowledge in Bilingual Preschoolers in Head Start

Sandra Vasquez, Speech Language and Hearing Sciences (U)

Purpose: Bilingual children bring to school important knowledge in their native language. If these skills are not assessed, educators may not understand the full picture of a child's language and literacy abilities. We report on the development and piloting of a new assessment of Spanish code-based literacy skills: Conocimiento de Letras y Ortografía (CLO). This is a computerized assessment that is intended to monitor progress in Spanish literacy skill acquisition. We wanted to understand what bilingual, preschool-aged children in English-only educational environments would know about letters and sounds in Spanish.

Procedures: Thirty-five children enrolled in the 4-year-old classroom at local Head Start locations were enrolled in the study. Children were all four years old. Many of these children came from a Hispanic background and the parents varied in educational level. The majority of the parents except for one speaks Spanish coming from Mexico. The assessment was administered on a touchscreen computer and consisted of three subtests: Letter ID, Sound ID, and Syllable ID. Within each subtest, items were presented in random order.

Results: For letter identification, overall identification of letter names in Spanish was low (overall accuracy: 40.4%). Only four letters were identified correctly more than 50% of the time: "B"

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(55.6%), “O” (70.7%), “t” (61.1%), and X (83.3%). For letter sound items, again overall accuracy was low (36.7%). Only four letter sounds were correctly identified at least 50% of the time: “C corresponding to /k/” (50%), “Q corresponding to /k/” (50%), “O corresponding to /o/” (76.9%), and “U corresponding to /u/” (58.3%). Finally for the syllable ID subtest, the overall performance was predictably even lower (33%) because the task difficulty was higher. Only 14/43 items were responded to accurately at least half of the time.

438 3:00 pm MM

Indigenous women leadership and political participation addressing gendered violence in Oaxaca

Jazmin Luna, Public Administration and Latin American Studies (M)

Gender violence in Latin American is evidently a public health concern affecting women from different backgrounds. The term femicide is used to describe the murder of women for the purpose of being female. The term later evolved to feminicide, or femicidio in Spanish, to include the large-scale impunity imposed by the state (Frias, 2021). Femicide has plagued women around the world, the study will focus on Indigenous women in Oaxaca, Mexico. Indigenous women activists navigate neoliberal organizations and governments, and understanding their role in how they strategize is important. How has their gender affected their political participation and decision-making? Who is recognizing their strategies and what type of partnerships are they trying to build? The research will cover issues regarding Indigenous women’s leadership, autonomy, feminicide, gender violence, grassroots organizing, and formal or informal activism.

439 3:00 pm NN

Brownfields Assessment Grant Recipients: Examining Funding Allocation, Utilization, and Outcomes

Rachel Ostiguy, Environmental Sciences (U)

This paper will examine the allocation and use of funds by EPA Brownfields Assessment Grant recipients. Brownfields are areas of previously used land that are no longer in use due to potential contamination from prior activity. The existence of brownfields in a community has numerous negative implications and notably affects marginalized and low-income communities (Center for Creative Land Recycling [CCLR], 2022). However, the transformation of brownfields into a positive asset is possible through revitalization and reuse. As of January 2002, the Small Business Liability Relief and Brownfields Revitalization Act awards up to \$200 million per year toward brownfields assessment and cleanup (Environmental Protection Agency [EPA], 2022). We will identify prior assessment grant recipients and determine how funds are allocated and utilized while analyzing challenges and outcomes to evaluate the success of the EPA Brownfields Program and emphasize the best

practices for brownfields funding. These findings will center on information from recipients of EPA Assessment Grants, grant recipient websites, EPA Brownfields websites, and websites of non-governmental brownfields agencies. Through this study, we aim to contribute to a framework for how best to approach brownfields assessment grants. A relevant framework will support the efficient use of funding and more successful results with future brownfields remediation and reuse, and consequently, will promote sustainability, social equity, and economic growth.

Session I-7

Physical and Mathematical Sciences 9

Friday, March 3, 2023, 3:00 pm

Montezuma Hall

440 3:00 pm OO

Measuring the Intermediate States of MS2 Viral Capsid Self-assembly Using Interferometric Scattering (iSCAT) and Cryogenic Electron Microscopies (CryoEM)

Nino Makasarashvili, Chemistry (M)

Viruses are formidable parasites and a threat to global health. Because some viruses are made of only a few hundred molecules, they are the only parasites that, in principle, can be understood in terms of the basic laws of physics and chemistry. This kind of basic understanding can greatly contribute to the development of antiviral therapies, drug discovery, and drug delivery solutions. The goal of this study is to explore how viral capsids form. The capsid is a protein shell that protects the virus genome. For some viruses, the capsids form by self-assembly, a spontaneous process that can occur in vitro but has yet to be fully explained.

The focus of this study will be on MS2, a bacterial virus with a complex structure that can also be found in other viruses. The plan is to identify intermediate states of the self-assembly process using Interferometric Scattering Microscopy (iSCAT), which measures the size of individual protein-RNA complexes, and then characterize the structures of these complexes using Cryogenic Electron Microscopy (CryoEM). To do this we will manipulate the forces that drive the assembly process. The major driving forces are RNA-protein and protein-protein interactions, which can be influenced by factors such as the concentration of RNA, protein dimers, and salt (Tris, EDTA, NaCl). By adjusting these parameters, the study aims to find conditions that favor intermediate states of the assembly process without driving it to full assembly. Uncovering the mechanisms of viral capsid self-assembly by specifically focusing on the MS2 virus and utilizing cutting-edge imaging techniques has the potential to revolutionize our understanding of viruses and pave the way for the development of innovative antiviral solutions.

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441 3:00 pm PP

Use of 3D Chaos Game Representation to Quantify DNA Sequence Similarity

Stephanie Young, Computational Science (D)

A 3D chaos game is shown to be a useful way for encoding DNA sequences. Since matching subsequences in DNA converge in space in 3D chaos game encoding, a DNA sequence's 3D chaos game representation can be used to compare DNA sequences without prior alignment and without truncating or padding any of the sequences. Four methods inspired by shape-similarity comparison techniques show that this form of encoding can perform as well as alignment-based techniques for building phylogenetic trees. The first method uses the volume overlap of intersecting spheres and the remaining three use shape signatures in the 3D chaos game trajectory: edge length in a 3-point sliding window, angles in a 3-point sliding window, and coordinates of the chaos-game trajectory. The methods are tested using: 1) mitochondrial DNA from four groups of primates, 2) the first exon of the beta-globin gene for 11 species, and 3) set of simulated DNA sequences. Simulations show that methods produce distances that are, on average, agnostic regarding whether mutations are deletions or substitutions.

442 3:00 pm QQ

Lewis base catalyst synthesis for the development of regioselective electrophilic trifluoromethylation methodologies

Nicholas Tabares, Chemistry (Emphasis in Biochemistry) (U)

Radical trifluoromethylation has been emerging in recent literature as a method to generate a variety of perfluoroalkylated arenes and heteroarenes. A drawback to many of the current methods is the lack of regio-control due to a mixture of constitutional isomers produced per substrate. Preceding work from the Gustafson lab has shown that several Lewis base catalysts (LBCs) can affect the regio-outcome for both electrophilic aromatic chlorination and bromination. Due to the ambiphilic nature of perfluoroalkyl radicals, many recent methods reported mimic a S_EAr mechanism. Currently we are developing a catalyst-promoted method to regioselectively perfluoroalkylate arenes and heteroarenes using a LBC approach. The LBCs were synthesized using a variety of different organic reactions that students often learn in their respective 232 and 432 courses.

443 3:00 pm RR

Utilizing Deep Eutectic Solvents for the Colorimetric Analysis of Nicotine from Thirdhand Smoke

Danielle Beerfas, Chemistry with an emphasis in Biochemistry (U)

Smoking tobacco products continues to be one of the leading causes of death in the United States, accounting for approximately one-fifth of deaths in adults¹, despite tobacco

products being less popular than they once were. Firsthand and secondhand smoke are both widely understood effects of smoking, however thirdhand smoke (THS) is a fairly new topic that is still being studied to understand its effects². THS is the chemical residues left behind in an environment once smoking has ceased. These residues can persist in environments from mere minutes to many months². THS is of particular concern in low-income communities, as smoking is more prevalent and multi-unit housing poses a higher risk².

The goal of this project is to develop an easy to use and affordable take-home test to detect nicotine in THS, as current testing is costly and requires complex instrumentation that isn't readily available to the average person. To achieve this goal, we have developed a technique using liquid-liquid extraction of nicotine from an aqueous to a nonaqueous solvent. The detection makes use of a unique nicotine-dye complex which can be detected by the naked eye. Our original process used chloroform as the nonaqueous solvent, however its toxicity makes it unsuitable for use in a take-home test. In order to make this method suitable for home use, we have identified a deep eutectic solvent (DES) to act as our nonaqueous phase. DES are green solvents formed from a hydrogen bond donor and acceptor that when combined form a solvent that is low in toxicity and easy to synthesize. Using this method, we currently have a naked eye limit of detection (LOD) of 0.1 μM or 42 ng of nicotine in our samples. This presentation will describe our advances in using this DES in our analysis and compare the approaches we are taking to further lower the LOD that can be achieved with our colorimetric assay.

444 3:00 pm SS

Synthesis of Alkenyl Trifluoroborates with Alcohols and Amines

Benjamin Blacker, Chemistry with Emphasis in Biology (U)

Organotrifluoroborates have the chemical properties that make them essential reagents for synthetic medicinal chemistry. These reagents are air-stable, easily stored and handled. They can be used in coupling reactions, such as the very important Suzuki-Miyaura reaction. The vast majority of organoborane reagents used for drug discovery are aromatic. Aromatic rich compounds can show undesirable drug properties when over-used. Increased use of sp³ saturated groups yield more desirable drug properties. Our research is focused on the synthesis of functionalized vinyltrifluoroborate salts. These reagents are prepared by the hydroboration of functionalized terminal alkynes using dicyclohexylborane, followed by the selective removal of the cyclohexyl groups. Unlike other hydroborating reagents, dicyclohexylborane does not reduce functional groups, only reacting with acidic groups such as: carboxylic acids, alcohols and amines. These acidic groups can be protected before hydroboration. In this study, we present our preliminary results on the preparation of amino vinyl and hydroxyl vinyltrifluoroborate salts. All small molecule drugs contain an amino group and the majority also have hydroxyl groups present. Herein, we report the synthesis of primary, secondary and tertiary amino vinyl- and hydroxyl vinyltrifluo-

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roborate products in good to very good yields. The utility of these compounds is illustrated in the Suzuki-Miyaura coupling reaction forming the products in very good to excellent yields and purities.

Session I-8

Health Nutrition and Clinical Sciences 6

Friday, March 3, 2023, 3:00 pm

Montezuma Hall

445 3:00 pm TT

The Effect of Demographic and Xenobiotic Factors on the Breast Milk Microbiome

Chloe Hull, Public Health; Environmental Health (M)

Although it was seen as a sterile fluid in the past, it is now accepted that a main component of breast milk is its unique microbiome. Various factors can play a role in the composition of the breast milk microbiome including mode of delivery (vaginal or cesarean), maternal demographic factors, nutrition, genetics and exposures to drugs and environmental contaminants, although research is still very new in this field. Breastfed infants consume up to 8×10^5 bacteria every day and thus breastfeeding plays an important role in inoculating the infant gut microbiome. Changes in the breast milk microbiome may alter the composition of the baby gut microbiome, therefore understanding what factors affect the breast milk microbiome is critical to determining the long-term impacts of breastfeeding on infant health. The objective of this study was to determine the influence of demographic and xenobiotic factors on the variety and abundance of bacteria present in breast milk samples. Samples of 50 mL of breast milk and respective maternal and child demographic information and maternal exposure to medications/drugs/environmental contaminants were collected from breastfeeding women (n=564) across the United States and Canada. 16srRNA amplicon sequencing and DNA extraction was performed on the thawed breast milk samples. T-Tests, ANOVA, and nonparametric tests using SPSS software were used to analyze the relationship between each exposure category and alpha diversity (Chao1), phylogenetic diversity (Faith's PD) and bacterial relative abundance. Antifungals, antibiotics, inhalers, pain medications, and having a child preterm were found to decrease both Chao1 and Faith's PD in breast milk samples. Several xenobiotics and demographic factors were found to decrease the mean abundance of some bacteria in breast milk samples including alcohol, caffeine, prescription medications, marijuana, having a male as a first child and being of non-Hispanic ethnicity. Conversely, vitamins and supplements, eye drops, vaccines, higher gravidity, and lower education increased the mean abundance of some bacteria in breast milk. The breast milk microbiome is sensitive to xenobiotics and demographic factors and thus this should be considered by public health agencies and medical organizations when creating clinical and counseling guidelines.

446 3:00 pm UU

Effects of Blackberry Consumption on Satiety, Postprandial Glucose, Anxiety, and Skin Health

Sarah Kinsey, Foods and Nutrition (U)

Blackberries are a rich source of anthocyanins and fiber and their consumption has been proven within multiple studies to have various health benefits. However, most blackberry studies used blackberry juice, powder, or extract in preclinical models. The purpose of this study was to assess if fresh blackberry consumption would improve postprandial blood glucose, satiety, and anxiety responses, as well as if a topical blackberry application would improve skin health. This experimental study consisted of two trials where participants (n=48, 37 females and 11 males; 24.0 ± 4.5 years; BMI 23.1 ± 4.13 kg/m²) consumed either white bread (isocaloric control, 110 kcal) or white bread and blackberries in a crossover design. Satiety and anxiety measures were assessed at baseline, right after consumption, and every 15 or 30 minutes respectively until 90 minutes post consumption. Blood glucose was measured at 0, 30, 60 and 90 minutes post juice consumption. For the topical application, blackberry juice or a sugar solution (control) was applied on the forehead of each participant and skin hydration and oil tests were taken over time. Satiety increased after snack consumption in both trials ($P < 0.001$), however there were no significant differences between trials. Both trials had increased blood glucose levels at 30 minute post consumption which slowly decreased as the study progressed ($P < 0.01$). No significant differences were found on postprandial glucose responses between the two trials. Both trials showed reduced anxiety scores over time ($P < 0.05$) with no significant differences between trials. There was no significant effect of the topical blackberry juice application on skin hydration compared to the sugar solution. Consumption of blackberries with a high glycemic index food (white bread) did not show any significant differences on a postprandial glucose, satiety, or anxiety response when compared to the isocaloric bread trial. There was also no significant effect of blackberry juice on skin health as compared to the sugar solution. Potential future research could include a higher dose of blackberries with a longer time period to monitor blood glucose, satiety, anxiety, and skin hydration over time.

447 3:00 pm VV

Food-related cues in a video game increase food cravings but not the intake, among adults overweight and obese

Marissa Fritch, Foods and Nutrition (U)

Obesity rates in the US have grown in parallel to the increased use of media such as playing video games (VG) and television (TV) viewing. Literature suggests that passive exposure to embedded food cues (e.g., cooking shows) on TV increases calorie intake in adults. However, if the recent surge in active engagement with high-calorie food cues (pictures or videos) via handheld entertainment devices (e.g., video games) has an influence on eating-related variables is unknown. This pilot

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study examines the contributions of immersive food-based VG and passive TV food content viewing on dietary behaviors. In this crossover study design, participants overweight and obese (body mass index 25-35kg/m², 18-40yr) participated in three experimental conditions with 1 week washout period: 1) passive food-TV condition includes watching a cooking show for 20 minutes (f-TV), 2) immersive food-VG condition (f-VG) includes playing an interactive food-based game for 20 minutes, 3) neutral non-food TV (nf-TV) includes watching a nature show for 20 minutes. During each visit, we collected ratings for appetite and food cravings, before and after exposure to the condition. We also measured saliva production pre-and post-condition and conducted a bogus taste test to measure food intake using a buffet of high and low-calorie snacks. We have completed data collection on 19 participants (mean age 25.5 yr; BMI 29.5 kg/m²). Our preliminary results indicate that participants felt equally focused, immersed, and involved in all three conditions. Hunger increased in fVG ($p=0.001$) and fTV ($p=0.01$), while fullness and satisfaction ratings decreased ($p<0.05$). We observed a significant increase in food craving scores in f-VG (42.7 ± 8.6 ; $p=0.04$), post VG food cue exposure. This increase in food cravings did not correlate with calorie intake from snacks in the lab. Calorie intake from snacks and saliva production also did not differ between the three conditions. However, we observed a significant decrease in systolic blood pressure in f-VG compared to the other two conditions. Our results suggest an impact of video game food cues on cravings, with no impact on acute food intake. A larger sample size is required to assess the relationship between food-cue exposure and food intake.

448 3:00 pm WW

Evening sleep chronotypes (late sleepers) perceive food odors to be more intense and report greater cravings compared to morning sleep chronotypes (early sleepers)

Paige Sullivan, Foods and Nutrition (U)

Chronotype reflects individuals' preferred time of day for sleep/activity. Studies suggest that compared to morning chronotypes (MC; preference for early sleep), evening chronotypes (EC; preference for early sleep) engage in poor diet intake, leading to adverse health effects. While greater sensitivity to food smells increase food intake, how odor perception may influence diet intake in EC is unknown. This study aims to determine whether EC perceives food odors to be more intense, and if that relates to poor diet. Fasting EC and MC (determined by Morningness-Eveningness Questionnaire) completed the Smell Identification Test and Sniffin' Sticks task to determine olfactory function, and rated the intensity of food (strawberry, S) and non-food (rose, R) odors at same time of the day (11am-12pm). Food and non-food odors were bifurcated into high and low intensities: strawberry high (SH), strawberry low (SL), rose high (RH), and rose low (RL). Participants completed food cravings questionnaires and a 3-day food diary. Healthy weight adults participated in the study (ECn=19, age 23.80, BMI 21.79 kg/

m²; MC (n=18, age of 24.11, BMI 22.63 kg/m²). No difference in olfactory function was reported between MC (33.06 ± 2.88) and EC (33.84 ± 2.09). Independent of S and R categorization, higher intensity odors were perceived as more intense in EC vs. MC ($p < 0.003$). These results were primarily driven by SH ($R^2 = 0.41$, $p < 0.004$). For every unit increase in odor intensity ratings, overall cravings scores were reported 17 points higher in EC vs. MC ($p < 0.001$). Interestingly, MC reported higher ratings for hunger ($p = 0.010$), desire to eat ($p = 0.027$), ability to eat ($p = 0.015$), and greater cravings for fruits ($p = 0.029$) and vegetables ($p = 0.030$). EC also reported higher intake of total calories and carbohydrates later during the day (after 8:00 pm). Our findings suggest that chronotype may influence perceived intensity of food odors enhancing cravings for unhealthy foods.

449 3:00 pm XX

Noise-Induced Hearing Loss in Student Musicians
Emma Holley, Speech, Language, and Hearing Sciences (U)

Noise-induced hearing loss (NIHL) is the second most prevalent type of hearing behind presbycusis, age-related decline in hearing. University student musicians are more at risk for NIHL because they rehearse and perform daily in loud environments. These musicians spend a significant amount of time in ensemble practices, music halls, and various performances because of various academic commitments. It is likely that student musicians have increased exposure to noise because of academic involvement in addition to any additional recreational noise exposure (i.e., personal music system use with earphones, music festivals). Not surprisingly, researchers have reported that student musicians are twice as likely to have hearing loss compared to non-musician students. The purpose of this was to evaluate hearing sensitivity in student musicians and non-musicians. Currently enrolled SDSU students were recruited for this study which is part of a larger ongoing study of auditory function in student musicians. Once informed consent was obtained, otoscopy, tympanometry, a measure of middle ear function, and pure-tone thresholds were obtained. The frequencies included 0.25 through 8 kHz and from these frequencies, three pure-tone averages (PTAs) were calculated. A low-frequency PTA (LFPTA) of 0.25, 0.5, 1, and 2 kHz, a middle-frequency PTA (MFPTA) of 0.5, 1, 2, and 4 kHz, and a high-frequency PTA (HFPTA) of 3, 4, 6, and 8 kHz were determined. There were 15 non-musicians (12 women, 3 men) and 21 musicians (11 women, 10 men) who participated. There were no statistically significant differences for MFPTA and HFPTA between the groups after adjusting for age and sex. Musicians did, however, have slightly higher LFPTA in both ears compared to non-musicians but after adjusting for age and sex, these differences were not statistically significant. These findings are somewhat surprising given the expectation that musicians would have poorer hearing sensitivity. It is interesting that musicians had poorer LFPTAs when the current literature suggests musicians have poorer HFPTAs. More research is needed to further explore this finding.

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450 3:00 pm YY

Noise Perception: Differences Between Student Musicians and Non-Musicians

Sophie Kaminsky, Speech Language and Hearing Sciences (U)

It is estimated that 1 in 5 young adults aged 20-29 years are at risk for developing noise-induced hearing loss (NIHL). Furthermore, university musicians are more at risk for NIHL, partly due to longer exposures to louder environments. University musicians spend a lot of time in ensemble practices, music halls, and various performances; they have noisier lives compared to their non-musician students. Researchers have reported that over 75% of student musicians exceeded noise exposure levels of 85 dBA on a weekly basis compared to 15% of non-musician students. Student musicians might be involved in other types of recreational noise exposure. One example is personal music (PM) system use with earphones. The two research aims of this study were: 1) what are the PM system use characteristics in student musicians compared to non-musicians; and 2) do student musicians report more hearing problems compared to non-musicians. Currently enrolled SDSU students were recruited for this study and categorized as either a musician or a non-musician. Recreational noise exposure questions included the duration and level of PM system use with earphones along with hearing-related questions such as, do you feel you have a hearing loss and do you experience tinnitus. There were 21 non-musicians (16 women, 5 men) and 43 musicians (28 women, 15 men) who participated. Almost all musicians (95.3%) and non-musicians (95.2%) reported PM system use with earphones. Musicians have a slightly longer reported single use (mean=2.2 hours) compared to non-musicians (mean=1.5 hours). Musicians were significantly more likely to report listening to a PM system at a higher level compared to non-musicians. A slightly higher percentage of non-musicians reported tinnitus after using a PM system (26.3%) compared to musicians (22.5%) but more musicians reported that they feel like they have a hearing loss (18.6%) compared to non-musicians (9.5%). These data suggest that student musicians have similar recreational noise exposure as non-musicians. These data further imply that despite having similar recreational noise exposure, musicians may have slightly better noise perception. These are only survey data, more diagnostic measures in these groups are needed to evaluate differences in hearing and to further this conclusion.

Session I-9

Health Nutrition and Clinical Sciences 7

Friday, March 3, 2023, 3:00 pm

Montezuma Hall

451 3:00 pm ZZ

An Analysis of Hearing Factors Among Arizona-Mexico Border Farmworkers

Eliana Marvizon, Audiology (D)

Hearing loss due to noise exposure is a prevalent occupational problem. Noise-related hearing loss can lead to difficulties in life such as communicating, social isolation, depression, and other problems. Farmworkers may work in environments with hazardous noise levels due to machinery, as well as other exposures that are known to be hazardous to the auditory system (e.g., pesticides), but to date there has been little research to explore hearing loss among this population. Our project was a survey-based study of Arizona/Mexico border farmworkers. The aim of our study was to gather data to determine the percentage of farmworkers that wear hearing protection in noisy work environments and the percentage of those that suspect their hearing was affected. We also aimed to determine any association between age, gender, number of years working, use of hearing protection, high noise environments, and hearing loss among survey respondents. Participants completed a brief anonymous survey that probed exposure to noise and pesticides, hearing protection, and hearing health. Out of a total 132 farmworkers surveyed, 96 (72.7%) reported never wearing hearing protection while working and approximately 30 farmworkers surveyed (22.7%) reported that they suspected having hearing loss. Most farmworkers we surveyed (84 out of 132, 63.6%) reported that their job was sometimes or always noisy, and most (95 out of 132, 72%) reported working with pesticides all of the time or sometimes. Our results suggest noise exposure is common among farmworkers. According to the data, noise exposure is most common in fieldwork done by men and pesticide exposure is most common in fieldwork done by women. Understanding risk factors associated with noise exposure is important for the development of appropriate safety measures known to lower the odds of experiencing hearing loss.

452 3:00 pm AAA

Lexical Access Differences And Cognate Effects During Eye-Tracking In Bilingual Adults With And Without A History Of Developmental Language Disorder

Alaa Shahan, Speech, Language, and Hearing Sciences (U)

Purpose: In this study, we examine whether bilinguals with a history of Developmental Language Disorder (HxDLD) demonstrate a difference in lexical access compared to bilingual individuals without a history of Developmental Language Disorder (NoDLD). We assess whether both groups

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(HxDLD, NoDLD) are sensitive to translation equivalents across their languages with phonologically similar forms (cognates) compared to translation equivalents with minimal cross-linguistic overlap (noncognates).

Method: Twenty-three English-dominant Spanish-English bilinguals participated. They were between the ages of 18-21 years. There were no significant differences between the groups across age, Spanish-English language background, and education. The task is a word comprehension, eye-tracking-while-listening task in both English and Spanish. There are 184 trials split between 92 cognate targets and 92 noncognate targets. We examined participants' time-course of eye-fixations to the target pictures and distractors to index lexical activation patterns.

Results: On the English task, NoDLD participants were more accurate overall than HxDLD participants, and cognates were recognized more accurately than noncognates, especially when the distractor was a noncognate. On the Spanish task (less dominant language), cognates were recognized more accurately and quickly overall, showing a clear cognate effect in both groups. NoDLD participants were quicker to respond overall and demonstrated a higher proportion of looks to target images than HxDLD participants.

Conclusion: As revealed in the results, evidence from the Spanish task suggests lexical access differences for HxDLD participants. Lexical access was slower and participants took more time to rule out distractors in their less dominant language, Spanish. Both groups (HxDLD, NoDLD) showed clear cognate effects in their less dominant language (Spanish). These findings suggest that, during word comprehension, individuals with a HxDLD show differences in how they activate and retrieve words. While these differences are subtle in their dominant language, they are more apparent in their non-dominant language.

453 3:00 pm BBB

Factors that determine self-perception of language proficiency in Spanish-English bilingual heritage speakers

Alexia Aranda, Speech Language Pathology (M)

The American Speech-Language-Hearing Association states that bilingual speech-language pathologists (SLPs) must have "native or near-native" proficiency in both of their languages to practice bilingually. Spanish-English bilingual heritage speakers of Spanish, a group well-represented among bilingual SLPs, may be hesitant to label their Spanish proficiency as "native" or "near-native" even if they are proficient in Spanish. The current study will examine factors that may influence a Spanish-English bilingual speaker's perception of their language proficiency.

We hypothesized that objective skills are predictive of self-reported proficiencies and confidence levels and that variables capturing exposure to Spanish predict confidence levels for heritage speakers. Finally, we anticipated that students would not be fully comfortable referring to their proficiency as "perfect or excellent."

Methods: Self-report data from 97 heritage speakers were analyzed. Variables of interest included exposure to Spanish through family and friends, learning Spanish from family and friends, classroom instruction in Spanish, months living in a Spanish speaking country, as well as objective vocabulary knowledge scores in Spanish and English.

Results: Results showed that greater Spanish vocabulary knowledge was predictive of higher perceived Spanish proficiency, although the effect size suggested that perceived proficiency is also driven by other unaccounted for factors. Further, analyses showed that a broader social environment, specifically exposure to and learning from Spanish-speaking friends, was predictive of perceived Spanish proficiency. Exposure and learning from family was a weaker predictor and classroom exposure was not found to significantly influence self-reported Spanish proficiency. Across the group of heritage speakers, only 23.3% were comfortable rating their Spanish proficiency as "perfect" and 31.6% were comfortable rating their Spanish proficiency as "excellent", confirming that heritage speakers who are fluent in Spanish are often critical of their own Spanish proficiency. Speakers with "perfect" or "excellent" ratings were observed to have higher exposure to Spanish from family than those with lower ratings.

In conclusion, a larger language community, in particular Spanish-speaking friends, may influence self-reported proficiency for Spanish-English bilingual heritage speakers.

454 3:00 pm CCC

Analyzing Regional Dialect Variation in Children's Language: Implications for Clinical Practice

Natalie King-Shaw, Psychology and Speech, Language and Hearing Sciences (U)

Two groups at risk of being both over- and under-diagnosed with language impairments are speakers of Black Vernacular English (BVE) (Pollock & Meredith, 2001) and Spanish-English dual language learners (DLL) (Sullivan & Bal, 2013). Hesitancy by teachers to refer speakers of "non-mainstream" dialects to speech-pathologists may contribute to this phenomenon (Gregory & Oetting, 2018). Further research is needed to identify similarities and differences across dialect patterns that contribute to a more accurate understanding of how "non-mainstream" dialects present in typically developing children and children with language impairments.

Using eight language samples of children who are either BVE speakers (N = 4) or Spanish-English DLL (N = 4), we will conduct a dialect density analysis using listener judgement and type based methods to identify 1) similarities observed between BVE speakers and Spanish-English DLL in this sample and 2) how rates of pattern usage compare to existing data from other geographical regions. Listener judgement analyses are used to "identify research subjects... identify target speech communities... [and] to examine adults' perceptions of race from speech" (Oetting & McDonald, 2002). Type based analyses count the number of features a speaker uses that match a given dialect description (Oetting & McDonald, 2002).

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Data analysis will be completed before the SDSU Student Symposium. We will share the clinical and socio-cultural implications of patterns of convergence and divergence (Labov, 2002) observed in speaker cross-analysis. Factors such as the multicultural demographics of San Diego may contribute to “continuous communication” (Labov, 2002) and cross-cultural interaction between Spanish-English DLL and BVE speakers that will lead to convergence. Close to 40% of San Diego residents older than five speak a non-English language at home, nearly double the national percentage of approximately 22% (US Census Bureau, 2021). Similarly, at approximately 13% (Urban Mapping, 2019), the percentage of Black residents in City Heights nearly doubles the roughly 6% Black population of San Diego (US Census Bureau, 2021). We will discuss the implications of these findings for educators, clinicians, and policy makers to build more culturally appropriate and affirming assessments and treatments for multilingual and multidialectal children.

455 3:00 pm DDD

Dysarthria in Adolescents with Cerebral Palsy

Cody Harris, Kinesiology (U)

Cerebral palsy (CP) is a neuromotor disorder that impairs muscle control, although the nature and severity of these impairments can vary widely between individuals. Many people with CP also have dysarthria, a motor speech disorder that results from motor control impairments that affect the speech system. Some symptoms of dysarthria may include slow, slurred speech, shortened breath, and poor control of intonation. In addition, children with cerebral palsy have different developmental trajectories for speech and language, because cerebral palsy is present before a child develops speech. Despite the clinical significance of the diagnosis, cerebral palsy is underrepresented in the current body of literature regarding dysarthria. Studies that have investigated speech production of children with dysarthria have focused on highly controlled phonetic contexts. The current project aims to find the same pattern from sentence-level data, in hopes that these findings can be more readily applied to real-world clinical settings.

A total of 24 adolescents were recorded retelling a story during this study. Twelve of the participants were diagnosed with cerebral palsy (CP) and dysarthria. The remaining 12 participants were age- and sex-matched typically developing (TD) peers. Participants' upper lip, lower lip, and jaw movements were recorded using an optical motion capture device. Custom Matlab algorithms conducted cross-correlation analyses to calculate spatial coordination (correlation coefficient) and temporal coordination (lag in s). We hypothesized that participants with CP will have more lag in their speech movements due to reduced temporal coordination and a lower correlation coefficient due to reduced spatial coordination. If the data supports this hypothesis, this finding would suggest that children with CP have reduced coordination while speaking, and may account for the dysarthria present in this group.

456 3:00 pm EEE

Parents' Sensitivity to their Children's Language Difficulties and Children's Sensitivity to their own Language Difficulties

Artah Yamin, Speech-language, and hearing science (U)

Parent questionnaires are a commonly-used and sensitive measure of child language abilities. What is less known is how well children with developmental language disorder (DLD) self-assess their language abilities. Kaderavek and colleagues (2016) found a significant but weak correlation between self-assessment and narrative skills for older typical language (TL) children (10-11 years old) but no significant correlation for younger children (5-9 year olds). Further complicating this question is whether knowing more than one language has an effect on the self-assessment of language skills. It is possible that bilinguals have more accurate self-assessment of language skills because they are shown to be more metalinguistically aware than monolinguals (Cummins, 2016). Of interest here is how accurate/sensitive TL vs. DLD children are in identifying their own linguistic strengths and weaknesses and whether their sensitivity is affected by age and multilingualism. The participants in this study are 27 children aged 9-12 (7 Spanish/English bilingual and 20 monolingual English speakers). The children are all participants in a larger study. For classification as DLD or TL, children were administered a standardized language assessment Clinical Evaluation of Language Fundamentals; CELF) in English, and the bilingual children were also given the parallel measure in Spanish. The monolingual children also completed a self-assessment survey that asked them to evaluate their English language abilities regarding comprehension, production, and vocabulary (10 questions). The bilingual children completed the same survey in Spanish for their Spanish language skills. We hypothesize that the TL children will be more accurate in self-assessing their language skills than the DLD children. Since bilingual children have been shown to be more metalinguistically aware, they will be more accurate in their self-assessments of their language abilities than the monolingual children. We also hypothesize that the younger children (9 year olds) will not be as accurate in their self-assessments as the older children (10-12 year olds). Conclusions will focus on whether the survey administered to older children provides valuable information about their possible DLD and/or if it needs to be revised. It will also focus on whether bilingual children can make more accurate self-assessments of their language abilities.

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Session J

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Session J-1

Creative Arts and Design / Visual or Performing Art 1

Friday, March 3, 2023 1:00 PM

Montezuma Hall

457 1:00 pm Exhibitor 1

My Brain and it's Eyes: Disability, Access, and Competent Care during Viral Times

Emily Teaze, Interdisciplinary Studies in Three Departments (English, Women's Studies, and Art - Illustration and Drawing) (U)

This exhibit stemmed from my experiences with ongoing health concerns while navigating health care as an uninsured undergraduate student in the San Diego area. It follows the events of my concussion, which I sustained in February 2022, the aftermath, and what it meant to lack access to competent care during that time. Through two poems, an accompanying art piece and essay, this exhibit looks at disability through the poetic, artistic, and essay form in order to convey the complexities of dealing with memory loss and sudden vision impairment following a concussion. The first piece: A Memory Test, goes through my experiences at Calpulli Center at SDSU post-concussion; the second: On Vision, explores optical migraines through poetry and a mixed media art piece that acts as a lens into a rapid moment of vision loss while driving. Ultimately, this project is narrative based, it explores access during Viral times; it explores disability through Crip theory, accommodations, and ongoing fears of conditions worsening.

This research project takes an interdisciplinary approach to narrative research through primary and secondary lenses. The primary lens is multimedia and visual arts. For this, I worked with narrative based poetry, and plan to work with visual imagery and the textile arts to create the art piece, featured in On Vision, that works in conversation with the poetry. The secondary lens is the narrative essay form. The accompanying essay further explores the theoretical frameworks surrounding Crip theory, living in Viral times, making private writing public.

The results of this project are ongoing. As this is a lived experience, I continue to face the repercussions that lack of access and competent care can result in. The results further explore my experiences through the larger social narratives that are ongoing through our current Viral times.

While this project is continuing, the larger conclusion was that having access to competent care, especially on a college campus, is integral to student success and wellbeing. For uninsured students facing injury and disability, we need to create an atmosphere that validates experiences and pursues ongoing treatment options.

458 1:00 pm Exhibitor 2

Gemstone Apothecary

Hana Foo, Applied Design - Emphasis in Jewelry and Metals (U)

The Gemstone Apothecary is a practice-based research project culminating in artworks that interpret superstition as found in jewelry, specifically those associated with purported 'healing stones'.

The research examined the stronghold gemstones and adornment for healing have had across cultures and generations through stones' attributed meanings.

"Apothecary" not only alludes to the idea of an established healing network of gemstones but also connects the believed medicinal properties of gemstones to conventional medicine. With both visual and interdisciplinary informational research, "Gemstone Apothecary" offers a new conceptual art perspective, highlighting the history of jewelry's purposes while relating it to modern-day social phenomena.

Informational research guided our visual research. We gathered historical research of different cultures' and time periods' usage of amuletic jewelry, information on gemstones' purported physical and psychological healing abilities, articles/journals about the psychology behind superstition, and also conventional and holistic medicines with attributes aligning with the gemstones.

Designs connecting gemstones with conventional and holistic medicine were developed by first gathering reference images of medicine's chemical structures, holistic herbal medicine forms, and gemstone images. We created design palettes with photoshop to digitally arrange elements for the final pieces, almost like a sketching technique. After the concept and design research, we conducted technical research, like learning lapidary techniques and tools, properties of different stones, and general skill building. The nature of how certain stones interacted with our machines affected the choices made in continuing the process. Different stones have different "hardness" levels, and the quality of the stone played a large part too. Considering each task's time commitment determined if we had to modify certain designs, like by adjusting the size variations.

The research confirmed connections between gemstones' believed healing powers and superstitions, also relating to the conversation surrounding conventional medicines' credibility. Multiple designs were able to reach points that effectively used stones as symbols of related conventional and herbal medicines, supporting the idea of "the wearer who believes." Each component in each piece connects the same healing properties but within different symbology. The jewelry pieces all aspire to soothe the wearer by recognizing the psychological needs of superstitious practices.

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459 1:00 pm Exhibitor 3

Breakdown | Right Thing to Do!

Nanzi Muro, MFA (M)

As an activist and professional photographer since 2017, I have used my activism to initiate dialogues about sustainability, composting, and current social concerns within my community. Through my artwork, which consists of powerful images of fresh produce, I aim to inspire individuals to take action by starting to compost at home and participating in community gardening. These efforts contribute to the establishment of food justice and social equity. Additionally, by showcasing imagery of compost piles, I aim to educate and raise awareness about the significance of composting and environmental conservation.

Composting is a highly effective method of environmental conservation, as it significantly reduces the amount of waste sent to landfills. There are several main benefits to composting, including minimizing the need for pesticides and artificial fertilizers, enriching the soil and promoting healthy plant growth, reducing the amount of trash and dependence on landfills and lowering greenhouse gas emissions, recycling essential nutrients back into the soil, and fostering a thriving soil ecosystem.

Through my activism, I have effectively engaged individuals in conversations about sustainability and sparked their interest in composting. This has led to an increase in community engagement and participation in community gardens and the local food system. My activism has not only positively impacted my own life but has also brought benefits to my community and the environment.

There is another way, I think a better way; it involves developing a network of “producing” theaters and smaller theaters that may not have as many skilled people, as much money, or time, and sharing resources when they are finished in a show. This can benefit all parties, help large theaters with their environmental impact, and smaller theaters produce better shows.

This project will show potential ways of finding and creating a network, practical considerations and steps to take in using and supporting a network, and hazard and benefit analysis for participating. This stems from years of personal experience developing personal local networks with school drama programs, borrowed concepts researched from groups who successfully collaborate in this way, and additional research found specifically to help this be more possible, less open to litigation. If these concepts were to reach a larger audience in the general theater and theater education world, possibly more theater companies would find they could participate in sharing resources.

460 1:00 Ppm Exhibitor 4

Considerations for Sharing Resources With Small Theaters and Drama Programs

Cynthia Bloodgood, Theater Design and Technology (M)

Many theaters with reasonable budgets and skilled workers make beautiful scenery, creating the illusion of a complete world on stage for a performance. Only a small fraction of this can be kept and reused due to lack of storage, very specific design choices that don't work for other shows, construction and installation techniques, the difficulty and expense of transporting items, and the addition of paying people to handle the pieces. The result is a cycle of raw materials coming in, applying beautifully skilled work and transforming it into scenery, and tossing it into a dumpster several weeks later after its one time use.

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Session K

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Session K-1

Oral Behavioral and Social Sciences 16

Saturday, March 4, 2023 9:00 am

Park Boulevard

461 9:05 am

Cognitive Advantages Associated with Musical Experience during Development

Hilda Parra, Language and Communicative Disorders (D)

Learning to play a musical instrument has been shown to enhance some cognitive skills including enhanced fine-tuned auditory perception and discrimination, verbal memory, phonological skills, reading, inhibitory control, working memory, and attention [2, 1, 3, 4]. However, there is also controversial evidence of cases demonstrating inconsistent results [5]. Furthermore, musical expertise has been associated with brain changes. For example, Thaut and colleagues found differences among prefrontal, frontal, cingulate, cerebellar, temporal, and parietal regions associated with rhythm processing in musicians and nonmusicians [6]. Longitudinal studies are less common, but could provide unique insights into the developmental course of effects. Therefore, the current goal is to provide further longitudinal evidence and further identify the emergence of neurocognitive advantages associated with musical expertise. We are analyzing music effects in data from the Pediatric Longitudinal Imaging Neurocognition and Genetics study (PLING) of 200 5-12 year olds, featuring detailed musical assessments from the study on Studying the Influence Music Practice Has On Neurodevelopment in Youth (SIMPHONY). Child participants with musical experience have higher performance on measures of phonological awareness, lexical processing speed, reading accuracy and fluency, verbal working memory, rhythm discrimination, sensitivity to beat perception and attention skills. Initial examination of brain structure demonstrates larger bilateral subcortical volume of the cerebellum amongst participants with musical experience. Ongoing analyses are testing music associations in structural and diffusion imaging in parietal, temporal, frontal and cingulate regions, and will examine the association between growth rates of brain structure and performance on behavioral assessments over four annual time points.

462 9:20 am

White matter pathways supporting semantic interference in language production

Yusheng Wang, Language & Communication Disorders (D)

Disentangling the underlying structural neural circuit for resolving semantic interference provides insights into how conflicts are resolved in language production. Several brain regions play a critical role in speech production and cognitive control, including the left lateral and medial prefrontal and the left temporal cortex. However, how these brain regions interact to resolve semantic conflict during speech production is still unknown.

In this tractography-based study, thirteen participants completed a blocked-cyclic naming task and a flanker task to examine semantic interference (SI) and congruency effect (CE), respectively and were scanned with a diffusion-weighted sequence. We examined if the size of the interference was correlated with the lesion volume and extracted fractional anisotropy (FA) values from manually dissected white matter tracts associated with language and cognitive control: frontal aslant tracts (FATs), uncinate fasciculi (UFs), inferior frontal-occipital fasciculi (IFOFs), and the three subcomponents of accurate fasciculi (AFs): anterior (AFAS), posterior (AFPS), and long segment (AFLS), bilaterally to examine the relationship.

In both tasks, we found significant differences between conditions, indicating the existence of semantic interference and congruency effects on behavioral measures. Patients with higher estimates of white matter integrity in the right AFLS showed smaller semantic interference in reaction time in the blocked-cyclic naming task. However, to our surprise, greater SI on accuracy was associated with greater white matter microstructure in right FAT. Contrary to expectations, larger lesions were associated with smaller CE in the flanker task, and higher FA values of the right AFLS were associated with higher CE.

We believe insufficient statistical power and significant participant variations contributed to the results. Nonetheless, the multiple significant correlations observed in the right hemisphere might suggest that right hemisphere structures are involved in beneficiary and less beneficiary ways in supporting semantic and non-linguistic interference resolution.

463 9:35 am

Defining “progress”: Integrating clinical and caregiver measures in speech sound intervention

Abigail John, Language and Communicative Disorders (D)

Background: Children with speech sound disorder (SSD) experience difficulties producing speech sounds, such that their ability to communicate and be understood by others is impacted significantly. Children with SSD are best supported by individualized and evidence-based speech sound intervention strategies (e.g., Baker et al., 2018; Kamhi 2006). Improvement as a result of intervention is commonly assessed using speech sound outcome measures as determined by clinicians, such as percent consonants correct (PCC; Shriberg & Kwiatkowski, 1982), or by monitoring speech sounds a child does not know before intervention for increased accuracy following intervention (Powell et al., 1991). In order to fully characterize a child's outcomes and adhere to evidence-based practice principles, measures completed by caregivers may also be used to assess their child's ability to be understood across home and school environments, as well as overall caregiver satisfaction with intervention services (McLeod et al., 2012; Watts Pappas et al., 2016).

Present Study: The current study, as a single subject design, included eight child participants (ages 3;3 - 6;9) with SSD. A primary caregiver for each child also participated in self-report measures related to the current intervention. Target selection for

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this speech sound intervention was based on the complexity approach (Gierut, 2007), and individually chosen for each child. Intervention was provided three times per week, for a total of 18 sessions over six weeks, via telepractice. The Intelligibility in Context Scale (ICS), a measure that captures each child's ability to be understood by a variety of listeners across multiple environments, was completed by caregivers before and after their child received intervention. Caregivers also evaluated their overall satisfaction with the intervention on a post-intervention survey.

Discussion: Results indicated that outcome measures were variable within and across participants, as expected due to the individualized nature of SSD, as well as child and caregiver characteristics. Caregiver-reported measures offered valuable insight into their child's communication abilities outside of the therapy session, and their overall intervention satisfaction. In summary, the use of both clinician- and caregiver- outcome measures may provide clinicians with a more complete picture of a child's progress across clinical and home environments.

464 9:50 am

The Influence of Heritage Speakers' Language Experiences on the Word Learning Facilitation Effect

Cristy Guerrero, Language and Communicative Disorders (D)

Recent literature provides evidence that bilinguals with high proficiency in both languages have better word learning than monolinguals. The U.S. Census Bureau estimates that 20% of the U.S. population speaks a language other than English at home and a considerable portion of this population has early exposure to Spanish (Spanish heritage speakers). Some Spanish heritage speakers only achieve a low level of proficiency in Spanish despite having significant exposure during childhood. An open question is whether the facilitation of word learning seen in high proficiency bilinguals is also present in Spanish heritage speakers with varying degrees of proficiency in Spanish.

In this study, Spanish heritage speakers completed word learning, identification, and recall tasks, as well as a battery of standardized language assessments. During the word learning task, participants learned the meaning of words from a language they had no prior exposure to (Finnish) with images that represented the learned words. During the identification task, participants encountered the same Finnish words and identified their meanings by selecting from a group of four images that had not been previously seen. The options included a similar image to the correct target and three foils: an image of another target presented during a different trial of the word learning task, an image representing a word that is semantically related to the correct target, and an image of an unrelated word. During the recall task, which took place approximately a week after the word learning and identification tasks were administered, participants were presented with the Finnish words and were asked to provide the meaning of the word in either English or Spanish.

We predict that the accuracy of successfully learned words would be dependent on the degree of early language

experiences with English and Spanish and current proficiency in both languages. This pattern of findings would suggest that the facilitation effect on word learning found in highly proficient bilinguals is not simply managing two languages but is influenced by varying degrees of proficiency. The present study will offer insight into the role of diverse language experiences in Spanish heritage speakers on word learning.

465 10:05 am

Attentional blink in aphasia: Using pupillometry to explore processing effort for linguistic and non-linguistic stimuli

Christina Sen, Language & Communicative Disorders (D)

Aphasia is an acquired language disorder, typically following damage in the left hemisphere of the brain. While language impairments are the primary symptoms of aphasia, research has demonstrated that people with aphasia (PWA) also experience issues in domain-general cognition. Aphasia has been hypothesized to involve an impairment in the interface between the language a person is aware of (explicit) and the unconscious processes that support language use (implicit). One tool to investigate this interface is the Attentional Blink (AB), which indexes the ability to explicitly engage implicit information. In a typical AB task, a rapid stream of letters is presented to participants. A blink occurs when participants attempt to attend to two targets and they miss the second target (T2) when it occurs too soon after the first target (T1).

The AB has not been explored in PWA, and it is unknown whether PWA will show similar attentional shifting to unimpaired adults. Furthermore, it is unknown whether reduced attentional shifting would result in requiring more cognitive effort to complete the task. Therefore, we combined the AB task with pupillometry, which indexes processing effort, to validate the use of pupillometry with this population and explore cognitive effort in PWA. Additionally, we examined whether aphasia involves only language-specific impairments by comparing linguistic and non-linguistic stimuli.

To date, we have recruited 4 PWA and 8 controls. Participants were presented with an AB task and were asked to identify a white letter/shape (T1) and determine the presence of a black X/triangle (T2) amongst distractors. Changes in pupil size were recorded.

Preliminary analyses show significant differences in performance accuracy between PWA and controls when accounting for stimulus type. Results were characteristic of an AB, such that both groups showed increased accuracy for T2 as the interval between T1 and T2 increased. However PWA were less able to identify T2 across all intervals, indicating a longer blink window. Pupil data also showed an interaction between groups and stimulus type, with PWA demonstrating smaller pupil changes across the task.

These results have implications for understanding the influence of attentional engagement on language processing in aphasia.

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466 10:20 am**Brain Dynamics of Cross-Linguistic Interference Resolution in Spanish-English Bilinguals With and Without Aphasia****Katherine Andrade, JDP Language and Communicative Disorders (D)**

Bilinguals simultaneously activate both of their languages during word retrieval. Crosslinguistic interactions occur when word representations overlap across languages. For example, false cognates (FCs) are phonetically and orthographically similar words that are semantically distinct across languages (e.g., Spanish “grapa” means “staple” but resembles “grape”). Previous data suggest that FCs trigger crosslinguistic interference during naming, increasing errors and reaction times. Bilinguals with stroke induced aphasia (BWA) typically evince cross-language deficits and have shown impairment of cognitive control abilities when navigating both languages. Yet little is known about the neural dynamics supporting cross-linguistic and nonlinguistic interference resolution processes may be linked in the context of aphasia. Here, we examine three conditions: FC, unrelated (UR), and identity (ID) during a picture-word interference (PWI) paradigm in Spanish-English BWA and age-matched controls (AMCs). Sixteen AMC (mean age=53.1yrs; SD=9.6; 4M) and 3 BWA (mean age=42.5yrs; SD=6.4; 1M) participated in a picture-naming task, and thirteen AMC (mean age=53.7yrs; SD=10.3; 2M) and 3 BWA participated in a nonlinguistic spatial Stroop task. Preliminary results suggest that BWA were significantly slower and made more errors than AMC. There was a main effect of condition and group on reaction time and naming accuracy. Preliminary analyses of naming accuracy also reveal some evidence for crosslinguistic interference and facilitation effects in controls but not BWA. Future results from this ongoing study will further examine performance on the nonlinguistic spatial Stroop task and shed light on the neural dynamics of crosslinguistic and nonlinguistic interference resolution. The current work will help to elucidate how aphasia can influence language and cognition in bilinguals.

Session K-2

Oral Behavioral and Social Sciences 17

Saturday, March 4, 2023 9:00 am

Visionary Suite

467 9:05 am**Healthy Food Promotion on Instagram: The role of different #Hashtags****Qin Zeng, Psychology (U)**

Instagram, as a picture-oriented social media platform, draws an increasing number of young users to share food-related experiences that can have an impact on their food consumption. Understanding the potential power of different hashtags as applied to food images can help organizations in the healthy food sector create successful strategies that will

attract and improve users' preference for healthy food. The goal of the current study is to explore the role of the most prominent food-related #hashtags on Gen Z's preference for healthy food. This research also explores whether individual factors such as gender and health consciousness have an impact on how food hashtags are perceived.

With an initial sample of one hundred Gen Z Instagram users, we explore six of the most popular food-related hashtags on Instagram: #food, #foodporn, #foodie, #foodstagram, #healthyfood, and #instafood. Preliminary analysis reveals that compared with other hashtags, food portrayed under the #healthyfood hashtag is perceived to be more enjoyable, more beautiful, and healthier. This is consistent with research on the experiential side of food consumption where pleasure is identified as an important factor for individuals who are concerned about their health. According to Jin et al. (2017), hedonic consumption is highly valued by customers who care about their health. When customers experience the pleasure effects from the food they consume, they may be willing to pay more for healthy foods (Jin et al., 2017). Our results also reveal gender and health-consciousness differences in the perception of different food hashtags. Gen Z Instagram users who are more health-conscious are more likely to be satisfied with the #healthyfood vs. #instafood hashtag. In terms of gender, females think images under the #healthyfood hashtag are healthier and may help them to lose weight, whereas #foodie is regarded as the least healthy. Males, on the other hand, believe the #foodie hashtag to be healthier.

This is the first study, to our knowledge, that explores the impact of different hashtags on Gen Z's perception of food on Instagram. The current study contributes to the understanding of the role of Instagram and hashtags in promoting healthy food choices among young consumers.

468 9:20 am**The Privacy Paradox Online: Exploring How Users Process Privacy Policies and the Impact On Information Sharing****Bridget Cole, Media Studies / Mass Communication (M)**

Social media provides information, community, and entertainment to users; however, to access these activities, people must agree to each platform's privacy policies. Many users click “Agree” without understanding what rights they are relinquishing to the technology companies.

Using a survey-experimental design, the researcher will explore the effects of mediating variables, including message formatting, information comprehension, and privacy concerns that may determine how users process privacy policies and impact their willingness to share personal information online.

The privacy paradox describes the disparities between people's privacy concerns and their privacy behaviors. This paradox will be studied through the lens of actor network theory to study the invisible relationships people have with non-human information systems and how this analysis is affected by information comprehension. Information comprehension will be analyzed using cognitive load theory and the limits of working memory

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alongside elaboration likelihood model (ELM), or motivation of privacy concerns effects on deep processing of given information. The purpose of this study is to shed light on how people understand online privacy information in an increasingly digital world and to determine the most effective way to communicate online privacy rights to users.

469 9:35 am

Influencers and Instagram: Using Advice Response Theory to understand health information on social media

Raquel Vega, Communication (M)

Using the Advice Response Theory as a guide, this paper examined social media credibility to further understand how undergraduate students interpret verified users on social media. This study focuses on further expanding the field of computer mediated communication. Results from an experiment with 333 college undergraduates found that blue check marks, also known as verification, do not impact credibility interpretations. Academic implications are seen in the expansion of Advice Response Theory in measuring credibility, as well as practical interventions on how to increase people's interpretation of real and fake information on social media. In the implications of everyday, a credibility checklist is recommended for individuals to utilize when coming across information on social media.

470 9:50 am

To Scroll or Not To Scroll

Ian Strate, Communication Studies (M)

Using the stimulus-organism-response model as a guide, this paper examined information overload, social media exhaustion, and discontinuance of the popular social media app, TikTok. Results from a survey with 299 undergraduate college students found that information overload does lead to the likelihood of discontinuing TikTok use. Findings have both academic and practical implications. First, scholars may use these findings to further extend current research surrounding TikTok and communication phenomena. Second, social media companies-like TikTok-can use these findings to offer solutions and advice to users regarding their social media usage and levels of information intake.

471 9:05 am

Postnatal Choline Supplementation as a Treatment for Prenatal THC Exposure on Spatial Learning and Memory in Rats

Karen Thomas, Psychology (M)

Since their introduction to the market in 2007, electronic cigarettes (e-cigarettes) have become increasingly popular. Alarmingly, these products allow for easy consumption of drugs such as nicotine and cannabis, either alone or in combination. Unfortunately, nicotine and cannabis are the most commonly used drugs among pregnant women and both may place the fetus at a higher risk for developing cognitive impairments.

While there is no known treatment for the effects of prenatal drug exposure, clinical evidence suggests that maternal levels of the essential nutrient choline are associated with reduced risk to adverse effects of marijuana on the developing fetus. Thus, the present study investigated the ability of early choline supplementation to mitigate the effects of prenatal exposure to nicotine, THC, and the combination of both via e-cigarette on spatial learning and memory. Pregnant Sprague-Dawley dams were placed in a vapor inhalation chamber from gestational days (GD) 5-20. Subjects were exposed to either THC (100 mg/mL), nicotine (36 mg/mL), the combination of both, or propylene glycol (vehicle control), via e-cigarette (6-sec puff every 5 min for 30 minutes per day). From postnatal days (PD) 10-30, male and female offspring received subcutaneous injections of either choline chloride (100 mg/kg) or saline. Subjects were tested on a Morris Water Maze spatial learning and memory task from PD 40-46, in which subjects had to locate an escape platform in a pool of water using visuospatial cues. During acquisition, subjects exposed to THC only were less thigmotaxic, suggesting that they were less anxious. In addition, females exposed to THC were less accurate in their swim direction and took longer path lengths, indicating spatial memory deficits, an effect attenuated with choline. During the probe trial, choline supplementation improved spatial memory among females exposed to THC, alone or in combination with nicotine. These findings suggest that choline can improve spatial learning and memory in subjects exposed to prenatal THC. These data suggest that postnatal nutrition may modify cognitive performance in subjects exposed to prenatal cannabis in a sex-dependent manner. Supported by TRDRP 28IP-0026 and 5R37AA012446.

Session K-3

Oral Behavioral and Social Sciences 18

Saturday, March 4, 2023 9:00 am

Legacy Suite

472 9:20 am

Investigating Neurobehavioral Indices Of Cognitive Control Dysregulation As A Function Of Binge Drinking History And Biological Sex

Ryan Shriver, Psychology (M)

Cognitive control facilitates behavioral optimization by combining inhibition of automatic responses and selection of context-appropriate behavior that is compatible with current goals. Primarily subserved by the prefrontal cortex, cognitive control deficits are implicated in the inability to regulate alcohol intake. However, evidence of the neural mechanisms underlying decision making as it relates to compulsive intermittent consumption such as binge drinking is scant. In the current study, young adult binge drinkers (BDs, N = 38, 21 women) reported engaging in at least five binge episodes in the past six months, defined as consuming 4+/5+ drinks for women/men within two hours. A group of demographically matched light drinkers (LDs, N= 39, 19 women) reported two or fewer binge

(U)=Undergraduate; (M)=Masters; (D)=Doctoral

episodes within the same time frame. Functional magnetic resonance imaging (fMRI) was used to examine neural indices of cognitive control as a function of recent BD history and biological sex during a Stroop task. The task engaged cognitive control on high-conflict trials that were analyzed relative to low-conflict trials resulting in the Stroop interference (SI) effect. SI is the tendency to respond slower and with less accuracy on high-conflict trials and is an index of difficulty resolving conflicting response options. Overall, BDs showed higher SI as they were less accurate than LDs on high-conflict trials, which correlated with increased alcohol consumption. Voxel-wise and region-of-interest analyses revealed different patterns of blood oxygen level-dependent (BOLD) activation between BD and LD groups. Within the anterior cingulate cortex, a region critical to cognitive control, BDs showed higher activation to SI than LDs, which was primarily driven by women BDs. Similarly, BOLD activity was greater in the thalamus and in the supplementary motor area in the BD group, which correlated with weekly alcohol intake. These results are consistent with compensatory recruitment of the cognitive control network to maintain normative task performance in BDs. Furthermore, they contribute to the growing body of research revealing how prolonged alcohol misuse alters typical neurocognitive functioning. Understanding the neural dysregulation associated with binge drinking in women and men may aid in early alcohol use disorder detection and improving intervention strategies.

473 9:35 am

Explaining Cross-Cultural Patterns of Female Substance Use: A Systematic Ethnographic Study

Drake Rinks, Anthropology (M)

Cross-national drug use data indicate a near-universal male bias for virtually all types of recreational drugs. Primarily derived from Western, Educated, Industrialized, Rich, and/or Democratic (e.g., WEIRD) populations, this data represents a small proportion of human biocultural variation. In contrast, there is almost no systematic data on drug use among traditional, small-scale hunting-gathering, pastoral, and horticultural populations. Whereas conventional explanations for low female use highlight sociocultural and political-economic factors, such as gender inequality, novel evolutionary explanations focus on sex differences in the costs associated with neurotoxin exposure (i.e., drugs contain teratogenic toxins and are often avoided by pregnant and lactating women). To explore the relative contributions of cultural, political-economic, and evolutionary factors in explaining low female use, we examined ethnographic descriptions of substance use in the electronic Human Relations Area Files (eHRAF), an online database containing ethnographies of over 400 cultures. We recorded all descriptions of drug use, and more than 70 variables were created and scored (i.e., drug type; age; sex; prescriptions and proscriptions; cost, etc.). The data were then restricted to the 186 cultures included in the Standard Cross-Cultural Sample, which controlled for non-independence between cultures and provided important population-level data on cultural and political-economic, environmental, and ecological factors for explaining female drug use. Our final dataset contained over 1300 ethnographic descriptions of drug

use across 171 populations, most of whom are traditional, small-scale populations. Preliminary results support the cross-national data of a consistent male bias of drug use, with considerable variation in female use by region and subsistence type. Exploratory analyses indicate that evidence of female use is positively associated with the degree of food stress and social integration and negatively associated with the degree of male dominance, market exchange, subsistence loss, and female empowerment, controlling for male use. Data on fertility are currently being collected and analyzed. The cross-cultural data on substance use complements the cross-national drug use data while also offering new insights into the ways in which environmental, ecological, and cultural factors influence patterns of drug use.

474 9:50 am

Examining Associations of Borderline Personality Disorder Symptoms and Eating Disorder Diagnoses

Rebecca Mendoza, Psychology (U)

Adults with both borderline personality disorder (BPD) and eating disorders (EDs) have been shown to display more severe psychopathology and higher levels of distress as compared to individuals with an ED alone. However, the literature is mixed as to which of the nine BPD symptoms (BPDS) are associated with which ED diagnoses (i.e., anorexia nervosa [AN], bulimia nervosa [BN], and binge eating disorder [BED]). Therefore, the present study aims to examine the association of specific BPDS with ED diagnoses. Data used in the current study were from 36,309 adult participants from the National Epidemiological Survey of Alcohol and Related Conditions-III (NESARC-III), a nationally representative sample of US adults. Logistic regression with complex sampling was used to assess the association of specific BPDS with a lifetime ED diagnosis (AN, BN, or BED) as compared to those who did not have a lifetime ED diagnosis, a psychiatric control group, and a healthy control group. Additional multiple logistic regression models included all BPDS and their association with each ED diagnosis to partition out shared variance explained by each symptom. All BPDS were independently positively associated with increased odds for a lifetime ED diagnosis (AN, BN, or BED) as compared to those who did not have a lifetime ED diagnosis. When accounting for all BPDS, impulsivity (OR = 2.25 [95% CI: 1.44, 3.50], $p < .001$) and affect instability (OR = 2.48 [95% CI: 1.42, 4.32], $p = .002$) remained positively associated with BED, and self-injurious behaviors (OR = 2.88 [95% CI: 1.51, 5.50], $p = .002$) remained positively associated with AN as compared to those who did not have a lifetime ED diagnosis. These associations remained statistically significant when ED diagnoses were separately compared to both a psychiatric and a healthy control group. The current study suggests that certain BPDS are more likely to co-occur with each ED diagnosis. Since EDs and BPD are common comorbidities, further understanding the associations between individual BPDS and each ED diagnosis could guide future research and treating symptoms that are relevant for specific BPD-ED presentations to improve outcomes for these patients.

(U) = Undergraduate; (M) = Masters; (D) = Doctoral

475 10:05 am

Have You Ever Done This Before?: Sexual Disclosure and Self Confidence in Emerging Adults and Relationships

Caroline Mahoney, Communication (M)

Using social exchange theory as a guide, this paper examined the self-disclosure of their sexual history between romantic partners. Results from a survey with 193 college undergraduates found that there is not a significant relationship between self esteem and disclosure of past sexual experiences to their current partner. Findings have implications for future research to examine sexual self-disclosure and its connection to a person's religious background and sexual orientation.

476 10:20 am

Occupational stigma and sexual health outcomes: Findings from a community-based cohort of women sex workers in Metro Vancouver, Canada (2014-2022)

Kirstin Kielhold, Public Health (D)

Background: Women sex workers (SWs) face high rates of health disparities due to structural barriers including criminalization and high rates of occupational stigma. Stigma is generally associated with HIV and STI related health inequities among marginalized populations, however we know less about the nature and impacts of sex work-specific stigma on sexual health risks among women SWs. Given these research gaps and the disproportionate burden of stigma faced by SWs, we evaluated the association between experiences of sex work occupational stigma and sexual health outcomes of (1) self-reported sexually transmitted infection (STI) diagnoses and (2) inconsistent condom use with clients, both measured in the last 6 months.

Methods: Baseline and semi-annual questionnaire data from a prospective, community-based cohort of SWs in Vancouver, Canada from 2014-2022. We used bivariate and multivariate logistic regression with generalized estimating equations (GEE) to analyze the relationship between occupational stigma (measured using a validated sex work scale, $\alpha = 0.96$) and outcomes of (1) self-reported STI diagnoses, and (2) inconsistent condom use with clients.

Results: Among participants ($n=574$), the median age was 39 (IQR:31-46) and 42.3% ($n=243$) identified as Indigenous. 17.9% ($n=103$) had at least one self-reported STI diagnosis, and 32.1% ($n=184$) reported inconsistent condom use with clients during the study period. In separate multivariate confounder models, occupational stigma was independently associated with recent STI diagnosis (aOR1.11, 95% CI: 1.03-1.20) and inconsistent condom use (aOR1.17, 95% CI: 1.10-1.23) after adjustment for confounders.

Conclusion: SWs who face more stigma face higher odds of self-reported STIs and inconsistent condom use. Interventions addressing the role of occupational stigma as a determinant of health are needed, including peer-delivered sexual health services and structural changes to decriminalize and destigmatize sex work.

Session K-4

Oral Biological and Agricultural Sciences 16

Saturday, March 4, 2023 9:00 am

Mata'yuum

477 9:05 am

Bigger and brighter: floral dimorphism in rare cactus *niveditha ramadoss, Evolutionary Biology (D)*

One of the remarkable evolutionary transitions in flowering plants is the development of separate sexes also known as 'dioecy'. Since the time of Darwin, there has been persistent interest in understanding the evolution of dioecy and its associated traits. Dioecious plants usually express sexual dimorphism, defined as the differences in morphological characters between male and female individuals. Identification and understanding of sexual dimorphism is critical as it can impact the growth, physiology, pollinator visitation, and adaptation of different populations. In our study, we focused on *Cylindropuntia wolfii* (Cactaceae), a rare native cactus bordering California and Baja California. This is a great model to study sexual dimorphism as it is dioecious and has six different flower color morphs within the same location. The aim of our study is to identify sexual dimorphism between the male and female flowers of *C. wolfii*. To identify sexual dimorphism, we measured several qualitative and quantitative factors that potentially influence pollinator visitation, including flower color, UV emission, autofluorescence, filament color, tepal shape, flower display diameter, tepal length, tepal width, and number of flowers per plant. The statistical significance of differences between the sexes was measured using a general linear model of ANOVA. Our results suggested that *C. wolfii* male flowers are bigger and brighter than female flowers. This implies that male flowers could be more attractive to pollinators than females which is a consequence of intrasexual competition in plants. Additionally, we observed novel sexual differences in fluorescence emission in these flowers, which is a pattern so far reported only in birds. Studies are underway to investigate the effects of these dimorphic traits on pollinator visitation in this endemic species.

(U)=Undergraduate; (M)=Masters; (D)=Doctoral

478 9:20 am**Morphology of a Rare and Endemic Barrel Cactus (*Ferocactus gracilis* subsp. *gatesii*) in Baja California**
Yazmin Lommel, Biology (M)

Ferocactus gracilis gatesii is a rare barrel cactus exclusively located on 7 granitic islands of the 16 total in Bahía de los Angeles, Baja California, Mexico. However, *F. g. gatesii*'s sister subspecies - *F. gracilis coloratus* and *F. gracilis gracilis* - are prevalent on the Baja Californian peninsula and are differentiated only through morphology. Additionally, researchers have been unable to solidify *F. g. gatesii*'s taxonomy despite its rarity. Currently, scientists hold two taxonomic hypotheses of *F. g. gatesii*: 1) it is a distinct species; or 2) it is a subspecies of *F. gracilis* (the default taxonomic status). However, no genetic or morphometric analyses have been conducted to elucidate these differences. Our goal of this study was to determine the morphometric differences between *F. g. gatesii* and its close relatives for better taxonomic resolution. We hypothesize that *F. g. gatesii* should be considered a species due to the difference in morphology from *F. g. coloratus* and *F. g. gatesii*. In order to test for any significant difference in morphology, central spine width and length measurements of *F. g. gatesii* and *F. g. coloratus* were collected in the spring of 2022. Our initial findings identified a significant difference in central spine length between the two subspecies, supporting the hypothesis that *F. g. gatesii* is its own species. Studies are underway to better resolve *F. g. gatesii*'s taxonomy using measurements of all *F. gracilis* subspecies from herbaria plus genetic analyses. Our findings can solidify *F. g. gatesii*'s taxonomy which land managers can use for conservation from threats such as climate change, poaching, and habitat degradation.

479 9:35 am**The Colors of Attraction: Sexual Dichromatism influence on Pollinators' Flower Choice in Rare Endemic Cacti****Scarlet Steele, Cell and Molecular Biology & Philosophy (U)**

The reproductive success of all animal-pollinated plants depends on their ability to attract pollinators. This is especially important in dioecious species that have their sexes separate because they cannot self-fertilize. Dioecious plants usually express sexual dimorphism which is the differences in morphological characters between male and female individuals. Sexual dimorphism in plants' floral traits, is a critical factor for pollinators' attraction to those flowers. It is imperative that we further understand sexual dimorphism and its effect on pollinator visitation, which ultimately affects their reproductive success. A great model to study sexual dimorphism and its impact is *Cylindropuntia wolfii*, commonly known as 'Wolf's cholla'. This is because this species has a functionally dioecious sexual system that possesses six different flower morphs within the same location. We have also observed the flowers to have sexually dimorphic traits that are attractive to pollinators. The goal of our current study is to determine if there is a difference in pollinator visitation rate between male and female flowers

and to understand pollinator flower color choice. To achieve this we first observed whether there are any potential pollinators to the species by manual survey in the field. Then we manually observed the pollinator visitation for different male and female individuals of different flower colors by observing them for 10 mins each. Finally, to track the pollinator color preference we used the fluorescent dye that dyes the pollen and can be transported by the pollinator to other flowers. We manually noted the presence or absence of fluorescent dye spread in the flowers of the neighboring plants. Our preliminary results showed that males attract more pollinators than females and that the pollinators are attracted to green/yellow flower colors more than orange or red. This suggests that when the pollinator density is low, the female flowers will hardly be visited leading to low seed production which has previously been reported in *C. wolfii*. This study has important implications for the management of rare dioecious cactus.

480 9:50 am**Possible Cloning in Native Succulent Population**
Camille Movafagian, Biology (U)

Agave shawii, also known as Shaw's agave, is a native succulent found in Baja California and Southern California. This species is important and versatile for native people in these areas, who use the succulent for its nutrition and durability for tools and clothing items. Previous research on *Agave shawii* has focused on its unsuccessful reproduction rates and low seed counts. For the populations located in Southern California, it has been difficult to pinpoint specific pollinators of the species. There has also been research on how the weather conditions in Southern California led to a decrease in its reproduction and increase in its survival. Despite these challenges, *Agave shawii* is not listed as threatened or endangered on the Environmental Conservation Online System. The purpose of this study is a) to determine the genetic diversity of the *Agave shawii* population at Cabrillo National Monument, which is located at Naval Base Point Loma in San Diego, and b) to determine whether individuals in this area are reproducing sexually or asexually by clonal propagation. Even though clonality helps keep population numbers high, it causes the genetic diversity to plummet leading to negative effects in the whole population. We have collected a total of 110 samples from 55 individuals from Cabrillo National Monument. We are currently running DNA extractions from each sample to determine if there are any clones. We will generate thousands of single nucleotide polymorphisms to calculate the genetic diversity and levels of clonality. We hope our results can give us information to understand the genetic diversity of this particular population of *Agave shawii*. If cloning is found in this population, it will be crucial to look into possible causes for this occurrence and to bring foreign pollen to increase genetic diversity. This research will help us work towards successful conservation and reproduction of the *Agave shawii* population in Southern California. We also hope this research will shine light on other species that are understudied and in need of reproductive and conservation studies.

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481 10:05 am

Dispersal and Vicariance in *Xylococcus bicolor*

Jordan Waits, M.S. Evolutionary Biology (M)

Oftentimes, species today are relics from time periods and ancient ecologies long since past and, as a result, are the sole surviving members of their genus, family, or order. Monotypic taxa are of the utmost conservation importance, especially if they have very limited ranges or are threatened by habitat encroachment, as is the case with *Xylococcus bicolor*. *X. bicolor*, or the Mission Manzanita, is related to *Arbutus* (madrones) and *Arctostaphylos* (true manzanitas), although its placement in the Ericaceae subfamily Arbutoideae is unresolved. It can resprout from an underground burl following fire and is incredibly long-lived - some individuals are estimated to be several hundred years old. Recent findings that this species is unable to establish new seedlings in the wild, despite producing viable seeds, may suggest that it required the moist, fertile conditions that were present in San Diego some 20,000 years ago to reproduce. Past genetic analyses using SNP data have segregated the mission manzanita into three or four clusters of genetic diversity: coastal San Diego county/northern Baja California, Catalina Island, and southern Baja California. FST estimates of these populations show high amounts of differentiation in the Catalina population, suggesting it could be its own subspecies or species. Without other closely related species to compare to *X. bicolor*, understanding the pattern and timing of divergence between these populations is crucial to understanding speciation and diversification in the genus. Here, we hypothesize that a) the San Diego/northern Baja population is the center and origin of the species' genetic diversity, b) the southern Baja population diverged after the Last Glacial Maximum (LGT), when the Vizcaino Desert formed and separated it from the other populations, and c) the Catalina population diverged before or leading up to the LGT, when the Catalina coastline was much closer to the mainland's. By creating a Site Frequency Spectrum from the previously collected SNP data, we will apply coalescent theory in a program called fastsimcoal2 to retrace when these populations each shared a most recent common ancestor. Additionally, we may construct a phylogeny to further explore the genetic substructure within these three populations.

Session K-5

Oral Physical and Mathematical Sciences 10

Saturday, March 4, 2023 9:00 am

Pride Suite

482 9:05 am

Detection of Oil Slicks Using Hydrocarbon Remote Sensing

Faith Poutoa, Physics (U)

The early identification of oil spills is vital in minimizing their detrimental effects on the environment. Numerous detection methods are currently in use, but most cannot be effectively

used on a 24-hour basis. Rapid emergency response and mitigation measures, such as the immediate cessation of the leak and implementing other damage control strategies, are essential in minimizing the spill's impact. In this work, we develop a fluorescence-based method that will enable improvements in next-generation oil sensors, particularly in chemical specificity. Our primary method of detection is through phase-sensitive detection using a lock-in amplifier. The phase-sensitive detection technique is an effective method of noise negation because it pulls out frequencies that match the reference signal, allowing for an efficient method of fluorescent signal detection. Optical signals from up to 60 meters away from the light source are received using a telescope, photodiode, and a UV light source. Varying light intensity levels are experimentally generated and compared to the results of computer simulations, showing excellent agreement.

483 9:20 am

Modeling Spatio-Temporal Distribution of HIV Particles on Cervicovaginal Mucus and Nanoparticle-based Preventive Therapy

Anuradha Agarwal, Computational Science (M)

Human Immunodeficiency Virus (HIV) epidemics remain devastating around the world. Since there is no cure for HIV, preventive therapy has received tremendous attention. To find the immune cells, the primary target of HIV, the virus needs to cross the cervicovaginal mucus (CVM) layer, which acts as a barrier for the virus to move freely. The drug-filled nanoparticles that destroy viruses in CVM are one of the essential preventive therapies. In this study, we develop mathematical models to describe how the virus transports through the CVM and how this transport is affected by the CVM acidity. Since the motion of the virus in the acidic CVM is hindered, accurate modeling is necessary to incorporate hindrance due to adherence in acidic media. We model the temporal dynamics of virus concentration using two model components diffusion, and hindrance where diffusion is modeled using Fick's law and hindrance is modeled with pH dependency. We will use our model to evaluate the effects of nanoparticle-based therapy on virus distribution and transport across CVM. Our objective is to show that the proper implementation of nanoparticle-based therapy can significantly control virus entry through CVM, thereby avoiding the establishment of HIV infection. Such preventive approaches can help curb the global HIV epidemic.

484 9:35 am

Simulated leaching and photodegradation of tire tread particle-derived compounds in natural water

Kelly Hollman, Civil Engineering (M)

Tire tread particles (TTP) are microplastics (< 5 mm) released from tire abrasion against road surfaces. TTP accumulate on roads in dry weather and are transported into surface water via atmospheric deposition and stormwater runoff. Like other microplastics, TTP are persistent in the environment and may transport various environmental contaminants.

(U)=Undergraduate; (M)=Masters; (D)=Doctoral

Previous research has shown that tires contain known toxic chemicals, such as 6PPD (antiozonant), plasticizers, and polycyclic aromatic hydrocarbons (PAHs). There is a need to better understand the behavior of TTP in water under realistic environmental conditions including sunlight exposure. The present study investigated the leaching of chemicals from TTP in photoirradiated (sunlight) or nonirradiated (dark) laboratory-made freshwater, and the photodegradation of dissolved constituents from TTP, or leachates, under photoirradiation. To quantify leachates, dissolved organic carbon (DOC) and total dissolved nitrogen (TDN) concentrations were measured. DOC and TDN range from 0.47 to 1.04 mg DOC/g TTP and 0.09 to 0.38 mg TDN/g TTP, depending on leaching time and presence or lack of photoirradiation. Leaching and photochemical degradation rates were also estimated by measuring fluorescence intensities over time. Fluorescence spectroscopy is a non-destructive method used in water quality studies to monitor organic compounds with fluorescent properties and collect three-dimensional excitation emission matrices (3D EEMs). Some fluorescent compounds were resistant to photodegradation, resulting in a zero order decay rate of 0.04 ± 0.0007 Raman Units (RU)/hour and first order decay rates that range from 0.015 to 0.017/hour. Others were photolabile and experienced double exponential decay, resulting in photolabile decay rates that range from 1.2 to 1.8/hour and photo-semilabile decay rates that range from 0.003 to 0.01/hour. Additionally, there are efforts in assessing the fluorescent spectral signatures of TTP-specific compounds or classes of compounds and comparing them to TTP leachates. This will improve the use of 3D EEM spectroscopy in detecting compounds from TTP. Overall, results will aim to support the advising of policy changes in California regarding the regulation of chemicals and materials used in tire manufacturing.

485 9:50 am

Single-Particle Studies of the Disassembly of Hepatitis B Virus Capsids in GuHCl

Daniel Villarreal, Biochemistry (D)

Viral capsids are highly functional nanoscale structures. They can be self-assembled around various cargos—such as nucleic acids—to protect the cargo from degradation, and they can be disassembled by changing buffer conditions to deliver their contents back to the solution. While much work has focused on the assembly of viral capsids, less is understood about how they disassemble. To better understand the disassembly process, we use interferometric scattering microscopy (iSCAT) to measure the mass of individual Hepatitis B virus capsids as they break apart in a buffer solution containing the denaturant GuHCl. We perform two types of experiments. In one experiment, we mix together the capsids and denaturant and then record changes in the mass distribution of the particles as a function of time, revealing the disassembly kinetics of the ensemble. In another experiment, we monitor changes in the mass of individual capsids as they break apart, revealing the disassembly kinetics of each particle. While the disassembly

process is different for each particle, many of the particles lose mass in bursts punctuated by pauses. The average duration of the pauses is shorter at higher denaturant concentrations, and the bursts become faster and larger on average as more mass is lost from the particle. These results show that interferometric scattering microscopy can be used to measure the disassembly kinetics of viral capsids and also provide initial clues about the underlying disassembly pathways.

Session K-6

Oral Business Economics and Public Administration/Education 2

Saturday, March 4, 2023 9:00 am

Aztlan

486 9:05 am

Integrating art and science as a tool to build science-specific disciplinary knowledge and skills.

Maraliz Fischler-Barraza, MSED Joint Doctoral Program (D)

Art has played an essential role throughout the history of science. It is only recently that science and art have been placed on divergent paths to form separate disciplines by the education system and those in power. Science fields suffer from a hostile and elitist reputation, while art has emerged as the more approachable subject, especially in K-12 education. Integrating art and science in elementary schools is an underutilized resource. I investigated whether an art curriculum can improve students' understanding of scientific concepts and principles. I studied interactions between 16 K-12 students who produced cyanotypes using their surroundings and shared them with a pen pal. The students were paired up so that one student was from California, and their pen pal was from Indiana. I analyzed 1) how students used art to observe their surroundings, 2) how students communicated their findings, 3) what attitudes students had toward their environment, 4) what attitudes students had toward caring for their environment. Findings show that students 1) are excited to obtain samples from their environment and evaluate them, 2) are eager to plan an exploration of their environment, create cyanotypes using things found in nature, and share their findings with their pen pals, and 3) awareness of the importance of caring for their environment is enhanced as they construct explanations for their findings and think of solutions to problems they encounter. These three main findings closely relate to the new NGSS practices. Strengthening the acquisition and application of scientific concepts through art may help foster a community that is engaged in meaningful scientific practices and is encouraged to participate in environmental stewardship that benefits society as a whole.

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487 9:20 am

Promoting Representation and Inclusion: Archaeology, Education, and the Nathan Harrison Historical Archaeology Project

Caeli Gibbs, Anthropology (M)

California K-12 curricula have often failed to incorporate the experiences and cultures of communities within the state, marginalizing the histories of People of Color. With the growing diversity of the state, it is imperative that California's curriculum actively reflects these demographics. Incorporating the life of Nathan Harrison, an African American born into slavery in the Antebellum South who later became San Diego's first Black landowner and a local legend, can help to diversify the curriculum, and promote Black history. This thesis will examine K-12 resources and materials made available by the California Department of Education in order to identify how best to construct lesson plans regarding Nathan Harrison in order to be adopted into classrooms. This study is important because it relates to the larger societal and systemic issues in the United States, addressing the often-Eurocentric curriculum taught in schools and advocating for class content that acknowledges and embraces diversity. In addition, archaeology helps to identify connections and resonances between the past and present which in turn can help to promote efforts of inclusion in school curriculum. In a country that is experiencing growing diversity in its population, it is essential that California's curriculum effectively reflects and promotes its diverse population. Once completed, this research will have created a K-12 curriculum regarding the Nathan Harrison project while simultaneously meeting the goals of multicultural education and public archaeology.

488 9:35 am

Exploring Expert and Novice Understanding of Organismal Relatedness

Tina Marcroft, Math and Science Education (D)

Phylogenetic trees are widely used diagrams in biology that depict hypotheses of evolutionary relatedness between organisms. Systematists use these hypotheses to name and group these organisms taxonomically. As these diagrams are critical to the understanding of evolution and its outcomes, reading them—also known as “tree-thinking”—is a critical skill for undergraduate biology students to acquire. Indeed, undergraduate students historically have found tree-thinking difficult and a significant portion of the biology education literature is dedicated to understanding what sorts of perceptual biases impact tree-thinking as well as the common misconceptions associated with them. The impact of individuals' categorization of organisms without the prompting of a formal phylogenetic tree on tree-thinking has not been explored, however. As these relationships essentially consist of the categorization and grouping of organisms and they may be critical to document to construct appropriate tree-thinking interventions, I conducted clinical interviews with 11 experts (biology faculty) and 18 novices (undergraduate students) to

understand their of grouping categories in the context of an organism grouping task. Our research objective was therefore to document and characterize the different conceptions of relatedness in both groups to answer the question “Do individuals have internal representations that resemble these conventionalized external representations or do they not?” Experts not having internal representations resembling trees could suggest that alternative representations be used or given to students to aid their understanding of trees. I found that both groups' conception of relatedness consisted of a relevant metaphor that described the structure of said understanding of these categories; some individuals for example, described certain groups as being “higher” than others while other individuals had a more flat understanding of the groups talking about them being “divided.” Individuals also referenced a variety of criteria that informed their groupings as well as some differences based on the context (i.e. specific taxa) mentioned. The aforementioned criteria differed between experts and novices. These results suggest that experts' and novices' internal representations typically do not resemble phylogenetic trees and novices' nascent understanding of categorization may be useful as scaffold for students' understanding of phylogenetic trees

489 9:50 am

The Psychological Needs of an Undergraduate Computer Scientist: Three Case Studies

Kristin Tenney, Math and Science Education Doctorate (D)

Rapid expansion in the field of computer science has led some to categorize computer science (CS) as a basic right. However, women and other underrepresented minorities have historically been marginalized and excluded from STEM fields, including computer science. It is therefore important to consider student experiences in CS and particularly those who have experienced systemic oppression in these spaces. Prior research has explored possible ways to increase participation and retention but there is limited research on the psychological needs of students in STEM. This case study serves to add to the literature on undergraduates' experiences in CS and begin conversations on how to study these concepts. Self-determination theory (SDT), utilized in this study, was originally designed to break down intrinsic and extrinsic motivations and is built off of the concept of individual psychological needs. The three psychological needs in SDT are autonomy, relatedness, and competency, where having these three needs met by an environment is what promotes intrinsic motivation to engage in an activity. Any of these three needs not being met is seen as compromising a person's overall well-being and motivation to continue in an activity such as computer science. This investigation explored three case studies of undergraduate computer science majors' psychological needs at an R1 institution. Each student volunteered to be a part of this work and participated in a virtual 45-60 minute semi-structured interview. The interview consisted of three primary questions, one for each of the psychological needs, with clarifying follow-up questions as needed. These transcripts were coded using the psychological needs as a

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priori codes. The three participants (de-identified) self-identified in the following ways: Zeke as a white man, Omar as a Middle Eastern man, and Bella as a Latina woman. The manner in which these participants' psychological needs are met or not met in their home departments of computer science varied widely. These three case studies explored the psychological needs of the participating undergraduate students and provided a platform for them to share their experiences.

490 10:05 am

Near-Peer Mentors: The Assets of Relationships in Mathematics Classrooms

Brinley Stringer, Mathematics and Science Education (D)

Near-peer mentor support models for students in introductory mathematics are becoming increasingly used at post-secondary institutions across the United States. Near-peer mentors, though not a well-defined term in the literature, are typically students supporting fellow students in roles such as tutors or teaching assistants. Near-peer mentor models have demonstrated many promising quantitative findings related to student performance. Departments who have implemented near-peer mentors anecdotally note meaningful change; however, very little formal qualitative research has investigated this educational support structure. This gap in the literature overlooks important insight, especially the student perspective on the impact of these models.

One near-peer mentor model, the Learning Assistant (LA) model, has been implemented in some SDSU mathematics courses for science, technology, engineering, and mathematics (STEM) intending majors. In this model, undergraduate students who have demonstrated course knowledge can then work as LAs for the course. LAs assist the instructor as an additional classroom resource, supporting students during class time in various ways. During the spring 2021 semester, I conducted classroom observations and interviews with students, learning assistants, and the instructor of a mathematics course that used LAs. Using Yosso's Community Cultural Wealth framework to analyze these data, I discuss some qualitative findings to perhaps determine how the learning assistant model has a positive impact on students beyond measures such as course grades.

By investigating the assets of the LA model from the perspective of students, the instructor, and the learning assistants themselves, relationships arose as a common theme across the data. One particular reason this research is important, especially at Hispanic Serving Institutions (HSIs) like SDSU, is because near-peer mentors give students an opportunity to connect with peers with whom they share similar identity traits, and whom they can look up to as examples of excellence within the field of mathematics, which is underrepresented by students of color and women.

I end with discussing my ongoing dissertation research plans. Utilizing Lave and Wenger's Legitimate Peripheral Participation lens and Engeström's Activity Theory, I hope to learn how near-peer mentors can help students build mathematics identities, and help mathematics departments continue evolving to better serve students.

491 10:20 am

Corporate Disclosure of Climate Change Risk - A Pilot Study

David Hampton, Economics, Specialization in Quantitative Analysis (U)

On March 21, 2022 the US Securities and Exchange Commission (SEC) proposed new climate change disclosure rules that would require companies to provide extensive and specific disclosures about the impact of climate change on their corporate policies and financial performance in mandatory company filings. Using hand collected data from 99 annual reports of 34 randomly selected S&P 500 firms from the 2019-2021 period, we find that 91% of the annual reports in the sample include some disclosures on climate related risks. The extent of the disclosure varies across industries but increases over our sample period. We also find that firms with higher fixed-asset intensity, higher profitability and lower operating cash-flows are more likely to make climate related risk disclosures than their counterparts and tend to disclose more information in their annual reports. Finally we find a positive relationship between climate-related disclosures and firms' financial performance. Taken together, our results suggest a potential benefit of the disclosure of climate related risks.

Session K-7

Oral Business Economics and Public Administration/Education 3

Saturday, March 4, 2023 9:00 am

Metzli

492 9:05 am

The impact of Covid-19 and sociopolitical unrest on Anti-racism in Education

Tamika Lovelace, Liberal Studies Elementary Education/ Psychology emphasis in Neuroscience (U)

Objective: Given the trajectory of our current socio-political climate, we questioned how the current body of research on this topic has been influenced amidst the global disruption caused by the COVID-19 pandemic, extreme politicization of topics such as CRT, rise in hate crimes and public outcry over the murders of George Floyd, and others. This study builds on the meta-analysis of past research focusing on anti-racism in education conducted by Lynch (2017) by reviewing peer-reviewed articles spanning 2000 to 2015. We hypothesize that there is a significant increase in research on anti-racism related to present socio-political division in recent years. Method: Searching the One Search and EBSCO databases for peer-reviewed articles written between 2019 and 2022 that were located searching the key words "anti-racist" "education" "anti-racism" "classroom" "Covid" "George Floyd" yielded 125 articles. 36 articles were randomly selected, coded similar to Lynch, we centered our focus on: author location, article type (empirical vs. theoretical research), gender, ethnicity, the

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aspects, and practices of educational anti-racism, dealing with backlash. We coded the 36 articles for themes that address themes associated with racism. Results: 89% of articles were conducted in North America showing it to be a topic of much greater concern in this region. 61% of the articles reviewed were theoretical, we identified 5 distinct themes that comprised, and extended the aforementioned components of anti-racist education within each of the articles that were centered on; teacher education and recognition of internal bias, decolonizing traditional curriculum, creating safe spaces for students, fostering open dialogue on sensitive topics between educators, and surrounding communities and finally addressing the role administrative support and school-wide culture contribute the acceptance of anti-racist practices or lack thereof within the educational system. Conclusion: In the past 3 years, there have been numerous articles written on antiracism, a vast increase from Lynch's study which was conducted over a 15-year period. Most of these articles were generated in North America. The location of the murder of George Floyd. Many of the articles published over the last 3 years have been theoretical in nature illustrating a greater interest having a conversation about antiracism in education rather than critically examining the factors that produce of solve it. The increased interest in this topic might be influenced by the deaths of George Floyd, Breonna Taylor, and the impact of Covid especially on students of color and their families.

Keywords: anti-racism, anti-racist education, COVID-19, George Floyd

493 9:20 am

In the Shadow of the Colossus: The Value of Student Leadership at Satellite Campuses

Alan Castro, Psychology (U)

For universities, satellite and alternate site campuses often experience differential funding and resources. In addition, centers and resources on main campuses, though technically available to students from other campuses, often are difficult to access for students due to distance and other factors. This is a crucial and important issue, especially in commuter campuses with many first generation college students such as SDSU-Imperial Valley. Due to this void, student leadership on satellite campuses often fills the gap in addressing student needs. This very under researched area of study could greatly benefit decision-making for resource allocation as well as provide models for student leadership in smaller campuses. My work explores my experiences as a latino student leader from the borderlands of southern California at San Diego State University Imperial Valley through my own testimonio. The purpose is to explore equity gaps, such as access to health care products and accessibility for the visually impaired, present at the Imperial Valley campus compared to the SDSU West campus and how it has affected my own student leadership experiences. Deriving from my own first hand accounts, this paper will highlight initiatives advocated for by student leaders, the inequalities of student leadership roles from a satellite campus, and explore past literature that focuses on the importance of student leadership.

494 9:35 am

Climate of the San Diego State University (SDSU)'s Campus from the Perspective of Students of Color **Arwa Alkhawaja, Education (D)**

Many universities have recently added a commitment to equity, diversity, and inclusion to their priorities (Rankin et al. 2022). Some universities took the initiative to launch a Recruitment Inclusive Champion (RIC) program with the intention of training faculty and staff on inclusive recruitment, search, and hiring practices (Davey, Johnson, Webb, & White, E. (2021). One way which San Diego State University (SDSU) strives to achieve its DIE goals is through the establishment of Cultural/Identity Centers. According to the mission statement of the Cultural Centers at SDSU, they support students' success by fostering equity, justice, and inclusion (San Diego State, n.d.). In addition, a university senate resolution was passed on Feb 6, 2018 which stated, in part: "...that San Diego State University creates a campus-wide diversity plan and that all academic and administrative divisions create individual diversity plans that are congruent with the University plan." We conducted a study which we entitled "Climate of San Diego State University (SDSU)'s Campus from the Perspectives of Students of Color." as a way to measure the efficacy of these programs and policies. We purposely sought the perspectives of Students of Color by approaching students from the Cultural Centers at SDSU as well as students from Muslim Student Association (MSA). The MSA was specifically selected due to the documented history of discrimination and harassment against Muslim students on SDSU's campus. The instrument used to conduct the study was a survey which consisted of questions that covered such topics as "Perceived Sense of Belonging," "Classroom Environment," and instances of "Insensitive and Disparaging Remarks" experienced on campus. One interesting finding was that while most students felt comfortable on campus, they were uncomfortable expressing themselves in the classroom. Additionally, a statistically significant bivariate association was observed between "Sense of Belonging" and the perceptions of SDSU's diversity initiatives such as "promotes the appreciation of cultural difference," and "has a long standing commitment to diversity."

495 9:50 am

Institutional Agent Perspectives: The Role of Latinx Servings at HSIs

**Griselda Paredes, Education
(concentration higher education) (M)**

The number of Hispanic Serving Institutions (HSIs) in the United States has increased tremendously, and now HSIs represent 18% of all US institutions (Excelencia in Education, 2022). The emphasis on servingness and informing educators of effective strategies for supporting Latinx students is integral in becoming a designated HSI. Yet, the designation alone provides HSIs with little to no support in achieving a culture of servingness (Malcom-Piqueux & Benisimon, 2015). Institutional agents who have enacted leadership roles and responsibilities for sustaining servingness efforts- are fundamental in supporting Latinx

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student success at HSIs due to this limited support (Espino & Camarillo, 2021; Herrera et al, 2022).

This literature review aims to understand how institutional agents of color contribute to Latinx student success at HSIs when they enact servingness, and what their experiences are like in these roles. In addition, this presentation aims to develop an understanding of what challenges and motivates institutional agents of color while they mobilize efforts to serve Latinx students.

Literature on student outcomes and institutional agents' perspectives was compiled from the databases OneSearch and Google Scholar. Keywords used to find these articles include Latinx student success, faculty perspectives, servingness, mentorship/mentor perspectives, and culturally responsive practices.

Findings show that Latinx institutional agents at HSIs who have cultural similarities to the student communities they serve are often the most effective in providing support (Espino & Camarillo, 2021). They understand how the institutional systems function and the cultural aspects that make it difficult for students to navigate them. They can then use their status and resources to advocate for and support Latinx students (Bensimon et al., 2019). Unfortunately, there is a disproportionately low number of Latinx institutional agents at HSIs and most institutions provide little to no resources or aid. Therefore, there is a need to understand and honor the intentional and directed efforts of institutional agents who commit to servingness, often without institutional support. This literature review will highlight the efforts of institutional agents at HSIs and analyze how institutions can better support and expand intentional practices that contribute to Latinx student success.

496 10:05 am

The Impact of HSIs and Community College-University Partnerships in Creating Experiential Learning Experiences

Elizabeth Vazquez, Masters of Arts in Postsecondary Educational Leadership with a specialization in Student Affairs (M)

Strong institutional relationships in the education field are crucial in establishing and offering resources, such as experiential learning experiences, to underrepresented and racial minority students in STEM (Higgins et al., 2018). Our guiding theoretical framework, Latinx Servingness, was used to understand the various ways Hispanic-Serving Institutions (HSIs) can provide significant resources to underserved minority students (Garcia et al., 2019). Experiential learning (EL), such as undergraduate research or work-based experiences, is an important way to enhance students' academic learning and transfer knowledge to new settings (Hora et al., 2021) through project-based, reflective, and cooperative learning experiences. (Furman & Sibthorp, 2013). Moreover, the collaboration

between community colleges (CCs) and universities are essential in overcoming barriers to creating EL opportunities at CCs (Loeser et al., 2021). There are multiple ways in which CCs can benefit from having strong institutional relationships with universities. For instance, universities help increase the capacity to support experiential learning experiences at CCs (Loeser et al., 2021), offer both mentorship and funding to CC students, and establish experiential learning opportunities for underrepresented CC students in STEM. The purpose of this literature review is to understand the importance of HSIs and CC-university partnerships in creating EL experiences and providing access to STEM higher education for underrepresented and racial minoritized students.

The key finding of our literature review is the importance of community college-university partnerships in creating positive outcomes for students by offering STEM EL opportunities. Literature findings show how students demonstrate STEM persistence through transfer rates in STEM (Ashcroft et al., 2021), graduate school aspirations (Hirst et al., 2014) and STEM major retention (Hirst et al, 2014). Other student outcomes include improvement in research skills (Ashcroft et al., 2021), increase in STEM confidence (Loeser et al., 2021), improved networking opportunities (Stoefer et al., 2021), science identity development (Ashcroft et al., 2021), and self-efficacy (Carpi et al., 2017). The literature on student outcomes was compiled using keywords such as experiential learning, HSI, community college, and internships on the databases EBSCO, OneSearch, and Google Scholar. The importance of these outcomes for underrepresented students in STEM will be further discussed in the presentation.

497 10:20 am

Funding For All The Effect of State Micro Grant Programs for Entrepreneurs in the Inland Empire: Utilizing Study Results from Caravanserai Projects' California Dream Fund Grant Program (2022)

Graciela Moran Moran, Public Administration (M)

Small businesses and entrepreneurs play a large part in California's economy, which contributes to its prosperity. Both new entrepreneurial activity and the opportunity share of new entrepreneurs partially returned to pre-pandemic levels as a sign of the recovery from the widespread economic damage caused by the COVID-19 pandemic. Yet there is a lack of diversity among entrepreneurs in the United States, among the gender gap and a lack of minority owned businesses within the entrepreneurship sector. California has been a key actor in funding minority owned businesses through the State. The California Office of the Small Business Advocate (CalOSBA) created a one-of-a-kind program, the Dream Fund. A \$35 million grant program to seed entrepreneurship and small business creation in the State of California to help tackle the barriers many minority owned entrepreneurs face and provide accessible and fair funding pathways. The Dream Fund merges

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technical assistance and microgrants of up to \$10,000. Despite the importance of funding minority owned small businesses, the current literature has been focused on enterprise creation, whereas innovative avenues of investment in minority owned entrepreneurs have very much gone unexplored.

In this study I partnered with Caravanserai Project, a nonprofit in the Inland Empire providing the Dream Fund to study how funding minority owned entrepreneurs in a fair and innovative approach affects their start up enterprise. In this qualitative study, we examine how Caravanserai Project influences minority owned business owners through innovative funding opportunities such as the Dream Fund. We focused on participants who have completed the program through Caravanserai Project, categorizing the participants through their prospective sectors to capture minority owned businesses within the region. We use a large number of different criteria for measuring the impact these funds create with a subset of questions through interviews and surveys.

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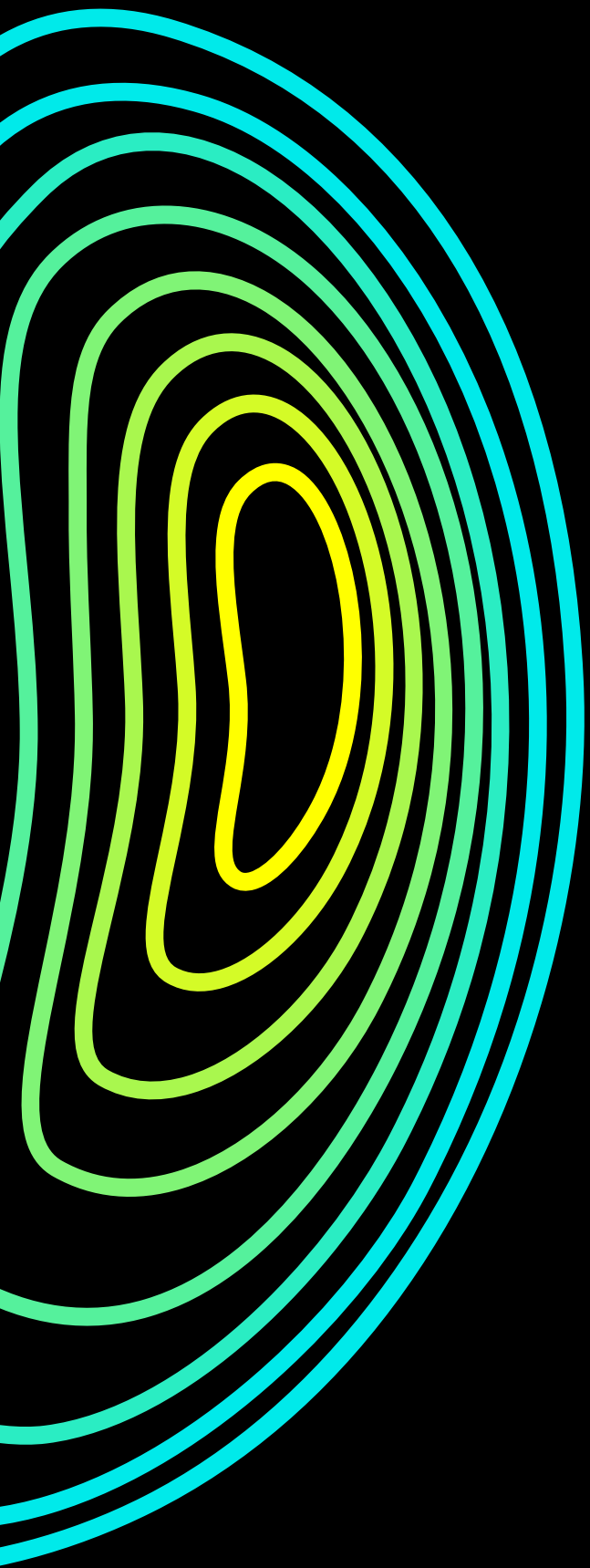
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