13th Annual Student Research Symposium

SRS
STUDENT RESEARCH SYMPOSIUM

Conrad Prebys
Aztec Student Union

February 28 and February 29, 2020

Friday, 8 am - 6 pm
Saturday, 8 am - noon

A Showcase of Student Discovery and Innovation

Celebrating the achievements of SDSU student research, scholarship and creative activity

SAN DIEGO STATE UNIVERSITY

AZTEC PARENTS
SAN DIEGO STATE UNIVERSITY

The PRESIDENT'S LEADERSHIP fund

SAN DIEGO STATE UNIVERSITY
Division of Undergraduate Studies
University Honors Program

Charles Wei-hsun Fu Foundation
傅偉勳

SWB

GOLDEN KEY INTERNATIONAL HONOUR SOCIETY

ΦΚΦ
CHAPTER OF EXCELLENCE

ΠΣΑ

ΦΒΚ

SDSS

13th Annual Student Research Symposium

February 28 and February 29, 2020

Celebrating the achievements of San Diego State University students in research, scholarship & creative activity

SAN DIEGO STATE UNIVERSITY

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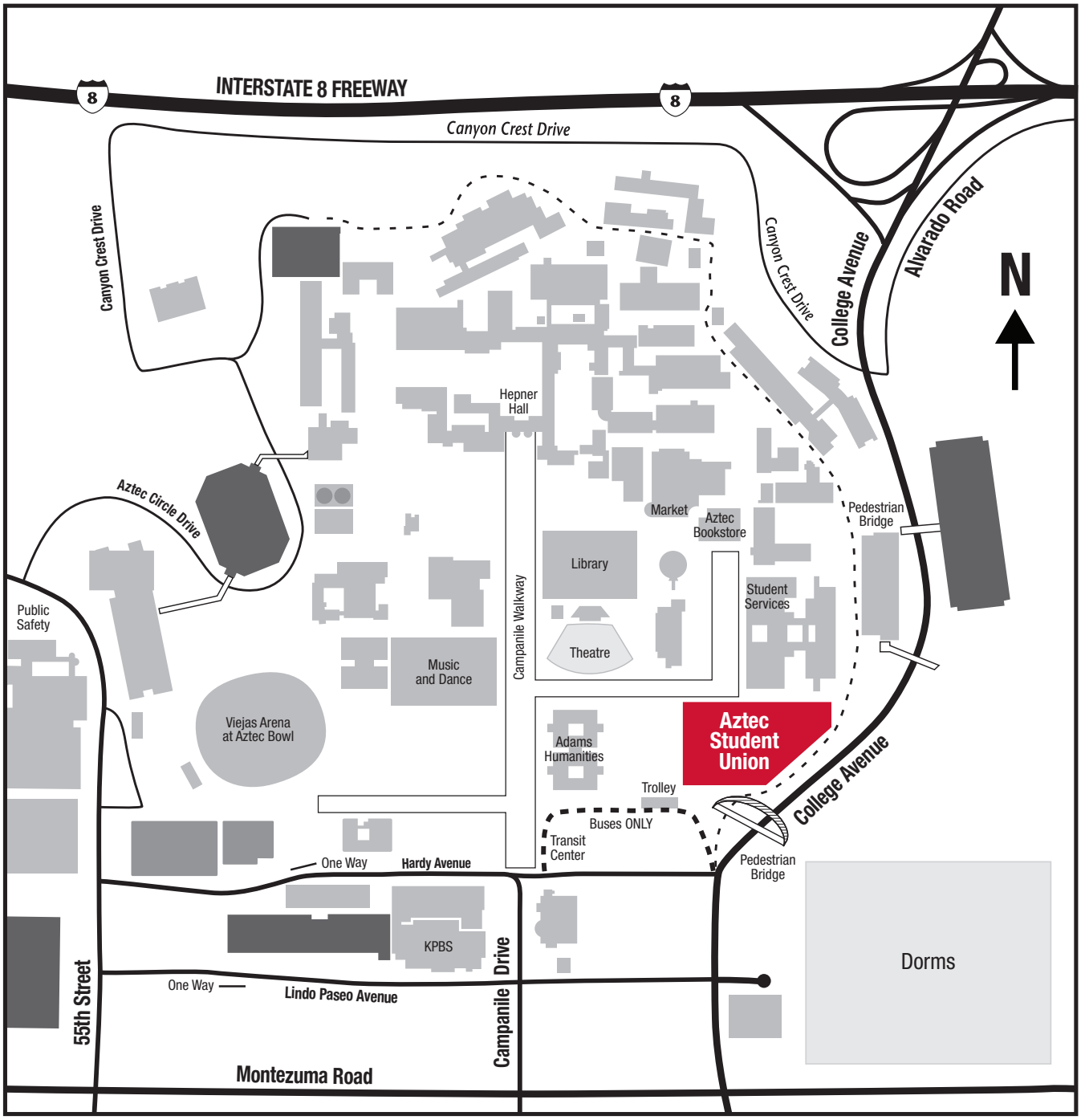
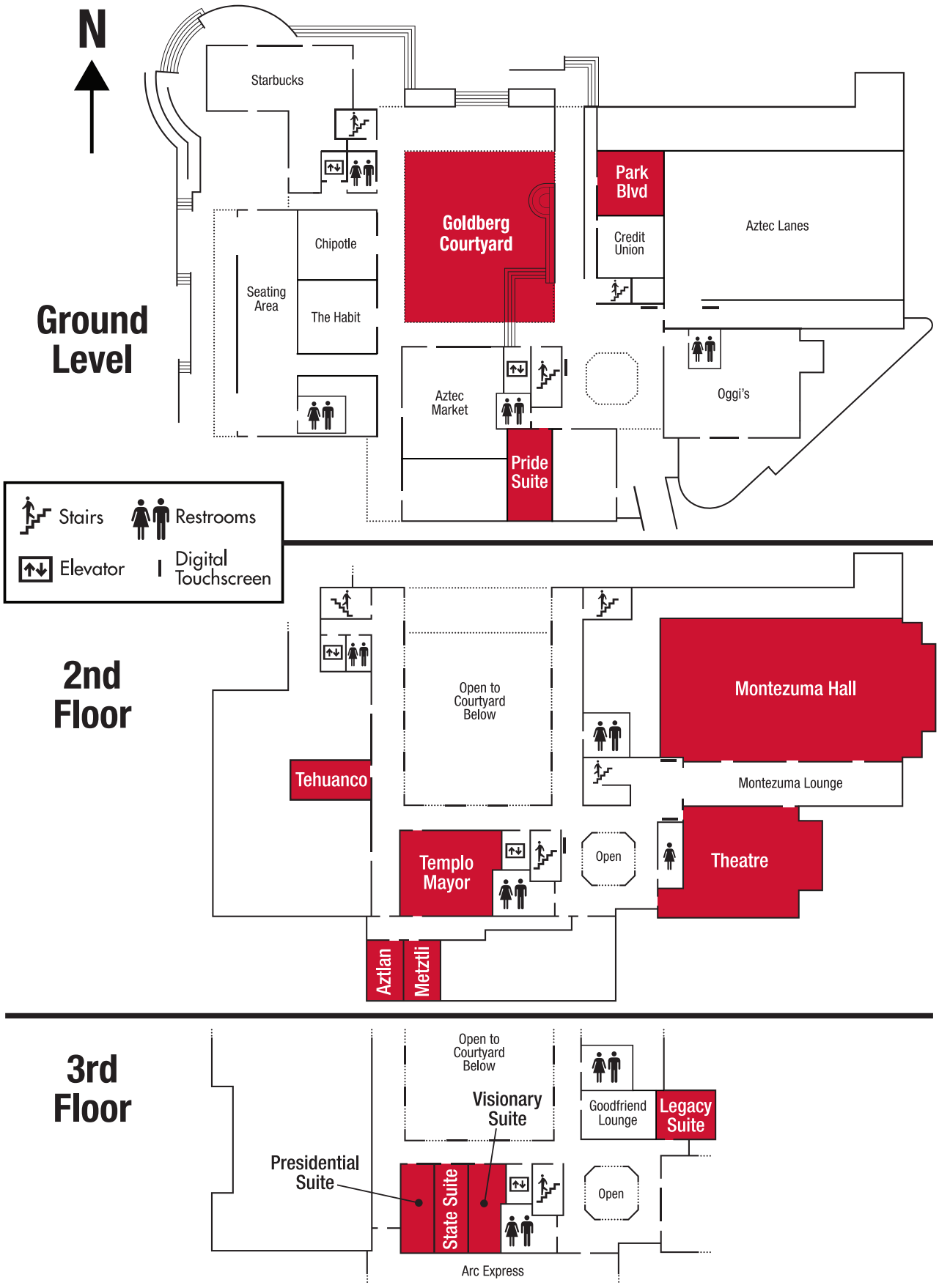
SAN DIEGO STATE UNIVERSITY CAMPUS MAP



AZTEC STUDENT UNION MAP



Dr. Salvador Hector Ochoa
Provost and
Senior Vice President,
San Diego State University

Dr. Salvador Hector Ochoa earned a Ph.D. in School Psychology from Texas A&M University in 1989. Prior to serving as Provost and Senior Vice President for Academic Affairs at San Diego State University, Dr. Salvador Hector Ochoa was professor and dean of the College of Education at The University of New Mexico from 2014 to 2019. He also served as the Dean of the College of Education at The University of Texas Pan American from 2007 to 2014. Dr. Ochoa's research focuses on bilingual psychoeducational assessment and educational programming issues pertaining to Latinx students. He has had input on these issues at both the state and national levels.

Thursday, February 27, 2020 - Registration

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

Friday, February 28, 2020 - Opening Remarks

8:30 am – 9:00 am Stephen Welter, Vice President for Research and Graduate Dean, SDSU, Aztec Student Union, Theatre, Room 270

Friday, February 28, 2020 - Sessions A and B

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

Time	Session Number	Session Type	Session Title	Presentation Location
9:00 am	A01	Oral	Humanities, History, Literature, Philosophy 1	Park Boulevard
	A02	Oral	Behavioral & Social Sciences 1	Tehuanco
	A03	Oral	Physical & Mathematical Sciences 1	Aztlan
	A04	Oral	Engineering & Computer Sciences 1	Metztli
	A05	Oral	Education 1	Templo Mayor
	A06	Oral	Biological & Agricultural Sciences 1	Visionary Suite
	A07	Oral	Interdisciplinary 1	Legacy Suite
9:00 am	A09	Poster	Engineering & Computer Sciences 2	Montezuma Hall
	A10	Poster	Interdisciplinary 2	Montezuma Hall
	A11	Poster	Physical & Mathematical Sciences 2	Montezuma Hall
	A12	Poster	Behavioral & Social Sciences 2	Montezuma Hall
	A13	Poster	Biological & Agricultural Sciences 2	Montezuma Hall
	A14	Poster	Behavioral & Social Sciences 3	Montezuma Hall
	A15	Poster	Education 2	Montezuma Hall
	A16	Poster	Behavioral & Social Sciences 4	Montezuma Hall
	A17	Poster	Engineering & Computer Sciences 3	Montezuma Hall
11:00 am	B01	Oral	Humanities, History, Literature, Philosophy 2	Pride Suite
	B02	Oral	Physical & Mathematical Sciences 3	Park Boulevard
	B03	Oral	Interdisciplinary 3	Tehuanco
	B04	Oral	Behavioral & Social Sciences 5	Aztlan
	B05	Oral	Engineering & Computer Sciences 4	Metztli
	B06	Oral	Interdisciplinary 4	Templo Mayor
	B07	Oral	Health Nutrition & Clinical Sciences 1	Visionary Suite
	B08	Oral	Interdisciplinary 5	Legacy Suite
10:45 am	B09	Poster	Interdisciplinary 6	Montezuma Hall
	B10	Poster	Engineering & Computer Sciences 5	Montezuma Hall
	B11	Poster	Behavioral & Social Sciences 6	Montezuma Hall
	B12	Poster	Health Nutrition & Clinical Sciences 2	Montezuma Hall
	B13	Poster	Physical & Mathematical Sciences 4	Montezuma Hall
	B14	Poster	Behavioral & Social Sciences 7	Montezuma Hall
	B15	Poster	Biological & Agricultural Sciences 3	Montezuma Hall
	B16	Poster	Behavioral & Social Sciences 8	Montezuma Hall

Friday, February 28, 2020 - Sessions C, D and E

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

Time	Session Number	Session Type	Session Title	Presentation Location
1:00 pm	C01	Oral	Humanities, History, Literature, Philosophy 3	Pride Suite
	C02	Oral	Interdisciplinary 7	Park Boulevard
	C03	Oral	Behavioral & Social Sciences 9	Tehuanco
	C04	Oral	Engineering & Computer Sciences 6	Aztlan
	C05	Oral	Interdisciplinary 8	Metztli
	C06	Oral	Behavioral & Social Sciences 10	Templo Mayor
	C07	Oral	Visual or Performing Arts 1	Visionary Suite
	C08	Oral	Engineering & Computer Sciences 7	Legacy Suite
12:30 pm	C09	Poster	Behavioral & Social Sciences 11	Montezuma Hall
	C10	Poster	Behavioral & Social Sciences 12	Montezuma Hall
	C11	Poster	Health Nutrition & Clinical Sciences 3	Montezuma Hall
	C12	Poster	Engineering & Computer Sciences 8	Montezuma Hall
	C13	Poster	Physical & Mathematical Sciences 5	Montezuma Hall
	C14	Poster	Behavioral & Social Sciences 13	Montezuma Hall
	C15	Poster	Engineering & Computer Sciences 9	Montezuma Hall
	C16	Poster	Biological & Agricultural Sciences 4	Montezuma Hall
	C17	Poster	Physical & Mathematical Sciences 6	Montezuma Halll
2:10 pm	D09	Poster	Behavioral & Social Sciences 14	Montezuma Hall
	D10	Poster	Health Nutrition & Clinical Sciences 4	Montezuma Hall
	D11	Poster	Behavioral & Social Sciences 15	Montezuma Hall
	D12	Poster	Engineering & Computer Sciences 10	Montezuma Hall
	D13	Poster	Health Nutrition & Clinical Sciences 5	Montezuma Hall
	D14	Poster	Behavioral & Social Sciences 16	Montezuma Hall
	D15	Poster	Biological & Agricultural Sciences 5	Montezuma Hall
	D16	Poster	Engineering & Computer Sciences 11	Montezuma Hall
	D17	Poster	Physical & Mathematical Sciences 7	Montezuma Hall
4:00 pm	E01	Poster	Behavioral & Social Sciences 17	Montezuma Hall
	E02	Poster	Engineering & Computer Sciences 12	Montezuma Hall
	E03	Poster	Biological & Agricultural Sciences 6	Montezuma Hall
	E04	Poster	Behavioral & Social Sciences 18	Montezuma Hall
	E05	Poster	Health Nutrition & Clinical Sciences 6	Montezuma Hall
	E06	Poster	Physical & Mathematical Sciences 8	Montezuma Hall
	E07	Poster	Biological & Agricultural Sciences 7	Montezuma Hall
	E08	Poster	Behavioral & Social Sciences 19	Montezuma Hallll
9:00 am	F01	Exhibit	Exhibit 1	Montezuma Hall
1:30 pm	G01	Performance Arts	Performance Arts 1	Montezuma Theatre

Saturday, February 29, 2020 - Sessions H

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

Time	Session Number	Session Type	Session Title	Presentation Location
10:00 am	H01	Oral	Humanities, History, Literature, Philosophy 4	Pride Suite
	H02	Oral	Engineering & Computer Sciences 13	Park Boulevard
	H03	Oral	Interdisciplinary 9	Tehuanco
	H04	Oral	Behavioral & Social Sciences 20	Aztlan
	H05	Oral	Behavioral & Social Sciences 21	Metztli
	H06	Oral	Engineering & Computer Sciences 14	Templo Mayor

12:30 pm - 1:30 pm Lunch Reception Goldberg Courtyard

2:00 pm - 3:30 pm Keynote and Award Ceremony

Awards will be presented at the Ceremony on Saturday, February 29, 2020, to recognize the most outstanding presentations of research, scholarship, and creative activity at the Student Research Symposium.

The awards are as follows:

President's Awards for Research

President's Awards of $500 will be given to the ten outstanding presentations in discipline-specific categories. Those receiving a President's Award will represent SDSU at the California State University (CSU) Student Research Competition on April 24 and 25, 2020 at California State University, East Bay.

President's Award for the Arts

A President's Award of $500 will be given to the outstanding presentation in the performance arts or exhibit category. This award is not eligible for the CSU competition.

Dean's Awards

Dean's Awards of $250 each will be given for oral presentations. Awards will go to the top presentations in each college. One award will go to the top presentation from the Imperial Valley Campus.

The Charles Wei-hsun Fu Foundation Award for Research in Philosophy

The Charles Wei-hsun Fu Foundation will award $500 to the best oral presentation in Philosophy.

Library Awards

Several awards from the Library of $250 each (both undergraduate and graduate) will be given for the best projects using library resources and collections, including, but not limited to, printed resources, databases, primary resources, and materials in all media.

Undergraduate Research Excellence Awards

Several undergraduate research will each receive $150 in recognition of their scholarly achievement. These students will be selected from both oral and poster presentations.

Research Awards for Diversity, Inclusion, and Social Justice

Diversity, social justice, and inclusiveness reflect some of the values at the core of our university mission. Four $250 awards will be presented jointly by the Chief Diversity Officer, the Division of Graduate and Research Affairs, and the Division of Undergraduate Studies for the two best undergraduate and two best graduate student research presentations that exemplify our ongoing commitment to diversity, inclusion, and social justice.

Women in Engineering Awards

Two awards will be given for the two best engineering presentation by women.

Awards for the Outstanding Creative and Performing Arts

In addition to the President's Award for the Arts, two awards for outstanding creative and performing arts presentations will be given.

Sustainability Award

The Center for regional Sustainability will award $250 to the best sustainability-related presentation.

A Note About The Awards

Students receiving one award will not be considered for additional awards.

Saturday, February 29, 2020

Reception:

12:00 pm – 1:30 pm, Aztec Student Union, Goldberg Courtyard

Keynote Address and Awards Ceremony:

2:00 – 3:00 pm, Aztec Student Union, Montezuma Hall

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

Awards Ceremony 2020 Student Research Symposium

Welcome
Keynote Address
Awards*

Undergraduate Research Excellence Awards

Research Awards for Diversity, Inclusion and Social Justice

Philosophy Award

Library Awards

Sustainability Award

Women in Engineering Awards

Awards for Outstanding Creative & Performing Arts

Women in Business Award

Deans Awards

Provost's Awards

President's Awards

Closing Remarks

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

SCRS

Creative Arts Exhibits and Presentations

Friday, February 28, 2020

Sessions F and G

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

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Friday, February 28, 2020
Session F: Creative Arts Exhibits

Session F-1

Exhibit 1
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

488 **9:00 am**
History of surbversive music of Brazil
John Mollet, History (U)

489 **9:00 am**
Use of Virtual Reality in Geographic Education
Christian Mejia, Geography (M)

Friday, February 28, 2020
Session G: Creative Arts Presentations

Session G-1

Performance Arts Performance Arts 1
Friday, February 28, 2020, 1:30 pm
Location: Montezuma Theater

490 **1:30 pm**
Worship of a Decaying Martyr
William Lambert, Creative Writing (M)

491 **1:45 pm**
Mesmerized: A 3'13" Serialism Piece about Today's Distracted Students
Andres Wong, Music Professional Studies (U)

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SRS

Oral Presentations

Friday, February 28, 2020

Sessions A, B and C

Saturday, February 29, 2020

Sessions H

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

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Friday, February 28, 2020
Session A: Oral Presentations

Session A-1

Oral Humanities, History, Literature, Philosophy 1
Friday, February 28, 2020, 9:00 am
Location: Park Boulevard

100 9:00 am
Victims of the Stasi: Their Trauma and What the World Can Learn From It
Emily Rascon, European Studies (U)

101 9:15 am
"Rape Me": Grunge Politics of Apathy, Trauma, and Sexual Violence
Andrea Alvarado, History (M)

102 9:30 am
Technology, Transportation, and Tourism: Changing Activity Patterns at the Nathan Harrison Archaeological Site
Jamie Bastide, Anthropology (M)

103 9:45 am
Enigmatic Tins at the Harrison Site: A Foundation for an Archaeological Chemical Signature Reference Collection for 1800s-1900s Medicinal Patents
Natalia Galeana, Anthropology (M)

104 10:00 am
Illuminating Interviews: The South African Jews in Southern California Oral History Project
Shannon Farnsworth, Anthropology (M)

105 9:00 am
Detection of brain activity associated with lexical retrieval: an analysis of intracranial electroencephalographic data in picture naming
Michelle FungSpeech, Language and Hearing Sciences (M)

Session A-2

Oral Behavioral & Social Sciences 1
Friday, February 28, 2020, 9:00 am
Location: Tehuanco

106 9:15 am
The Relationship between Language Impairment and Cerebral Blood Flow: Evidence from Chronic Hypoperfusion in Aphasia
Noelle Abbott, Language and Communicative Disorders (D)

107 9:30 am
Are all word relationships processed equally in our brains?
Elizabeth Anderson, Language and Communicative Disorders (D)

108 9:45 am
Characterizing grammatical productivity in Spanish-English bilingual children
Alicia Escobedo, Language and Communication Disorders (D)

109 10:00 am
Matching pictures and signs: an ERP study of the locus of the effects of iconicity and structural alignment in American Sign Language
Meghan McGarry, Speech, Language and Hearing Sciences (D)

Session A-3

Oral Physical & Mathematical Sciences 1
Friday, February 28, 2020, 9:00 am
Location: Aztlan

110 9:15 am
Designed Synthesis of Small Molecules Active Against Hepatitis C Virus
Kevin Walsworth, Chemistry (D)

111 9:30 am
Developments towards Total Synthesis of Lagunamide A
Monny Singh, Chemistry (DI)

112 9:45 am
Nucleophilic Substitution Methodologies Towards Pharmaceutically Relevant Atropisomers
Mariel Cardenas, Chemistry (D)

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113 **10:00 am**
Simulating the Interaction of Silver Nanoparticles with Silicon Solar Cells
Martha Zepeda Torres, Chemistry (D)

114 **10:15 am**
Regioselective Electrophilic Aromatic Substitution of Phenols and Anilines via Lewis base catalysis
Andrew Dinh, Chemistry (D)

Session A-4

Oral Engineering & Computer Sciences 1
Friday, February 28, 2020, 9:00 am
Location: Metztli

115 **9:00 am**
Prandtl-D Aerodynamic Load and Induced Thrust Validation using Stereoscopic PIV Wind Tunnel Measurements
Bradley Zelenka, Aerospace Engineering (M)

116 **9:15 am**
Flow Visualization of Patient-Specific Right Heart Models in a Mock Circulatory Loop
Jacob Steiner, Bioengineering (M)

117 **9:30 am**
Wind tunnel testing for hydrodynamic load characterization of icosahedron-shaped coral reef arks
Mohamed Amine Abassi, Aerospace Engineering (D)

118 **9:45 am**
Aortic insufficiency during Heartmate3 Left Ventricle Assist Device support: a mock loop study
Vi Vu, Mechanical and Aerospace Engineering (D)

119 **10:00 am**
Hermeneutic Quran Classification using Machine Learning
Dhaha Nur, Big Data Analytics (M)

120 **10:15 am**
Economic Wireless Multimedia ommunication QoE Modeling: A Prospect Game-Theoretic Approach
Krishna Murthy Kattiyan Ramamoorthy, Computational Science (D)

Session A-5

Oral Education 1
Friday, February 28, 2020, 9:00 am
Templo Mayor

121 **9:00 am**
Collaboratively Cognitive: High School Students' Perceptions of Collaborative Problem-Solving
Al Schleicher, Education (D)

122 **9:15 am**
Students' Personal Concept Definitions of Linear Independence
Ernesto Calleros, Mathematics and Science Education (D)

123 **9:30 am**
Defining as an Introduction to Set Theory
Michael Foster, Math and Science Education (D)

124 **9:45 am**
Visualizing Girlhood
Darielle Blevins, Education (D)

125 **10:00 am**
Unpacking LGBQA: Experiences and Supports or Queer Spectrum Students in Math
Matthew Voigt, Math and Science Education (D)

Session A-6

Oral Biological & Agricultural Sciences 1
Friday, February 28, 2020, 9:00 am
Visionary Suite

126 **9:00 am**
Analyzing trophic structure of island ecosystems using stable isotopes: what is the role of nutrient subsidies from seabird nesting and foraging behavior?
Ana Gomez Ramirez, Biology (U)

127 **9:15 am**
An integrative approach to assess the conservation status of the binationally distributed Mission Manzanita (Xylococcus bicolor)
Kyle Gunther, Evolutionary Biology (M)

128 **9:30 am**
What can Phyloregionalization tell us about Middle American Herpetofauna? Region Formation Utilizing the Evolutionary History of Reptiles and Amphibians
Dillon Jones, Evolutionary Biology (M)

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129 **9:45 am**
An investigation of a hybrid zone using geographic cline analysis
Aubtin Rouhbakhsh, Biology (U)

130 **10:00 am**
Metabolic Serum Profile of Three Captive Shark Species
Asha Goodman, Cellular and Molecular Biology (D)

Session A-7

Oral Interdisciplinary 1
Friday, February 28, 2020, 9:00 am
Location: Legacy Suite

131 **9:00 am**
Sociodemographic, Psychosocial, and Behavioral Correlates of Medical Mistrust in Latino Sexual Minority Men
Isaiah Jones, Psychology (U)

132 **9:15 am**
Sociodemographic and Behavioral Factors Associated with Students' Initiation of the MenB Vaccine During a University Outbreak
Nicholas Lucido, Public Health (U)

133 **9:30 am**
Traditional Machismo, Caballerismo, and the Pre-exposure Prophylaxis (PrEP) Cascade among a Sample of Latino Sexual Minority Men
David Rivera, Psychology (U)

134 **9:45 am**
"Dude, check yourself": A Quantitative Analysis of Mental Health in Masculine Same-Sex
Stetler Brown, Communication Studies (M)

135 **10:00 am**
Sex You Want: PrEP Campaign Messages and Safe-Sex Intention
Gumaro Sanudo, Communication (M)

136 **10:15 am**
Vaccination and Healthcare Mistrust Among Low Socioeconomic Minority Adults
Cassandra Wilson, Anthropology (M)

Friday, February 28, 2020
Session B: Oral Presentations

Session B-1

Oral Humanities, History, Literature, Philosophy 2
Friday, February 28, 2020, 11:00 am
Location: Pride Suite

195 **11:00 am**
State, Sect, or Sons: Iraqi Identities as Byproducts of Sociopolitical Structures
Abdullah Haki, Political Science (U)

196 **11:15 am**
Koi Kaleidoscope
Diana Phan, Creative Writing (M)

197 **11:30 am**
Othering Eastern Women in Frankenstein
Reyam Rammahi, English and Comparative Literature (M)

198 **11:45 am**
The German Reunification War Scare
Eugene Phillips, History (M)

199 **12:00 pm**
Sugar and Spice and Women's Rights: The Historiography of US Women's Rights Groups during The Women's Liberation Movement of the 1960s to 1980
Jade Connolly-Cepurac, History (M)

Session B-2

Oral Physical & Mathematical Sciences 3
Friday, February 28, 2020, 11:00 am
Location: Park Boulevard

200 **11:00 am**
Constraints on the Properties of Superdense Matter from Astrophysical Observations of Neutron Stars
Kara Whitaker, Physics (U)

201 **11:15 am**
Using computational modeling to predict pulmonary function in cystic fibrosis lungs
Amanda Lee, Mathematics (U)

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202 11:30 am
Improving Foreground Modeling in Searches for the 21cm Reionization Signal
Kelcey Davis, Astronomy (U)

203 11:45 am
Ultraviolet and visible photoluminescence of aluminum-doped zinc oxide multilayered metamaterial
Bethany Campbell, Physics (M)

204 12:00 pm
A mathematical model describing the role embryonic nutrition plays in overall growth
Ashley Schwartz, Applied Mathematics (M)

Session B-3

Oral Interdisciplinary 3
Friday, February 28, 2020, 11:00 am
Location: Tehuanco

205 11:00 am
Role of E3 ubiquitin ligases Mindbomb and Neuralized in tissue regeneration
Madison Balagtas, Cellular and Molecular Biology (U)

206 11:30 am
The relative timing of population growth and urban land use change – A case study of north Taiwan from 1990 to 2015
Hsiao-chien Shih, Geography (D)

207 11:45 am
Mimicking Fibrosis and Inducing Stress into iPSC-Derived Cardiomyocytes
Emily Morgan, Biology (U)

208 12:00 pm
Inhibition of enzymatic browning during protein isolation from mealworm (Tenebrio molitor) larvae
Alexandra Rosenbloom, Foods and Nutrition (U)

209 12:15 pm
Identifying new regulation strategies of isocitrate dehydrogenase 1
Alexandra Strom, Biology (U)

210 12:30 pm
The effect of post translational modification on isocitrate dehydrogenase 1 (IDH1)
Viraj Upadhye, Biology (U)

Session B-4

Oral Behavioral & Social Sciences 5
Friday, February 28, 2020, 11:00 am
Location: Aztlan

212 11:15 am
Navigating a Sea of the Unexpected: A Quantitative Analysis of Message Manipulation through EVT
Stephany Rojas Hidalgo, Communication (M)

213 11:30 am
“Like” Meme or Not, Sex is Important: A Quantitative Study of Sex-Positive Meme Diffusion
Laura Horton, Communication (M)

214 11:45 am
Silver Linings Breakup: A Quantitative Analysis of Social Support Received From Friends Pre- and Post-Romantic Relationship Dissolution
Courtney Meissner, Communication (M)

215 12:00 pm
Hispanic Students’ Perceived Prejudice in the Health Care Setting
Evelyn Puga, Communication (M)

216 12:15 pm
Examining Organizational Readiness Determinants Using the Consolidated Framework for Implementation Research (CFIR) Framework in FQHCs to Implement Health Promotion Programs
Sophia Rodriguez, Public Health/Latin American Studies (M)

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Session B-5

Oral Engineering & Computer Sciences 4
Friday, February 28, 2020, 11:00 am
Location: Metztli

217 11:00 am
New Generation of Multi-Modal Spinal Neural Probes for Epidural Stimulation
Rita Hanna, Bioengineering (M)

218 11:15 am
Mechanobiology of the LVAD-assisted heart
Frances Lagarda, Bioengineering (M)

219 11:30 am
Lactic Acid Neurotransmitter Detection using Functionalized Glassy Carbon Microelectrodes
Amish Rohatgi, Bioengineering (M)

220 11:45 am
Nano-SCALPEL: Nanoparticle Spinning Cutting, Ablation, Lysis in Plasma Environmental Liquid for blood clot removal
Sherwin Navindaran, Bioengineering (M)

221 12:00 pm
Glass-Based Microfabrication of Rare Cell Capture Chips
Kevin Peguero-Garcia, Mechanical Engineering (M)

222 12:15 pm
New Platform for Detecting Non-Electroactive Neurotransmitters – Case of Glutamate
Sandra Lara Galindo, Bioengineering (M)

223 12:30 pm
Fabrication of Ceramic Bone Scaffolds by Solvent Jetting 3D Printing and Sintering Towards Load-Bearing Applications
Maricruz Carrillo, Mechanica/Aerospace Engineering (D)

Session B-6

Oral Interdisciplinary 4
Friday, February 28, 2020, 11:00 am
Location: Templo Mayor

224 11:00 am
Accurate Identification of Endangered Fairy Shrimp: It's All Coming Into Focus
Andrea Albarran, Biology (U)

225 11:15 am
Development of unisexual flower by abortion in Cylindropuntia wolfii
Amy Orduño-Baez, Biology (U)

226 11:30 am
Improving plant viability using methanotrophs with Boechera depauperata
Ruth Epstein, Biology (U)

227 11:45 pm
Ferocactus gatesii & F. cylindraceus
Julia Gomez, Biology (U)

228 12:00 pm
An In Vitro Assay to Test for Viral Proteolytic Activity on Host Proteins
Nina Barr, Cellular and Molecular Biology (M)

229 12:15 pm
Development of a cell-based assay to monitor the activities of the Chikungunya Viral Capsid Protein to identify potential antivirals
Alex Escobar, Cellular and Molecular Biology (M)

230 12:30 pm
What is causing the reduced seed production in Cylindropuntia wolfii?
Niveditha Ramadoss, Biology (D)

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Session B-7

Oral Health Nutrition & Clinical Sciences 1
Friday, February 28, 2020, 11:00 am
Location: Visionary Suite

231 11:00 am
Pulsed 450 nm blue light suppresses MRSA and Propionibacterium acnes in planktonic cultures and bacterial biofilms
Paulina Cortez, Biology (U)

232 11:15 am
Postural Control Deficits in Atypical Parkinsonism: Pilot Case Series
Kathleen Dillon, Kinesiology (U)

233 11:30 am
Impact of Blood Flow Restriction Training on Patellar Tendon Stiffness and Patient Outcomes-A Pilot Study of Short-Term Effects
Freddy Gonzalez, Kinesiology (U)

234 11:45 am
Imposed Expiratory Resistance and Pulmonary Function in Young Healthy Volunteers
Monica Bari, Exercise Physiology (M)

Session B-8

Oral Interdisciplinary 5
Friday, February 28, 2020, 11:00 am
Location: Legacy Suite

235 11:00 am
Hands on Exploration of Air Pollution in Three Regions in India: Agra, Delhi, and Odisha
Harmit Chima, Statistics (U)

236 11:15 am
Microfabrication and Characterization of an On-chip Reference Electrode for Neural Probes
Marina Buezo, Bioengineering (M)

237 11:30 am
A comparison of oral hygiene behaviors among Mexican-origin, young adult men and women
Melissa Yu, Health Promotion and Behavioral Science (M)

238 11:45 am
Assessing Marine Endocrine Disrupting Chemicals in the Critically Endangered California Condor: Implications for Reintroduction to Coastal Environments
Margaret Stack, Environmental Health (M)

527 12:00 pm
Spatial Distributions Effect on the Evolution of Arbutus in North America
Alexandra McElwee-Adame, Evolutionary Biology (M))

Friday, February 28, 2020
Session C: Oral Presentations

Session C-1

Oral Humanities, History, Literature, Philosophy 3
Friday, February 28, 2020, 1:00 pm
Location: Pride Suite

289 1:00 pm
Creation of a Narrative: The Cultural Ostracization of Monastic Figures in Renaissance and Early Modern Europe
Christopher Balingit, History (U)

290 1:15 pm
History of El Asalto a las Tierras in the Mexicali Valley of Baja California Continued
Rigoberto Gerardo, Social Science (U)

291 1:30 pm
Yesterday's Brew: Beer and Society in San Diego, 1860 - 1920
Alec Whitson, History (M)

292 1:45 pm
From the Campus to the Community: The Struggle for Gay and Lesbian Rights in 1970s San Diego
John Gove, History (M)

293 2:00 pm
Exploring Approaches to Examining Government Managed Healthcare in Mexico City
Jorge Juarez, Communication (M)

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Session C-2

Oral Interdisciplinary 7
Friday, February 28, 2020, 1:00 pm
Location: Park Boulevard

294 1:00 pm
Using Transmission Electron Microscopy to investigate the effect of pulsed 450 nm blue light on methicillin-resistant Staphylococcus aureus
Chynna Bowman, Biology (U)

295 1:15 pm
Inhibition of RET via Pralsetinib in an in vitro Model of Neuroblastoma
Jessica Gutierrez, Biology (U)

296 1:30 pm
Examining the role of High Mobility Group Box 1 (Hmgb1) in cardiomyocyte senescence
Jeffrey Jones, Biology (U)

297 1:45 pm
Human iPSC-derived senescent microglia as a screening platform for Alzheimer's disease therapeutics
Carolina Cano Macip, Cellular and Molecular Biology (U)

298 2:00 pm
Discovering Bacteriophages in the Human Gut
Melissa Giluso, Bioinformatics/ Medical Informatics (M)

299 2:15 pm
The Efficacy of VAX014 in the B16F10 Mouse Model: A Novel Oncolytic Immunotherapy for Melanoma
Katherine Reil, Cell and Molecular Biology (M)

Session C-3

Oral Behavioral & Social Sciences 9
Friday, February 28, 2020, 1:00 pm
Location: Tehuanco

300 1:00 pm
"I wish I had more time, I felt a little rushed": Miscommunication Inhibiting Success in Students' Academic Plan
Nicole Deis, Health Communication (U)

301 1:15 pm
National Identity in Israel and its Relation to Inequality and Conflict
Brenden Hawk, Environmental Engineering (U)

302 1:30 pm
Organizational communication: Jersey Mike's Subs
Asia Smith, Philosophy (U)

303 1:45 pm
Recognizing, Respecting, and Reaffirming Indigenous Lands: Exploring San Diego State University's Newly Established Land Acknowledge Statement
Lane Yazzie, Interdisciplinary Studies (U)

304 2:00 pm
Women Facing Homelessness and Vulnerability: An Assessment at a Large Public Library in San Diego
Janny Li, Social Work (M)

305 2:15 pm
Framing Coast Guard Press Releases: Examining the PR Practitioner - Journalist Relationship and Multimedia Applications
Robert Simpson, Mass Communications (M)

Session C-4

Oral Engineering & Computer Sciences 6
Friday, February 28, 2020, 1:00 pm
Location: Aztlan

306 1:00 pm
Los Penasquitos Black Mountain
Raghad Hashim, Civil Engineering (U)

307 1:15 pm
Design, Microfabrication, and Characterization of Bismuth and Glassy Carbon Based Sensor for Heavy-Metal in Drinking Water
Ryan Butler, Bioengineering (M)

308 1:30 pm
Rainwater Harvesting in Southern California
Cheyenne Graves, Water Resources Engineering (M)

309 1:45 pm
Urban Fire Effects on Hydrologic and Soil Mercury Processes in a San Diego Creek
Quinn Alkin, Civil Engineering (M)

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310 2:00 pm
Using Floating-Gate MOS as a Non-Volatile Analog Memory for Energy-Efficient Adaptive Thresholding in ECG Sensors
Cihan Gungor, Electrical and Computer Engineering (D)

311 2:15 pm
SVM-based Channel Estimation and Data Detection for Massive MIMO Systems with One-Bit ADCs
Van Ly Nguyen, Computational Science (D)

529 2:30 pm
Novel Terahertz Spectroscopy In-situ Dynamic Mechanical Loading for Polymer Characterization
Nha Uyen Huynh (D)

Session C-5

Oral Interdisciplinary 8
Friday, February 28, 2020, 1:00 pm
Location: Metztli

312 1:00 pm
Portrayal of Migrants in the Media
Franklin Robles, Criminal Justice (U)

313 1:15 pm
Corruption at the US-Mexico Border: Qualitative Analysis of Official Documents
Eduardo Villa, Criminal Justice (U)

314 1:30 pm
Spending Habits Revealed Through Prosody
Tanya Ortiz, Communication (U)

315 1:45 pm
Court Cases, Plagiarism, and the Ability to Decipher Music Examples
Andrew Michel, Music-Global Composition (M)

316 2:00 pm
The Problem of Information Technology
Dustin Gray, Philosophy (M)

Session C-6

Oral Behavioral & Social Sciences 10
Friday, February 28, 2020, 1:00 pm
Location: Templo Mayor

317 1:00 pm
How Student Workers at SDSU Manage their Professional Fronts when Lacking Audience Segregation
Alina Aguirre, Criminal Justice (U)

318 1:15 pm
he Impact of Specific Dimensions of Gender Sexuality Alliance Participation on Academic Outcomes Among LGBTQ+ High School Students
Talia Kieu, Public Health (U)

319 1:30 pm
The Associations between Sexual Assault, Sexual Exploitation and Greek Affiliation
Christian Cacho, Social Work (M)

320 1:45 pm
Parent-Therapist, Youth-Therapist, Parent-Youth & Parent-Youth-Therapist Agreement on Externalizing & Internalizing Treatment Goals Related to Treatment Engagement in Latinx Families
Devynne Diaz, Psychology (M)

321 2:00 pm
Pathways to Student Leadership Within High School Gender Sexuality Alliances
Fitri Wijaya, Public Health (M)

322 2:15 pm
HIV Stigma in HIV-positive people in Rural Uganda: a psychometric evaluation of HIV Stigma Mechanisms Scale (HIV-SMS)
Alexandra Almeida, Substance Use (D)

Session C-7

Oral Visual or Performing Arts 1
Friday, February 28, 2020, 1:00 pm
Location: Visionary Suite

323 1:00 pm
Zilphia Horton: Connecting Church Life, Labor Organizing, and the Civil Rights Movement through Music
Willow Lark, Music (U)

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324 1:15 pm
The Effect of Materials on the Western Concert Flute Tone
Anna Sharp, Flute Performance (M)

325 1:30 pm
Parallels in the lives Rachmaninoff and Tchaikovsky through their mental illness and symphonies The Bells and Pathetique
Nick Newman, Choral Conducting (M)

326 1:45 pm
Memorizing Piano Music for Performance: A Qualitative Analysis of the Most Effective Techniques
Nancy Coto, Piano Performance (M)

327 2:00 pm
Building the Pipeline: A Proposed Curriculum for a Graduate Certificate in Musical Theatre Education and Direction
Devon Hunt, Musical Theatre (M)

Session C-8

Oral Engineering & Computer Sciences 7
Friday, February 28, 2020, 1:00 pm
Location: Legacy Suite

328 1:00 pm
Investigating Stress-Induced Domain Switching in Piezoelectric Materials
Steven Malley, Mechanical Engineering (U)

329 1:15 pm
Electron and Hole Mobility in Graphene and Glassy Carbon-Based Transistors
Trevor Hunt, Bioengineering (M)

330 1:30 pm
Fracture Behavior of Concentric Multiferroic Composite Cylinders
Ryan Stampfli, Mechanical Engineering (M)

331 1:45 pm
Deformation nanomechanics and dislocation quantification at the atomic scale in nanocrystalline pure-metal magnesium
Md. Shahrier Hasan, Engineering Science/ Mechanical and Aerospace (D)

332 2:00 pm
Electrical-mechanical-magnetic properties of Terfenol-D particulate embedded in PVDF-TrFE matrix composites
Scott Newacheck, Mechanical Engineering (D)

333 2:15 pm
Preliminary Characterization of Glassy carbon and Graphene based Metamaterial
Surabhi Nimbalkar, Bioengineering (D)

Saturday, February 29, 2020
Session H: Oral Presentations

Session H-1

Oral Humanities, History, Literature, Philosophy 4
Saturday, February 29, 2020, 10:00 am
Location: Pride Suite

492 10:00 am
Film as medium for sustainability
Sebastian Frias, Philosophy (U)

493 10:15 am
Shame and Misogyny
Tawny Whaley, Philosophy (M)

494 10:30 am
Realizing Consciousness Through the Metaphysical Model of Physiophenomenalism
Brian Archibald, Philosophy (M)

495 10:45 am
Believing and Acting Responsibly
Brandon Walton, Philosophy (M)

496 11:00 am
Edna and Lois: A Look at the Lives, Times, and Writings of a Mother and Daughter in National City
Albert Contreras Jr., History (M)

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Session H-2

Oral Engineering & Computer Sciences 10
Saturday, February 29, 2020, 10:00 am
Location: Park Boulevard

497 10:00 am
The Effects of Gravity on the Combustion of Thermally-Thin PMMA in a Narrow Channel
Lucas Massey, Mechanical Engineering (U)

498 10:15 am
Infrared Examinations of Preheating in imulated Microgravity Flamespread
Michael Berry, Mechanical Engineering (M)

499 10:30 am
Implementation of SpraySyn, a standardized spray flame nanoparticle synthesis system
Helena Rodriguez Fernandez, Mechanical Engineering (M)

500 10:45 am
Synthesis of Manganese Oxide Nanoparticles in Flames
Shruthi Dasappa, Engineering Sciences (D)

501 11:00 am
High Quality Video Compression and Reconstruction
Patrick Perrine, Computer Science (U)

502 11:15 am
BRIC: Locality-based Encoding for Energy-Efficient Brain-Inspired Hyperdimensional Computing
Justin Morris, Computer Engineering (D)

Session H-3

Oral Interdisciplinary 9
Saturday, February 29, 2020, 10:00 am
Location: Tehuanco

503 10:00 am
A Qualitative Understanding of the Migration Experience in Mexico
Martin Ibarra, Health Promotion & Behavioral Science/ Latin American Studies (M)

504 10:15 am
Dungeons & Dragons Player Differences
Nathaniel Rogers, Communication (M)

505 10:30 am
The Effect of Traumatic Brain Injury Prevention Laws on Youth Sports Participation
Oren Rosenberg, Economics (M)

506 10:45 am
Praying the Hurt Away: The Impact of Evangelical Values on Seeking Mental Health Support
Kara Sutton, Communication (M)

507 11:00 am
Distributor agreements and the location and branding of unhealthy products within food stores
Petrona Gregorio-Pascual, Public Health, Health Behavior (D)

508 11:15 am
Investigating the mechanism of a bacterial protein that induces animal metamorphoses
Milagros Esmerode, Cellular and Molecular Biology (U)

Session H-4

Oral Behavioral & Social Sciences 20
Saturday, February 29, 2020, 10:00 am
Location: Aztlan

509 10:00 am
An Inbred Strain Comparison of Alcohol Consumption in Neonatal Mice
Kiley Borchard, Psychology (U)

510 10:15 am
The Effects of Prenatal Alcohol and THC Vapor Exposure on Anxiety
Jaclyn Hanson, Psychology (M)

511 10:30 am
Psychometric Properties and Validation of the Self-Reported Offending Measure among Justice-Involved Youths
Sarah Chavez, Interdisciplinary Research on Substance Use (D)

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512 10:45 am
Effects of changes in binge drinking on attention, learning and memory
Nafisa Ferdous, Interdisciplinary Research on Substance Use (D)

513 11:00 am
Homeless and Polysubstance Use:
A Qualitative Study on Treatment Access Solutions
Melanie Nicholls, Interdisciplinary Research on Substance Use (D)

Session H-5

Oral Behavioral & Social Sciences 21
Saturday, February 29, 2020, 10:00 am
Location: Metztli

514 10:00 am
Sex differences in tobacco use among Mexican-origin young adults
Gabriella Corralejo, Public Health (U)

515 10:15 am
Establishing a Qualitative Understanding of the Drinking Water and Sanitation Infrastructure in Rural Oaxaca, Mexico
Alexandra Fox, Environmental Health/Latin American Studies (M)

516 10:30 am
The Right to Health Care: Central American Asylum Seekers in Chiapas, Mexico
Ivette Lorona, Health Promotion & Behavioral Science/Latin American Studies (M)

517 10:45 am
Dental anxiety and dental utilization among Mexican-origin adults on the US-Mexico border.
Logan Okawachi, Health Promotion and Behavioral Science (M)

518 11:00 am
Medical pluralism and factors influencing health care decision making in a rural Paraguayan community
Jennifer Schneider, Health Promotion & Behavioral Science/Latin American Studies (M)

519 11:15 am
Perceptions and Attitudes on the Increase of Caesarean Section Within Oaxaca
Amelia Torres, Public Health/Latin American Studies (M)

Session H-6

Oral Engineering and Computer Sciences 13
Saturday, February 29, 2020, 10:00 am
Location: Templo Mayor

520 10:00 am
IoT-Based Remote Data Collection and Monitoring System for Organic Solar Cells
Liam Slimmon, Electrical and Mechanical Engineering (U)

521 10:15 am
Graphene Quantum Dots
Arantxa Gomez Ferrer, Aerospace Engineering (U)

522 10:30 am
Power Point
Omar Nunez Cuacuas, Mechanical Engineering (M)

523 10:45 am
Heliostat Field Design Study for the Small Particle Heat Exchange Receiver
Steven Webb, Mechanical Engineer (M)

524 11:00 am
Optical Design of a Solar Flux Uniformity Corrector for a Combined PV-T Receiver
Raymond Smith, Mechanical Engineering (M)

525 11:15 am
Techno-Economic Analysis for Wave Energy Conversion Devices Designed for the United States West Coast
Omri Paran, Engineering (M)

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SRS

Poster Presentations

Friday, February 28, 2020

Sessions A, B, C, D and E

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

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Friday, February 28, 2020
Session A: Poster Presentations

Session A-9

Poster Engineering & Computer Sciences 2
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

137 **9:00 am** A
Data Analysis of Passenger Counts at SDSU Shuttles Stops
Emmanuel Millan, Civil Engineering (U)

138 **9:00 am** B
Optimal Emergency Planning for Urban Drone Traffic
Kevin Ayala, Aerospace Engineering (U)

139 **9:00 am** C
Trajectory Prediction at Intersections Using Inverse Reinforcement Learning
Mohammad Sadegh Jazayeri, Civil Engineering (M)

140 **9:00 am** D
Assessing the Safety Impact of a Narrow Automated Vehicle-Exclusive Reversible Lane on an Existing Smart Freeway
Anagha Katthe, Civil Engineering (M)

141 **9:00 am** E
Developing an Intelligent Transportation Management Center (ITMC) with a Safety Evaluation Focus
Alireza Darzian Rostamil, Transportation Engineering (M)

142 **9:00 am** F
Behavior modeling of drivers in the presence of automated vehicles-exclusive lanes
Aryan Sohrabi, Computational Science (M)

143 **9:00 am** G
Python Simulation of Core Autonomous Robot Functionality and Algorithms
Onat Gungor, Electrical and Computer Engineering (D)

Session A-10

Poster Interdisciplinary 2
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

144 **9:00 am** H
Factors Explaining High Mortality Rates Among Hispanics after Melanoma Diagnosis
Marlene Crespo, Psychology (U)

145 **9:00 am** I
Assessment of developmental toxicity from embryonic exposures to the emerging contaminant Tris(4-chlorophenyl)methanol (TCPMOH)
Julian Navarrete, Biology (U)

146 **9:00 am** J
Assessment of e-vape waste as a contaminant and hazardous waste material and creating recommendations for its proper disposal based on components of the product
Hailey Weinberg, Environmental Science (U)

147 **9:00 am** K
Relationships between digital deterrents and access to health information among older adults
Jeffrey Jimenez, Public Health, Health Management and Policy (M)

148 **9:00 am** L
Effects of Aging on ADAS-Cog and Odor Memory Performance Between Genders
Conner Frank, Psychology (M)

149 **9:00 am** M
Electronic Cigarette Twitter Sentiment Analysis
Karen Robinett, Geographic Information Science (M)

150 **9:00 am** N
Secondhand Exposure Assessment to Electric and Conventional Cigarettes via Silicone Wristbands and Non-Targeted Chemical Analysis
Pamela Olguin, Environmental Health Science (M)

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Session A-11

Poster Physical & Mathematical Sciences 2
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

151 **9:00 am** O
Fluorescent labeling and enzyme kinetics of tricyclic cytidine nucleosides with reverse transcriptases
Julian Cizmic, Biology (U)

152 **9:00 am** P
Using Silk-like Peptides to Study Native Spider Silk Protein Assemblies
Steven Decker, Biology (U)

153 **9:00 am** Q
Using CE-SELEX to evolve a ssDNA Aptamer for Nicotine Capture
Catrin Law, Chemistry (U)

154 **9:00 am** R
Utilizing capillary coatings in capillary isoelectric focusing to exploit differences in fresh and stored red blood cells to determine blood doping
Madison Noroña, Chemistry (U)

156 **9:00 am** T
Thirdhand smoke- Colormetric detection of nicotine using dyes
Arrion Smith, Biochemistry (U)

157 **9:00 am** U
The effects of acetylation mimics on isocitrate dehydrogenase 1 (IDH1)
Vinnie Widjaja, Biochemistry (U

Session A-12

Poster Behavioral & Social Sciences 2
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

158 **9:00 am** V
Is Reading Attitude related to Oral Reading ability in Monolingual Vietnamese Speaking Children?
Michelle Harrison, Speech Language and Hearing Sciences (U)

159 **9:00 am** W
Grammatical Productions in Vietnamese Children using a Novel Sentence Formulation Task
Lena Pham, Speech, Language and Hearing Sciences (U)

160 **9:00 am** X
The Relationship between Teacher-reported Proficiency and Language Ability Measures in Spanish-English Bilingual Preschoolers
Cristal Toscano, Speech Language and Hearing Sciences (U)

161 **9:00 am** Y
Cross-Linguistic Activation and Interference during Naming in Bilinguals with Aphasia: An Eye-Tracking Study
Valeria Garcia, Speech, Language, and Hearing Sciences (M)

162 **9:00 am** Z
Cross-linguistic Interaction During Word Selection for Bilinguals with Aphasia: An Electroencephalography Study
Linda Nadalet, Speech Language and Hearing Sciences (M)

163 **9:00 am** AA
The Crosslinguistic Cognate Effect in Bilinguals Across the Lifespan: A Systematic Literature Review
Carmen Nguyen, Speech-Language Pathology (M)

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Session A-13

Poster Biological & Agricultural Sciences 2
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

164 **9:00 am** BB
Catalytic Activity of tumor relevant mutant Isocitrate Dehydrogenase 1 (IDH1)
Nalani Coleman, Biochemistry (U)

165 **9:00 am** CC
Analyzing, within Humans, the Presence of Crassphage: A Highly Abundant Bacteriophage Found Around the World
Julia DePillo, Chemistry (U)

166 **9:00 am** DD
Investigating the role of tetrabromopyrrole production in Pseudoalteromonas luteoviolacea on marine invertebrate metamorphosis
Iman Shaikh, Biochemistry (U)

167 **9:00 am** EE
Untargeted Metabolomic Analysis of Performance Enhancers
Heather Vettel, Biochemistry (U)

168 **9:00 am** FF
Kinetic and Cellular Consequences of pH on Metabolic Enzyme Activity
Lucas Luna, Biochemsitry (D)

169 **9:00 am** GG
In vitro characterization of a multi-subunit Drosophila melanogaster IκB kinase complex
Samantha Cohen, Biochemistry (D)

Session A-14

Poster Behavioral & Social Sciences 3
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

170 **9:00 am** HH
Preliminary Findings on Video-based Messaging Around Mood and Body Image
Boyu Wei, Psychology (U)

171 **9:00 am** II
The Longitudinal Relationship Between Sexual Satisfaction and Processing Speed in Older Men
Riki Slayday, Psychology (U)

172 **9:00 am** JJ
"Hey Google, What's a 'Vape God'?" An Analysis of Characteristics Emulated by "Vape Gods" on YouTube
Rebeca N. Navarrete, Spanish (U)

173 **9:00 am** KK
A systematic review of the use of Intersectionality in Research on Tobacco Use among Sexual and Gender Minorities
Jezmin Afroze, Psychology (U)

174 **9:00 am** LL
Relations between Youth Cognitive Style and Parenting Behavior
Alexandra Argiros, Psychology (U)

175 **9:00 am** MM
Marital Quality in the Third Year of Marriage: Effects of Premarital Cohabitation, Ethnicity, and Gender
Ana Duarte, Psychology (U)

Session A-15

Poster Education 2
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

176 **9:00 am** NN
Evaluation of First-Generation Status and Supplemental Instruction Attendance as Predictors for Grade Distribution
Joanna Arroyo, Kinesiology (U)

177 **9:00 am** OO
Voices from the "Third Space:" Students Experience with Auto-Ethnography as Research
Reychel Robles, English (U)

178 **9:00 am** PP
Assessing Student-Created Videos
Kathryn Beckhard, Mathematics (U)

179 **9:00 am** QQ
Effects of Physical Activity on Student Behavior: When Should Schoolchildren Engage in Physical Activity?
Giannela Gonzales, Liberal Studies (U)

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180 **9:00 am** RR
Implementation of Ethno-Studies Curriculum in Barranquilla, Colombia: Towards Inclusivity of the Afro-Colombian Populations
Hannah Sandoval, Latin American Studies (M)

181 **9:00 am** SS
High School English Learner Desertion
Azar Robles, Education Dual Language & English Learner (M)

182 **9:00 am** TT
Investigating Mathematics Teachers' Knowledge of the Line of Best Fit
Kevin Pelaez, Mathematics and Science Education (D)

Session A-16

Poster Behavioral & Social Sciences 4
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

183 **9:00 am** UU
Verb Learning Strategies in Typically Developing Children
Elaine Peralta, Speech Language and Hearing Sciences (U)

184 **9:00 am** VV
Examining Peer Interactions during an Intervention for Spanish-speaking Children with and without Developmental Language Disorder
Megan Douglass, Speech Language and Hearing Sciences (U)

185 **9:00 am** WW
Electrophysiological Analysis of Neural Processes Underlying Verb Learning in Typical School-Aged Children
Savannah Kennedy, Speech, Language and Hearing Sciences (U)

186 **9:00 am** XX
Saving the Best for Last: A Word Final Complexity Study
Julia Moluf, Speech, Language and Hearing Sciences (U)

187 **9:00 am** WW
Word Learning in Children Based on Frequency and SES Status
Amber Henmi, Speech, Language and Hearing Sciences (U)

188 **9:00 am** ZZ
Representation of Implicitly-learned Words in School-aged Children with and without Language Disorders
Ashley Goussak, Speech, Language and Hearing Sciences (M)

Session A-17

Poster Engineering & Computer Sciences 3
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

189 **9:00 am** AAA
Water Table Experiment: Interaction of a cloud of particles with a hydraulic jump
Devin Burke, Aerospace Engineering (U)

190 **9:00 am** BBB
Analysis of Unmanned Aerial Vehicle Imagery along the Southernmost Elsinore Fault Zone
Faith Burkett, Environmental Geosciences (U)

191 **9:00 am** CCC
Synthetic Jet
Elmer Carrillo, Aerospace Engineering (U)

192 **9:00 am** DDD
Single Barrier Discharge Plasma Actuators for Flow Control on an Aerospike Nozzle Engine
Stephen Yu, Aerospace Engineering (U)

193 **9:00 am** EEE
3D-printing and consolidation of 316L stainless steel powder components
Ifeanyichukwu Olumor, Mechanical and Aerospace Engineering (D)

194 **9:00 am** FFF
Unmanned Aerial Systems: Nonlinear High-Fidelity Aeroelastic Analysis
Enrico Santarpia, Engineering Science (D)

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Friday, February 28, 2020
Session B: Poster Presentations

Session B-9

Poster Interdisciplinary 6
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

239 **10:45 am** A
Source to sensors topography covariance of sleep spindles in MEG vs EEG
Sophie Kajfez, Psychology (U)

240 **10:45 am** B
Synthesizing PROTACs, Generating haloTAG cells and testing PROTACs on haloTAG cells
Ronnesha Johnson, Biology (U)

241 **10:45 am** C
Characterization of RAS/RAF interactions on the lipid bilayer
Yecenia Peraza, Chemistry (M)

242 **10:45 am** D
Nontargeted Evaluation of Aerobic and Anaerobic Membrane Bioreactors for Treating Emerging Contaminants in Municipal Wastewater
Jade Johnson, Public Health (M)

244 **10:45 am** F
Lead-halide Perovskite Quantum Dots for Photocatalytic [2+2] Cycloadditions with High Diastereoselectivity
Yixiong Lin, Chemistry (D)

Session B-10

Poster Engineering & Computer Sciences 5
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

245 **10:45 am** G
Chollas Creek Rolando
Salman Almutairi, Civil Engineering (U)

246 **10:45 am** H
Performance Evaluation of a Decentralized Wastewater Treatment Plant in Tijuana, B.C.
Denise Garcia, Environmental Engineering (U)

247 **10:45 am** I
The Propensity of Flooding Events in Chollas Creek and 54th Street Concrete Channel
Minerva Munoz, Civil Engineering (U)

248 **10:45 am** J
Hydrologic Stability of Nine Mile Creek
Samuel Zorn, Environmental Engineering (U)

249 **10:45 am** K
Concentrations and Loadings of Anthropogenic Pollutants in the San Diego River and Its Tributary During Storm Events
Federick Pinongcos, Environmental Engineering (M)

250 **10:45 am** L
Photodegradation of Emerging Chemicals in Aerobic and Anaerobic Wastewater Treatment Systems for Decentralized Water Reuse
Alma Rocha, Civil Engineering/Environmental Engineering (M)

251 **10:45 am** M
Is recharging groundwater basins by stormwater an environmentally-sustainable idea?
Yousef Sangsefidi, Mechanical and Aerospace Engineering (D)

Session B-11

Poster Behavioral & Social Sciences 6
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

252 **10:45 am** N
Language Specificity in Maternal Education Revisited: Vocabulary Growth before 30 Months of Age
Oliver Lopez, Psychology (U)

253 **10:45 am** O
Concurrent and Predictive Relations Between Vocabulary and Narrative Ability
Tyler Haubeck, Psychology (U)

254 **10:45 am** P
Measuring Early Vocabulary: a Facilitating Assessment in Multiple Languages
Kiryl Kachko, Psychology (U)

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255 **10:45 am** Q
Lexical Decision Task Performance and Executive and Linguistic Abilities in Adolescents with Autism Spectrum Disorder
Kalekirstos Alemu, Psychology (U)

256 **10:45 am** R
The effects of iconicity in word and picture naming in American Sign Language: preliminary testing of stimuli in a control group of monolingual English Speakers
Bradley Cheng, Psychology (U)

257 **10:45 am** S
Audio-Visual Integration Skills and Language Abilities in Monolingual Adults
Michelle Villaraza, Speech, Language and Hearing Sciences (M)

258 **10:45 am** T
Explicit Repetition Priming in Treatment of Anomia
Rana Tabrizi, Speech, Language and Hearing Sciences (M)

Session B-12

Poster Health Nutrition & Clinical Sciences 2
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

259 **10:45 am** U
Head and Neck Cancer - Disease and Treatment Impact on Speech Physiology
Annie Miodovski, Speech, Language and Hearing Sciences (U)

260 **10:45 am** V
Do the Dietary Practices of African Americans Increase Their Rate of Colorectal Cancer?
Tony Zamro, Biology (U)

261 **10:45 am** W
Using a process map to identify workflow and intervention points for colorectal cancer screening in community health centers
Carly DaCosta, Biology, Public Health, and Women's Studies (U)

262 **10:45 am** X
Trends in Stage at Diagnosis for Lung Cancer in the US, 2009-2016
Paris Offor, Public Health (U)

263 **10:45 am** Y
Comparing age at cancer diagnosis between Hispanics and non-Hispanic Whites in the United States
Andrew Vu, Epidemiology (M)

264 **10:45 am** Z
Developing and Adapting Survivorship Care Plans for Rural Latina Breast Cancer Patients
Viviann Cesena, Social Work (M)

265 **10:45 am** AA
The Spatial and Temporal Association between Breast and Colorectal Cancer Incidence and Poverty among California Teachers
Rachelle De Ocampo, Public Health Epidemiology (M)

Session B-13

Poster Physical & Mathematical Sciences 4
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

266 **10:45 am** BB
Evolution of Spectral Distributions in Deep-Water Constant Vorticity Flows
Mackensie Murphy, Applied Mathematics (U)

267 **10:45 am** CC
Distinctive allometry relations and conserved properties in dsDNA viral lineages
Meg Robinson, Applied Mathematics (U)

268 **10:45 am** DD
Finding Dense Lattice Packings in Prime Dimensions
Michael Angel, Mathematics (M)

269 **10:45 am** EE
Land-cover Classification using Spectral Mixture Analysis and Random Forest
Ye Mu, Geography (M)

270 **10:45 am** FF
Modeling Fibroblast Growth Factor Expression in Embryonic Lungs
Geneva Porter, Applied Mathematics (M)

271 **10:45 am** GG
Mathematical Models of the Transmission Dynamics of Black Band Disease in Coral Reefs
Jayme Rosenquist, Applied Mathematics (M)

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Session B-14

Poster Behavioral & Social Sciences 7
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

272 **10:45 am** HH
Investigating Spatiotemporal Stages of Emotional Face Processing with anatomically-constrained MEG
Joseph Gorski, Psychology (U)

273 **10:45 am** II
Accuracy of An Automated Decision Tree Tool for Detecting ARND
Emily Duprey, Psychology (U)

274 **10:45 am** JJ
The Relationship between Apolipoprotein E Alleles, Cognitive Performance, and BrainAGE Among People with and without Bipolar Disorder
Da Yeoun Moon, Psychology (U)

275 **10:45 am** KK
Moderate Ethanol and n-3 Diet Interactions on Lipid Profile and Liver Function in Mice
Luciano Voutour, Psychology (M)

276 **10:45 am** LL
The Stroop effect reveals deficits of cognitive control in individuals with AUD
Rebecca Carvalho, Psychology (M)

277 **10:45 am** MM
Altered Functional Connectivity During Cognitive Conflict in Men and Women with Alcohol Use Disorder
Sojung Youn, Psychology (M)

Session B-15

Poster Biological & Agricultural Sciences 3
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

278 **10:45 am** NN
Pathophysiology of Neurodegenerative Langerhans Cell Histiocytosis
Samantha Trescott, Biology, Cell and Molecular (U)

280 **10:45 am** PP
Knocking out genes downstream of Yamanka factors to elucidate necessity in dedifferentiation of hepatocytes
Jasmine Chavez, Cell and Molecular Biology (M)

281 **10:45 am** QQ
Effect of LMX1A in the generation and differentiation of dopaminergic neurons from iPSCs
Willi Cheung, Cell and Molecular Biology (M)

282 **10:45 am** RR
The effect of drugs that induce E2A activity on pancreatic cancer stemness
Denay Stevenson, Cell and Molecular Biology (M)

283 **10:45 am** SS
RNA and protein composition of extracellular vesicles compared throughout different human tissues
Amber Morey, Cell and Molecular Biology (M)

Session B-16

Poster Behavioral & Social Sciences 8
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

284 **10:45 am** TT
Associations between Temperature Variables and Heat-Related Deaths in the Contiguous United States
Jessica Embury, Geography (U)

285 **10:45 am** UU
Vegetation regrowth in a post-wildfire riparian environment using field-based observations and citizen science
Madeline Hapgood, Geography (U)

286 **10:45 am** VV
Detecting Risky Driving from Recorded Driving Data
Eduardo Cordova, Geographic Information Science (M)

287 **10:45 am** WW
Nongovernmental Organizations in Mexico: Impacts on Food Policy
Paola Diaz de Regules, Administration/Latin American Studies (M)

288 **10:45 am** XX
Indigenous Social Movement in Nayarit
Samuel Orndorff, Geography (M)

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Friday, February 28, 2020
Session C: Poster Presentations

Session C-9

Poster Behavioral & Social Sciences 11
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

335 12:30 pm A
Comparing trust in sources of cancer health information between Hispanics and Non-Hispanic Whites in the San Diego County
Harvey Vu, Nursing (U)

336 12:30 pm B
What Matters During EOL Care Planning? From the Perspective of Rural Latino Cancer Patients
Evan Acosta, Public Health (U)

337 12:30 pm C
Investigating the influence "powerful others" have on colorectal cancer screening among Latinxs
Miriam Maldonado, Public Health (U)

338 12:30 pm D
Identifying Chemicals of Emerging Concern in San Francisco Bay Sediment Using a Non-targeted Approach
MaryAnn Zakaria, Public Health (M)

339 12:30 pm E
An Examination of Parental Services Efficacy in Child Mental Health Treatment
Ruth Nunez, Child Development/ Mental Health (M)

340 12:30 pm F
Colorectal Cancer Trends and Screening Modalities Among Californians in 2018
Marisa Torres-Ruiz, Public Health, Health Behavior (D)

Session C-10

Poster Behavioral & Social Sciences 12
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

341 12:30 pm G
Nicotine effects on activation in the Isula, Primary Taste Cortex
Jessica Hennies, Psychology (U)

342 12:30 pm H
Can Stress Change Sensory Perception?
Carly Flynn, Psychology (U)

343 12:30 pm I
Effects of Anxiety on Neural Cognition through Attentional-Control Theory
Abigail Albertazzi, Psychology (U)

344 12:30 pm J
Odor and Taste Thresholds: Is Anxiety a Factor?
Kayla Gorenstein, Psychology (U)

345 12:30 pm K
Comparing recognition task performance for odor and visual stimuli
Chantal Dietzen, Psychology (M)

346 12:30 pm L
Impaired Lexicosemantic Performance and Effects of Implicit Semantic Categories in Adolescents with ASD
Apeksha Sridhar, Psychology (M)

Session C-11

Poster Health Nutrition & Clinical Sciences 3
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

347 12:30 pm M
The Association Between Acoustic Reflex Thresholds and DPOAEs in Young Adults
Athena Doss, Speech, Language and Hearing Sciences (U)

348 12:30 pm N
Role of Toll-like receptor 4 in joint remodeling, sprouting, and allodynia in the K/BxN serum transfer model of arthritis
Andrea Gonzalez Cardenas, Biology (U)

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349 **12:30 pm** O
Tobacco, Marijuana, and E-cigarette Effects on the Composition of the Oral Microbiome
Mambu Nsuangani, Microbiology (U)

350 **12:30 pm** P
Pure-tones and Self-Report Alcohol Use in Young Adults
Rebecca Vieira, Speech Language and Hearing Sciences (U)

351 **12:30 pm** Q
The effect of Green Tea Extract (GTE) on fat oxidation and glycemic responses during and after arm exercise
Tayelor Roberson, Interdisciplinary Studies (U)

352 **12:30 pm** R
Extraction of antioxidants from pistachio seeds using different solvents
Zheyuan Liu, Foods and Nutrition (U)

Session C-12

Poster Engineering & Computer Sciences 8
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

353 **12:30 pm** S
Dynamic Nice Value Assignment
Michael Fox, Computer Engineering (U)

354 **12:30 pm** T
Multi-Processed VS Multi-threaded Socket Communication
Ramiz Hanan, Computer Engineering (U)

355 **12:30 pm** U
Implementation of Machine Learning Algorithm with Cryptosystems
Cesar Sanchez, Mathematics (U)

356 **12:30 pm** V
Minimization of Utility Pole Failure Through Julia Optimization
Michael Violante, Civil Engineering Water Resources (M)

Session C-13

Poster Physical & Mathematical Sciences 5
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

357 **12:30 pm** W
Nuclear Scattering Modeling with Machine Learning
Steven Bradley, Physics (U)

358 **12:30 pm** X
Analyzing the interaction between FGF10 and SHH proteins in early lung development through mathematical and computational models
Jasmine Camacho, Applied Mathematics (U)

359 **12:30 pm** Y
Machine Learning to Improve Theoretical Nuclear Binding Energies
Matthew Crowley, Physics (U)

360 **12:30 pm** Z
Numerical Semigroups: Analysis of Element Factorizations
Jose Parra, Teaching Credential (U)

361 **12:30 pm** AA
Modeling the effects of environmental temperature on the avian influenza epidemics among migratory birds of North America
Sophia Vargas, Statistics (U)

362 **12:30 pm** BB
Ball-collision Decoding Analysis: Linear Codes in McEliece Cryptography
Kyle Yates, Applied Mathematics (U)

Session C-14

Poster Behavioral & Social Sciences 13
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

363 **12:30 pm** CC
Navigating Care for HIV/AIDS at the US-Mexico Border in Mexicali
Dario Reyes-Gastelum, Psychology (U)

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364 **12:30 pm** DD
To Intervene or Not Intervene: Bystander Intervention in Potential Sexual Assault as a Function of Perpetrator and Victim Gender and Perpetrator Relationship to Bystander
Rachel Hamilton, Psychology (U)

365 **12:30 pm** EE
Enhancing Providers' Delivery of Feedback About an Autism Spectrum Disorder Diagnostic Evaluation
Kaitlin Chau, Psychology (U)

366 **12:30 pm** FF
Patient Activation in Latino/Hispanic Populations with Cardiometabolic Conditions
Alexis Osuna, Psychology (U)

367 **12:30 pm** GG
The Relationship Between Fatalism and Patient Activation among Hospitalized, Hispanic Adults with Cardiometabolic Conditions and Behavioral Health Concerns
Mariana Marin-Estrada, Psychology (U)

368 **12:30 pm** HH
Informational and sensorial interventions for improving consumer acceptance of edible insects
Cassandra Maya, Nutritional Sciences (M)

Session C-15

Poster Engineering & Computer Sciences 9
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

369 **12:30 pm** II
BRAF Oncogene Mutations in Non-Small Cell Lung Cancer
Christian Ramirez, Mechanical Engineering (U)

370 **12:30 pm** JJ
A Cellular Based Assay to Monitor the Cleavage of the Extracellular Matrix by Matrix Metalloproteinases as a Tool for Drug Discovery Against Metastasis
Ryan Doyle, Mechanical Engineering (U)

371 **12:30 pm** KK
Chemical Characteristics of sludge generated by parallel aerobic and anaerobic bioreactors
David Aponte, Environmental Engineering (U)

372 **12:30 pm** LL
IDH1 Mutation Effects on Cell Migration
Amanda Coale, Bioengineering (M)

373 **12:30 pm** MM
Genetic engineering of Methanococcus maripaludis and Shewanella oneidensis MR-1 for applications in bioelectrochemical systems
Tyler Myers, Bioengineering (D)

Session C-16

Poster Biological & Agricultural Sciences 4
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

374 **12:30 pm** NN
Investigating Phage Immunogenicity for Pseudomonas Aeruginosa Phage PAK_P1
Isaura Villalba, Cell and Molecular Biology (U)

375 **12:30 pm** OO
Analyzing Protein Expression for Genetic Engineering in Methylomicrobium alcaliphilum 20ZR: A Methanotrophic Bacteria
Dennis Krutkin, Cell and Molecular Biology (U)

376 **12:30 pm** PP
Phages isolation for the treatment of multi-drug resistant Achromobacter sp. in Cystic Fibrosis lung infections
Bhumika Gode, Cellular and Molecular Biology (U)

377 **12:30 pm** QQ
Role of Genes Located Downstream of SoxB1-2 in the Development of Sensory Neuron Populations in the Planarian Species Schmidtea mediterranea
Sarai Alvarez-Zepeda, Cell and Molecular Biology (U)

378 **12:30 pm** RR
Sensory Neuron Differentiation through Pou4-2 Transcriptional Regulation
Ryan McCubbin, Cell and Molecular Biology (M)

379 **12:30 pm** SS
Determining the molecular function of bacteria stimulated animal development
Kyle Malter, Cell and Molecular Biology (D)

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Session C-17

Poster Physical & Mathematical Sciences 6
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

380 **12:30 pm** TT
Spectroscopic Properties of Fluorescent 8-DEA-tc DNA-RNA Heterduplexes
Grace Kim, Chemistry (U)

381 **12:30 pm** UU
Electrochemically Controlled Dimerization of Ferrocene Ureidopyrimidone Derivatives. The Effect of Ferrocene Position and Electrostatics of the System
Veronika Mikhaylova, Chemistry Biochemistry (U)

382 **12:30 pm** VV
Improving regiocontrol of Minisci-type alkylations on N-heterocycles using a Lewis acid blocking strategy
Ernesto Millan Aceves, Chemistry (U)

383 **12:30 pm** WW
Asymmetric methodology to obtain selective atropisomeric BTK Kinase Inhibitors
Mariami Basilaia, Chemistry (M)

384 **12:30 pm** XX
Synthesis of Atropisomeric Diarylamines as a Scaffold for Kinase Inhibitor Development
Beeta Heydari, Chemistry (M)

385 **12:30 pm** WW
Investigation of Fluorescence Quenching and the Fluorescence-Turn-On-Effect In Fluorescent Nucleosides
Harrison Pearce, Chemistry (D)

Friday, February 28, 2020
Session D: Poster Presentations

Session D-9

Poster Behavioral & Social Sciences 14
Friday, February 28, 2020, 2:15pm
Location: Montezuma Hall

386 **2:15 PM** A
Correlation Between Stress and Comfort in a Commuting Setting
Rebeca Pozos, Urban Studies/Sustainability (U)

387 **2:15 pm** B
Market Failure of Parking Permits and Transit Pass at SDSU Campus
Daniel Mendoza, Economics (U)

388 **2:15 pm** C
Value of Contingency Planning in the Face of Potential Family Separation
Lorena Garcia, Social Work (U)

389 **2:15 pm** D
Environmental Aesthetics
Austin Cosler, Philosophy (M)

390 **2:15 pm** E
Sexual Exploitation Among College Students: An Exploratory Study In San Diego State University Student Body
Lauren Azar, Social Work (M)

391 **2:15 pm** F
Predictors of Suicidal Ideation among Pediatric Patients seen in an Emergency Department
Khusnnora Satybaldiyeva, Epidemiology (M)

392 **2:15 pm** G
Impact of Advance Care Planning Education Intervention on Advance Directive Completion and End of Life Communication Among Hispanic Cancer Patients
Nayeli Gonzalez, Social Work (M)

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Session D-10

Poster Health Nutrition & Clinical Sciences 4
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

393 **2:15 pm** H
Barriers and Supports Related to Exclusive Breastfeeding Duration among Hispanic Women
Flor Gallegos, Nursing (U)

394 **2:15 pm** I
HPV Vaccination Knowledge & Beliefs: A comparison between U.S- México Border Area Residents and Non Residents
Priscila Chagolla, Public Health (U)

395 **2:15 pm** J
The relationship between household food insufficiency and development of type 2 diabetes over 10 years in a sample of U.S. black and white adults
Cynthia Chow, Public Health/Epidemiology (M)

396 **2:15 pm** K
Student Nurse Empowerment in Death and Dying
Shaina Marie Jacob, Nursing (M)

397 **2:15 pm** L
Use, Knowledge, and Perception of Electronic Cigarettes in Undergraduate Nursing Students
Brittany Kinsler, Nursing (M)

398 **2:15 pm** M
Language barriers in self-management outcomes for patients with heart disease
Phuong Nguyen, Public Health (M)

Session D-11

Poster Behavioral & Social Sciences 15
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

399 **2:15 pm** N
Parallel processing of semantics in the flanker paradigm: Evidence from the N400
Jacqueline Manning, Psychology (U)

400 **2:15 pm** O
Blocked vs Random Design: Masked Repetition Priming using Event-Related Potentials
Emily Akers, Psychology (U)

401 **2:15 pm** P
Attention to Salient Emotional vs. Non-Emotional Stimuli in Anxiety
Megan Spence, Psychology (U)

402 **2:15 pm** Q
Discriminating between autism-related social deficits and social anxiety in adolescents with autism spectrum disorders
Monica Deyski, Psychology (U)

403 **2:15 pm** R
Functional connectivity within the anxiety network is atypical in middle-aged adults with autism and associated with anxiety symptom severity
Ryan Tung, Psychology (U)

404 **2:15 pm** S
Subcortical volumes in middle-aged adults with autism spectrum disorders and typical control adults
Emma Churchill, Psychology (U)

Session D-12

Poster Engineering & Computer Sciences 10
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

405 **2:15 pm** T
Post-fire soil processes in urban and Mediterranean watersheds
Rey Becerra, Civil Engineering (U)

406 **2:15 pm** U
Persistence of sewage-derived bacteria and viruses in soil
Mia Gil, Environmental Engineering (U)

407 **2:15 pm** V
Post-Fire Turbidity and Soil Erosion Modeling in an Urban Environment
Kevin O'Marah, Civil Engineering (U)

408 **2:15 pm** W
Flood after fire in Southern California – Incorporating Machine Learning to Identify Important Parameters for Process-based Hydrologic Models
Brenton Wilder, Civil Engineering (M)

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Session D-13

Poster Health Nutrition & Clinical Sciences 5
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

409 **2:15 pm** X
Effects of balance training with visual perturbations on people with incomplete spinal cord injury
Angelica Mora, Kinesiology (U)

410 **2:15 pm** Y
Reliability of NordBord Nordic Hamstring Exercise Testing in Healthy Adults
Justine Buenaventura, Kinesiology (U)

411 **2:15 pm** Z
Associations between Sport Specialization, Income, and Injury among Collegiate Athletes
Bailey Bingham, Athletic Training (U)

412 **2:15 pm** AA
Increased muscle co-contraction around the ankle joint and center of pressure beneath the foot associated with increased chance of falls in elderly adults
Khoa Vo, Kinesiology (U)

413 **2:15 pm** BB
A fast-start pacing strategy does not improve locomotor fatigue dynamics but does improve supra-critical power work capacity
Tori Simon, Exercise Physiology (M)

414 **2:15 pm** CC
Greater Severity and Functional Impact of Post-Traumatic Headache in Veterans with Comorbid Neck Pain following Traumatic Brain Injury
Robyn Bursch, Physical Therapy (D)

Session D-14

Poster Behavioral & Social Sciences 16
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

415 **2:15 pm** DD
A Closer Look at Common Core Exemplars
Savannah Irwin, Psychology (U)

416 **2:15 pm** EE
Minority vs. White Perspectives: Context Ethnic Diversity Indicators Differentially Predict State-Level Implicit Biases
Brigitte Tomma, Psychology (U)

417 **2:15 pm** FF
U.S. Students of Indigenous Descent Returning into the Mexican Educational System
Luis Betancourt, Latin American Studies (M)

418 **2:15 pm** GG
A Person-Centered Investigation of Time Urgency and Related Work-Outcomes
Rebecca Harmata, Industrial Organizational Psychology (M)

419 **2:15 pm** HH
Examining the Effects of Interleaved Solutions and Problem Solving on Math Fluency Outcomes
Brianna Wuensch, Psychology (M)

Session D-15

Poster Biological & Agricultural Sciences 5
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

420 **2:15 pm** II
Characterization of Q425: an anti-CD4 antibody
Citlayi Villaseñor, Chemistry (U)

421 **2:15 pm** JJ
Characterization of Amplified Malate Dehydrogenase 1 (MDH1) in the Context of Squamous Cell Lung Cancer
Sati Alexander, Biology (U)

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422 **2:15 pm** KK
Mechanisms of malate dehydrogenase 1 regulation
Ngoc Huynh, Chemistry (M)

423 **2:15 pm** LL
Using Metabolomics to Determine the Effect of Dihydromyricetin on Alcohol Metabolism
Kristin Hughes, Chemistry (M)

424 **2:15 pm** MM
Biomarker Detection via Capillary Electrophoresis for the Investigation of Extraterrestrial Life
Jessica Torres, Chemistry (M)

425 **2:15 pm** NN
Single Molecule Analysis on Membrane Recruitment of B-Raf
Andres Jimenez Salinas, Chemistry (D)

426 **2:15 pm** OO
Understanding IDH1 Regulation through Site Specific Acetylation Mimics
Joi Weeks, Cellular & Molecular Biology (D)

Session D-16

Poster Engineering & Computer Sciences 11
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

427 **2:15 pm** PP
Baja Epi-Intra NeuroMEMS Device
Rene Arvizu, Mechanical Engineering (U)

428 **2:15 pm** QQ
Utilizing A 3D printer and Arduino Hardware to Build An Inexpensive Capillary Electrophoresis Instrument
Davis Klein, Biochemistry (U)

429 **2:15 pm** RR
Tri Hybrid Ultra Light Composites for Bio-applications
Christopher Oyuela, Mechanical Engineering (U)

430 **2:15 pm** SS
Effect of Outflow Graft Size on Stroke Risk of the Aortic Arch
Shelby Angel, Mechanical Engineering (M)

431 **2:15 pm** TT
Mathematical modeling and simulations of centriole positioning during mitosis of cells in confined environments
Nadia Beydoun, Bioengineering (M)

432 **2:15 pm** UU
Receptor cross-talk prediction in epithelial cell stress signaling based on boolean network
Esra Tiftik, Engineering/Bioengineering (D)

Session D-17

Poster Physical & Mathematical Sciences 7
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

433 **2:15 pm** VV
Silver Nanoparticles as Catalysts for Conversion of Carbon Dioxide to Useful Products
Nicholas Smith, Chemistry (U)

434 **2:15 pm** WW
Improving Solar Cell Performance by Incorporating Silver Nanocubes and Nanostars
Carla Hyppolite, Chemistry (U)

435 **2:15 pm** XX
Sensitive and Selective Detection of Breast Cancer Biomarker HER2 Using Laser Wave-Mixing Detector Interfaced to Microfluidics
Nino Shatirishvili, Chemistry (M)

436 **2:15 pm** WW
Modifying Electroosmotic Flow Mid-separation as a Method of Sample Stacking
Muhand Rashid, Chemistry (M)

437 **2:15 pm** ZZ
Tuning Morphology of Nanostructured Silicon Interfaces Using Magnetic Nanoparticles for Photoelectrochemical Water Splitting
Margaret Patrick, Chemistry (M)

438 **2:15 pm** AAA
Sensitive Detection of Heart-Failure Biomarkers Using Multi-Photon Laser Wave-Mixing Spectroscopy
James Suprapto, Chemistry (D)

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Friday, February 28, 2020
Session E: Poster Presentations

Session E-1

Poster Behavioral & Social Sciences 17
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

439 **4:00 pm** A
Comparing Cancer Beliefs and Practices across the US-Mexico Border: A Binational Study
Elvira Hernandez, Psychology (U)

440 **4:00 pm** B
Cultural Factors the Influence African American/ Black Women's Adherence to Breast Cancer Treatments: A Review of the Literature
Victoria A. Davis, Psychology (U)

441 **4:00 pm** C
Barriers to Advance Care Planning in Latino/ Hispanic Cancer Patient Communities: A Review of the Literature
Aleigha Binda, Psychology (U)

442 **4:00 pm** D
Advance Care Planning: Barriers and Facilitators among Rural Latino Cancer Patients in the US-Mexico Border
John Moreno Jr., Psychology (U)

443 **4:00 pm** E
Gender and the Link Between Fitness and Cancer Risk/Mortality: A Review of the Literature
Andrea Ramos, Foods and Nutrition (U)

444 **4:00 pm** F
rAAV as Potential Therapeutic for Glioblastoma
Sharon Sengphanith, Interdisciplinary Studies (U)

Session E-2

Poster Engineering & Computer Sciences 12
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

445 **4:00 pm** G
The Utilization of Flue Gas for Desalination
Marina Balcazar, Environmental Engineering (U)

446 **4:00 pm** H
Zero-Valent Iron Enhancement of Bioelectrochemical Methanogenesis
Sarah Perkins, Environmental Engineering (U)

447 **4:00 pm** I
Horizontal Flame Spread Research on Thermally-Thin PMMA at Varied Opposed Flow Velocities in Simulated Micro-gravity Environments
Joseph Schottmiller, Mechanical Engineering (U)

448 **4:00 pm** J
Carbon Nanoparticle Production through Hydrocarbon Pyrolysis Experimentation and Modeling
Nicholas Bauer, Mechanical Engineering (M)

449 **4:00 pm** K
Towards physics-based turbulence modeling of pressure-related terms
Jose Moreto, Engineering Science (D)

Session E-3

Poster Biological & Agricultural Sciences 6
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

450 **4:00 pm** L
Assessing the Therapeutic Potential of Cannabinoids using a Drosophila (fruit fly) Based Traumatic Brain Injury Model
Natasha Sam, Biology (U)

451 **4:00 pm** M
Testing the Toxicity and Neural Protective Potential of Cannabinoid Compounds by Examining Adult Drosophila (fruit fly) Longevity and Behavior Profiles
Alec Candib, Cellular and Molecular Biology (U)

452 **4:00 pm** N
Design and testing native CRISPR-based gene editing for genetic manipulations in Methylomicrobium alcaliphilumStrain 20ZR, a model methanotroph
Pedro D'Alo, Biology (U)

453 **4:00 pm** O
Assessing the Role of Hsp60A in Inclusion Body Myopathy Type 3 Utilizing a Drosophila Model
Megan Bacabac, Biology (U)

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454 **4:00 pm** P
Characterization of the ultrastructure of the common marmoset (Callithrix jacchus) hippocampus using electron microscopy
Casey Vanderlip, Biology (U)

455 **4:00 pm** Q
Impacts of TCPMOH Exposure on Zebrafish Embryonic Development
Peyton Wilson, Environmental Science (U)

456 **4:00 pm** R
Gastrointestinal Stromal Tumors Expression of Truncated KIT
Antonio Delgado, Kinesiology (U)

Session E-4

Poster Behavioral & Social Sciences 18
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

457 **4:00 pm** S
First Trimester Equivalent Binge-like Alcohol Exposure in Mice
Deva Reign, Psychology (U)

458 **4:00 pm** T
The Effects of Chronic Drinking in Pregnant C57BL/6J x FVB/NJ F1 Hybrid Mice
Yanna Roumeliotis, Psychology (U)

459 **4:00 pm** U
The Effects of Prenatal Nicotine and THC Exposure on Motor Coordination in Rats
Samirah Hussain, Psychology (M)

460 **4:00 pm** V
The Effects of Prenatal Nicotine and THC Exposure via E-Cigarette on Working Memory in a Rat Model
Cristina Rodriguez, Psychology (M)

461 **4:00 pm** W
Olfactory Detection in C57BL/6J FVB/NJ F2 Hybrid Mice with Prenatal Alcohol Exposure
Lindsey Aguilar, Psychology (M)

462 **4:00 pm** X
Examination of Hippocampal Subfield Volumes in Adolescents and Adults with Fetal Alcohol Spectrum Disorders
Emily Sones, Psychology (M)

Session E-5

Poster Health Nutrition & Clinical Sciences 6
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

463 **4:00 pm** Y
Does environmental PPARγ crosstalk with Nrf2 signaling pathways?
Alexa Garcia, Environmental Science (U)

464 **4:00 pm** Z
Role of olfactory imagery on eating patterns and weight gain - A Narrative Review
Melissa Favela-Ayala, Foods and Nutrition (U)

465 **4:00 pm** AA
A Rodent Model of Prenatal THC and Nicotine E-Cigarette Exposure
Karen Thomas, Cellular and Molecular Biology (U)

466 **4:00 pm** BB
Demographic, Psychological, and Physical Predictors of Comorbid Health Conditions among People with Fibromyalgia
Alan Patrus, Biology (U)

467 **4:00 pm** CC
The Effects of Smoking on the Gut Microbiome: The Relationship to Colorectal Cancer Disparities for African-American Men
Shawn Barrowcliff, Biology (U)

468 **4:00 pm** DD
PyFBA: Simulating Genome-Scale Metabolic Models
Shane Levi, Biological and Medical Informatics (M)

Session E-6

Poster Physical & Mathematical Sciences 8
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

469 **4:00 pm** EE
Nucleophilic Substitution Methodologies Towards Pharmaceutically Relevant Atropisomers
Deane Gordon, Chemistry (U)

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470 **4:00 pm** FF
Total Synthesis of Palmyramide A: A Promising Therapeutic Agent Against Colon Cancer
Melody Matthe, Chemistry (U)

471 **4:00 pm** GG
Fine Tuning Dihedral Angles for Novel Pyrazolopyrimidine Inhibitor Scaffolds
Bahar Heydari, Chemistry (M)

472 **4:00 pm** HH
Cu tuned Lead-Halide Perovskite for N-N bond formation
Jovan San Martin, Chemistry (M)

473 **4:00 pm** II
Metal Dichalcogenides for Facile and Selective Direct Electrochemical Co-enzyme Regeneration
Nicholas Williams, Chemistry and Biochemistry (D)

474 **4:00 pm** JJ
Peptide Stapling by Lewis Base/Bronsted Acid Catalyzed Sulfenylation of Tryptophan
Zachary Brown, Chemistry (D)

475 **4:00 pm** KK
Comparison of Fluorogenic Cytidine Nucleosides: Developing a New Analogue to Test Structure and Properties
Casey Heaney, Cellular and Molecular Biology (U)

Session E-7

Poster Biological & Agricultural Sciences 7
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

476 **4:00 pm** LL
An Overview of the Microhabitat on Cylindropuntia Wolfii Fruits
Carlos Portillo, Biology (U)

477 **4:00 pm** MM
Effects of new bacterial pathogen species, Bordetella atroposiae, on the genetic fitness of Oschieus Tipulae
Munira Ali, Microbiology (U)

478 **4:00 pm** NN
Discovery of a Buttiauxella species that adheres to intestinal cells and is likely a commensal microbe of wild C. elegans
Jonah Faye Longares, Microbiology (U)

479 **4:00 pm** OO
Exploring the genetic elements of methane-based chemotaxis in Methylomicrobium alcaliphilum 20 Z
Cassandra Ortiz-Nelsen, Microbiology (U)

480 **4:00 pm** PP
Assessment of chondrichthyan biodiversity in western India
Isabella Livingston, Biology (U)

481 **4:00 pm** QQ
Skin microbiome of the round stingray, Urobatis halleri, in southern California
Emma Kerr, Biology (U)

Session E-8

Poster Behavioral & Social Sciences 19
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

482 **4:00 pm** RR
Ravens and Other Small Birds of Grasshopper Pueblo
Francesca Beaird, Anthropology (U)

483 **4:00 pm** SS
Exploring the spatial resolution of the pit organ system of pitvipers through evoked behavioral responses to standardized stimuli
Ann Doan, Biology (U)

484 **4:00 pm** TT
How Host-Parasite Interactions Impact Behavior in a Salt Marsh System
Melissa Belen-Gonzalez, Biology (U)

485 **4:00 pm** UU
Spanish land-use methods on California ecosystems in the Mission and early post-Mission periods
Kellen Lovell, Anthropology (U)

486 **4:00 pm** VV
A Model Based Approach to Human Impact and Extinction
Miriam Kopels, Anthropology (M)

487 **4:00 pm** WW
Osteological Analysis of a Burial from the Lower Río Verde Valley
Scott Miller, Anthropology (M)

SRS

Abstracts of Presentations

Session A

SAN DIEGO STATE UNIVERSITY

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Session A-1

Oral Humanities, History, Literature, Philosophy 1
Friday, February 28, 2020, 9:00 am
Location: Park Boulevard

100 9:00 am

Victims of the Stasi: Their Trauma and What the World Can Learn From It

Emily Rascon, European Studies (U)

Although East and West Germany were united thirty years ago, many East Germans continue to be haunted by the GDR's dark past and the foreboding presence of the notorious Staatssicherheit . From 1950 to 1990, East Germans who did not align with the GDR's values were targeted by the Stasi through their tactic of Zersetzung, a form of psychological warfare which translates from German to "decomposition". The desired results of the Stasi's Zersetzung were the repression of opposition, mass paranoia amongst their targets, and the feeling of isolation. Due to the cruel, mentally trying nature of Zersetzung, victims of the Stasi still suffer to this day from deep rooted trauma, which manifests itself most commonly into trust issues and self-isolation.

In my research, I examine personal accounts from Stasi victims and identify the long term effects of the psychological persecution inflicted upon them by their former government. I also examine current forms of compensation provided to Stasi victims by the German government via pensions, therapy groups, and memorials.

In a world where knowledge of the GDR is slowly slipping away into the past, I hope to shed light on these victims' stories and their collective traumas, which long outlived the Stasi themselves. I believe Stasi victims deserve awareness, not only to aid in their personal healing processes, but to serve as an example to other nations as to what the long-term repercussions of militant surveillance are on targeted populations.

101 9:15 am

"Rape Me": Grunge Politics of Apathy, Trauma, and Sexual Violence

Andrea Alvarado, History (M)

Male grunge artists of the 1990's developed a political rhetoric characterized by a tone of satirical apathy as a means to discuss issues that directly impacted the Seattle Riot Grrrl and gunge scene. Artists engaged in politics by developing an apathetic attitude in both lyrics and their persona to satirize what they felt was a generational conflict of interests. Many artists came from small towns and expressed frustration with what they perceived to be bigotry, racism, and misogyny that informed a traditional outlook on sexuality and gender roles. They conveyed deeply personal topics, with some of the most popular songs discussing rape, domestic abuse, suicide, addiction, struggles with mental health, family estrangement, homelessness, and PTSD. Satirical apathy operated as a means to appropriate the language used by their parents' generation that generalized Generation X as entitled, lazy, and stupid. This offered an element of humor to lyrics that conveyed feelings of isolation, hopelessness, and pain.

Male grunge artists developed a rhetoric of satirical apathy juxtaposed by aggressive confrontation to engage in social commentary concerning sexual violence and trauma. This research is informed by affect theory and poststructural analysis, particularly in the examination of how male musicians constructed lyrics and music to convey intense emotions. Through the use of song lyrics, interviews, album artwork, and music videos, focus will be given to the ways that some grunge artists criticized and portrayed sexual violence, as seen most prominently in Nirvana's "Rape Me." Nirvana's album artwork for In Utero (1993) and the song "Rape Me" serve as case studies that subvert and deconstruct traditional views of female sexuality and motherhood. These works first decontextualize the female body in an effort to capture the struggle for control, and then expose the complexity of genitals that have been framed in terms of motherhood and violence.

102 9:30 am

Technology, Transportation, and Tourism: Changing Activity Patterns at the Nathan Harrison Archaeological Site

Jamie Bastide, Anthropology (M)

The second industrial revolution, the arrival of the railroad in San Diego, and the county's expansion of the road that led past the Nathan "Nate" Harrison cabin each transformed daily life for Harrison by creating different opportunities for income, interaction, and material goods. This paper identifies temporal, spatial, and formal patterns within the artifact assemblage and examines them in the context of these technological and social changes. It also pays particular attention to Harrison's mobility in historical records and how shifts corresponded with broader transportation phenomenon, his own aging body, and the emergence of his status as legendary pioneer and tourist attraction.

103 9:45 am

Enigmatic Tins at the Harrison Site: A Foundation for an Archaeological Chemical Signature Reference Collection for 1800s-1900s Medicinal Patents

Natalia Galeana, Anthropology (M)

Three of the more enigmatic finds from the Harrison site were small, flat, cylindrical sealed metal containers. The first was an unlabeled brass tin that appeared to contain a white cosmetic. In addition, excavators found two similarly shaped iron canisters at the site; both were intact, sealed, and rusted shut. One had remnants of a painted bottom label with writing, although over half of the script was missing. This item was a tin of "Kohler's One Night Corn Cure," and the script included

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instructions on how to apply the salve to aching feet. This salve was one of many self-medicating products uncovered in the Harrison assemblage. This paper presents the results of chemical analyses on the contents of all three metal containers. It compares the chemical signature of the contents of each and offers interpretations as to the identity and use of each.

104 10:00 am

Illuminating Interviews: The South African Jews in Southern California Oral History Project

Shannon Farnsworth, Anthropology (M)

Beginning in the early 1970s, during the heyday of the apartheid regime, South Africa's Jewish population, who had originally escaped Eastern European pogroms in the late 19th century, began to emigrate in large numbers. A significant community formed in Southern California, with a large concentration in the San Diego area. However, their story remains almost completely unstudied. The creation of the South African Jews in Southern California Oral History Project at San Diego State University this past fall seeks to remedy this, seeking to illuminate and understand this unique story of Jewish identity, South African politics, and new lives in California.

Session A-2

Oral Behavioral & Social Sciences 1
Friday, February 28, 2020, 9:00 am
Location: Tehuanco

105 9:00 am

Detection of brain activity associated with lexical retrieval: an analysis of intracranial electroencephalographic data in picture naming

Michelle Fung, Speech, Language and Hearing Sciences (M)

When we want to speak, we start with a concept in mind (semantic level), retrieve the corresponding word (lexical level), and gather the needed sounds for production (phonological level). One paradigm that looks at lexical retrieval processes is the Continuous Naming Paradigm (CNP) in which participants are asked to name intermixed pictures from different semantic categories. Prior research shows that participants' naming latencies increase with each preceding member of the category, an effect known as the cumulative semantic interference effect (Howard et al, 2006). This effect has been linked to increased difficulty in word retrieval due to cumulative activation of other semantically related lexical representations. Previous work has shown that EEG components within 250 ms. post stimulus onset and perfusion signal change in the left prefrontal and temporal cortices (LIFG, pre-SMA, left posterior temporal cortex, ACC) are sensitive to cumulative semantic interference (Costa et al, 2009, Zubicaray et al, 2015). However, these studies lack combined spatial and temporal resolution. This study compiled intracranial electroencephalographic (iEEG) data from twelve subjects participating in the CNP. These participants, diagnosed with intractable epilepsy, had stereotactic EEG electrodes implanted in their brains for medical purposes. The iEEG contacts from each subject recorded the activity of specific brain regions with high spatial and temporal resolution. Analysis of the naming latencies revealed a cumulative semantic interference effect. Analysis of the iEEG data (from six patients) revealed significant high frequency band (HFB) activity in the hippocampus and middle temporal cortex. Early hippocampal activity was found to be sensitive to semantic context in both directions: some sites had less HFB activity for items presented later in the category (priming), while others showed the reverse effect (interference). HFB activity in the left and right middle temporal cortices was found to be sensitive to the cumulative semantic interference effect around vocal onset. These preliminary results indicate that both semantic priming and interference effects can be found in the brain when we retrieve words as we speak, and may shed light on the roles of the hippocampus and middle temporal cortex in lexical retrieval.

106 9:15 am

The Relationship between Language Impairment and Cerebral Blood Flow: Evidence from Chronic Hypoperfusion in Aphasia

Noelle Abbott, Language and Communicative Disorders (D)

The literature reports widely variable performance by individuals with aphasia (IWA) on both receptive and expressive measures, within and across aphasia typologies. Despite prior research that has attempted to link behavioral deficits and patient variability to site and extent of neural lesion, a good deal of disagreement remains in the literature. The current project investigates a possible neuro-physiological source of language variability in chronic aphasia (> 1 year post-onset): cerebral blood flow (CBF). The majority of the prior research with CBF in aphasia focuses on IWA in the acute stages of recovery. In this study, we asked whether hypoperfusion (decreased CBF in structurally intact neural regions) underlies seemingly aberrant behavioral patterns among individuals with chronic aphasia.

In the literature, CBF has been broadly linked to an overall severity of language impairment in IWA, however few studies have investigated the link between specific language impairment patterns and CBF within specified neural regions linked to the language network. For this study, MRI perfusion (CBF) imaging data were collected for 20 IWA. As a first pass, overall CBF along with region specific measures in the left inferior frontal gyrus (BA 44/45/47) were examined in the context of sentence level processing.

Results demonstrated that individuals who had reduced CBF in BA 44 and 45 (but not BA47) performed worse on measures of sentence comprehension than those who had relatively normal blood flow patterns in those regions. By contrast, when we compared size and extent of structural damage

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within BA 44/45/47 to language comprehension measures, no clear relationship emerged. Thus, CBF appears to be a more sensitive measure of sentence-level language impairment in IWA and may provide better insight into the relationship between brain structure and brain damage, as well as the underlying language network.

107 9:30 am

Are all word relationships processed equally in our brains?

Elizabeth Anderson, Language/Communicative Disorders (D)

Semantically related concepts are known to be co-activated when we speak. Prior research has reported both behavioral interference and facilitation due to co-activation during picture naming. One possibility for this discrepancy may be different word relationships. In particular, taxonomically-related words (e.g., wolf and dog) have been associated with semantic interference. Conversely, thematically-related words (e.g., bone and dog) are usually associated with facilitation. We conducted a picture-word interference EEG experiment in which participants named images preceded by a taxonomically-related (Ta) word, a thematically-related (Th) word, or a matched unrelated word. Naming latencies were longer for related than for unrelated Ta pairs, and shorter for related than for unrelated Th pairs, replicating the taxonomic interference and thematic facilitation effects previously reported. We conducted both traditional monopolar analyses and Laplacian analyses on our ERP data. Monopolar ERP analysis revealed a greater negativity for unrelated than for related Ta pairs but no difference between Th pairs 150-250ms after stimulus presentation. In the 300-500ms epoch (N400), both unrelated pair types were more negative-going than related pairs, as previously reported. Similar analyses of the Laplacian-transformed ERPs revealed effects on two lateral temporal components in similar directions as the results on monopolar ERPs within the 150-250ms epoch. In the N400 epoch, relatedness effects occurred in both directions: an interference effect (greater negativity for related than for unrelated Ta pairs) at a left frontal site, and a sustained facilitation effect at mid-posterior left lateral sites. This indicated that facilitation effects began earlier and persisted while interference effects began later in the speech production process. Our results suggest that when we speak, spreading activation between semantically related concepts facilitates lexical access in the brain whether or not the relationship is thematic or taxonomic, as indicated by the early ERP effects. However, when we are placed in the context of taxonomically-related words, we must then choose from a more densely activated network of words in comparison to a thematic context (according to previous semantic network research). This leads to more effortful processing in the later stages of lexical retrieval, as indicated by the observed interference effect in the N400 window.

108 9:45 am

Characterizing grammatical productivity in Spanish-English bilingual children

Alicia Escobedo, Language and Communication Disorders (D)

Background: Analysis of children's morpheme production is often used to differentiate typically developing (TD) children from those with specific language impairment (SLI; Hadley & Short, 2005). However, clinical approaches in speech-language pathology have traditionally been designed for monolinguals and, as such, are not necessarily appropriate for children who are acquiring multiple languages. Recently, a productivity-based approach to evaluating grammatical development in bilingual children has been found to differentiate bilingual children with typical language from peers with low language skills (Potapova, Kelly, Combiths, & Pruitt-Lord, 2018). Recognizing the importance of assessing both languages for bilingual children, the current study lays the foundation for a Spanish productivity measure by identifying which grammatical structures may most appropriately contribute to such a measure.

Methods: Language samples were collected from 15 TD Spanish-English bilingual children at the beginning and end of their preschool year (mean age = 4;4, SD = 2.96 months). All children were identified as TD based on having no more than one of the following criteria: 1) a mean length of utterance lower than the group average, 2) parent reported language concern and 3) teacher reported language concern. Per parent report, average Spanish exposure was 72.27 (SD = 23.43) and average Spanish output was 62.74 (SD = 32.20; English heard = 30.22%; SD= 22.98, English spoken = 37.25%; SD= 32.20).

Results: Preliminary results indicate that children yield a growth in productivity in direct object clitics and 3rd person singular present. However, the same growth in productivity was not found for article-noun agreement, adjective-noun agreement, noun plural –s, 3rd person plural present, 3rd person plural past, subjunctive, and progressive forms. This productivity analysis for 13 additional children is underway to supplement preliminary results.

Implications: Previous research has established that productivity can differentiate typically developing monolingual, English-speaking children from those with SLI (Hadley & Short, 2005; Gladfelter & Leonard, 2013). Thus, we expect that this study will serve as an extension towards using productivity to accurately characterize typical language development in Spanish-English bilingual children and enhance clinical decision making.

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109 10:00 am

Matching pictures and signs: an ERP study of the locus of the effects of iconicity and structural alignment in American Sign Language

Meghan McGarry, Speech, Language and Hearing Sciences (D)

We capitalized on the temporal sensitivity of Event-Related Potentials (ERPs) to investigate whether the behavioral effects of sign iconicity and alignment observed by Thompson et al. (2009) occurred during lexical access or decision-making. They had ASL signers perform a picture-sign matching task and found faster RTs when an iconic property of the sign aligned with a salient feature in the preceding picture than when the preceding picture was not aligned with the sign. In addition to RTs we measured the N400 component, a wave that peaks around 400ms after stimulus onset and has been shown to reflect lexico-semantic processing for spoken words and signs. We also measured the P3, a component tied to decision-making. If the effect of iconic alignment occurs during lexical access, we would expect N400 modulation. If the effect is related to decision making, we would expect P3 modulation.

Deaf native signers were presented with line drawings, followed by videos of ASL signs. The signs' meaning either matched or did not match the object shown in the picture. Participants responded by pressing a button indicating whether the picture and the sign matched. In the matching condition, some signs were visually aligned with preceding picture, while some were not. Hearing controls completed the same task and were presented with the same pictures followed by videos of spoken English. As there is no form overlap between spoken English words and pictures, the English words were neither aligned nor non-aligned with the pictures, and thus no effects of alignment were expected.

Significant effects of alignment on RTs were not found for deaf signers or hearing controls. However, modulation of both ERP components was found. For the deaf signers the signs preceded by aligned pictures produced components that were more negative in both the N400 and P3 windows. No effect of alignment was found for hearing English speakers.

Overall, the results indicate that the structural alignment between visual features of an iconic sign and a picture affects sign comprehension. The presence of effects on the N400 and P3 components suggests that both lexico-semantic processing and decision making are sensitive to alignment

Session A-3

Oral Physical & Mathematical Sciences 1

Friday, February 28, 2020, 9:00 am

Location: Aztlan

110 9:15 am

Designed Synthesis of Small Molecules Active Against Hepatitis C Virus

Kevin Walsworth, Chemistry (D)

Background and Significance: Approximately 3.2 million people in the United States are currently living with hepatitis C virus (HCV). As a positive-sense RNA virus, HCV is prone to mutations, which makes it difficult to design drugs that can target the viral proteins. It has been discovered that a small section of the 5' non-coding RNA, called the internal ribosome entry site (IRES) subdomain IIa, acts as a molecular switch. The IRES recruits human ribosomes to bind, which causes a conformational change in the RNA, and allows for the ribosome to translate the RNA into viral proteins. Notably, this small section of RNA is highly conserved; as previously discovered, the virus showed only two point mutations in the subdomain IIa. Due to this high degree of conservation, it is an invaluable target for drug design that mimics the natural ligand and forces the IRES into a conformation that will not recruit ribosomes, rendering the virus unable to translate its RNA into proteins.

Methods: We have devised an improved, efficient synthesis of diverse compounds using novel techniques developed in our laboratory. We have initiated synthesizing new analogs designed to improve affinity of the targets for the HCV RNA. We plan to conduct rapid assays of the new compounds against the IRES-IIa subdomain, allowing us to iteratively refine SAR and leverage our new synthetic route toward obtaining compounds with increased potency.

Results: It has been shown that precise shape complementarity based solely on hydrophobic interactions can significantly improve ligand binding even in hydrophilic target sites such as RNA. We have focused on synthesizing heterocyclic methylsulfoximine and boronamide derivatives of the natural HCV IRES ligand that will take advantage of these space-filling interactions. Multiple scaffolds have been tested against the IRES construct, and we are currently designing and synthesizing new derivatives based on these results.

Conclusions: The efficient new synthetic route we have developed has made it practical to obtain enough material to optimize for inhibition, replication, favorable pharmacokinetics, and bioavailability, thus advancing the prospects of this class of compounds as potential anti-HCV medications.

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111 9:30 am

Developments towards Total Synthesis of Lagunamide A

Monny Singh, Chemistry (D)

Lagunamide A is a natural product originally isolated from Cyanobacterium has exceptional biological activity showing great promise for being a future therapeutic agent. This peptide's mode of action is an intrinsic apoptotic pathway by cleavage of capsase-9 which initiates a series of cascades causing mitochondrial assisted apoptosis. Lagunamide A has many biological activities and exceptional IC50 values: cytotoxicity against P388 murine leukemia cell lines (IC50 6.4-20.5 nano-M) and Ileocecal colen cancer (IC50 1.6 nM). This possible therapeutic also has impressive anti-malarial properties (IC50 0.19-0.91 micro-M) making it an attractive target for potential therapeutics. Such noteworthy activities brings the need for a direct total synthesis of this macrocyclic depsi-peptide.

We will present our total synthesis of Lagunamide A. This encompasses of a highly convergent asymmetric route which installs 5 of the 10 critical stereocenters found along the aliphatic backbone of the natural product. Four stereocenters are installed with high selectivity using two novel Vinylogous Mukaiyama Aldol Reactions with high yields. We will also present a new optimized method for coupling unique N-methylated unnatural peptide fragments completed via solid phase synthesis which produces the pentapeptide fragment which completes the northern hemisphere of Lagunamide A. All data for all fragments will be presented including full characterization via NMR spectroscopy, X-ray crystallography, FTIR, HPLC, and LCMS. Our presentation of these methods for creating each fragment include modifications of the total synthesis which will create divergence for modifications of the natural product. This sets the stage for future work of Lagunamide A to be the synthesis of its analogs for structure-activity relationship (SAR) studies which will be tested against various malarial and cancer cell lines.

112 9:45 am

Nucleophilic Substitution Methodologies Towards Pharmaceutically Relevant Atropisomers

Mariel Cardenas, Chemistry (D)

Within this last decade, there has been a renewed interest in leveraging stable atropisomerism to synthesize more effacacious and selective N-heterocyclic pharmaceuticals. One unaddressed challenge is the narrow window of synthetic methodologies to directly access these important atropisomeric scaffolds on desired "gram-scale" quantities. Herein we report an enantioselective nucleophilic aromatic substitution towards a diverse range of these aforementioned compounds in high enantioselectivities and optimal yields. With leaving groups such as a fluoride or chloride, we perform kinetic resolutions and dynamic kinetic resolutions using nucleophilic thiophenols. Twice oxidation to the sulfone can lead to a subsequent nucleophilic substitution to virtually any functionality that medicinal chemistry would be interested in (e.g. various amines, methoxy-groups). Examples of N-heterocycles we have directly functionalized with this chemistry include 3-aryl pyrrolopyrimidines (PPYs, a well-studied kinase inhibiting scaffold) and 3-aryl quinolines (which are found in many FDA-approved drugs and bioactive compounds).

113 10:00 am

Simulating the Interaction of Silver Nanoparticles with Silicon Solar Cells

Martha Zepeda Torres, Chemistry (D)

Silver nanoparticles have been a topic of interest in the research community for the last few decades due to their unique optical properties and antimicrobial capabilities. These properties are the basis of many applications such as plasmon-enhanced solar cells, Surface-enhanced Raman Spectroscopy, and medical devices with sterilized surfaces. A key focus in the Pullman Lab is in improving the performance of silicon solar cells by incorporating silver nanoparticles. To help guide the experiments, we have undertaken computer simulations of the optical properties of triangular silver nanoparticles attached to silicon surfaces. The triangular shape was chosen because the sharp points provide hot spots where the electric field is amplified and can interact strongly with the solar cell. The simulations are carried out using the Discrete Dipole Approximation (DDA), which is a method that allows the interaction of light with an array of dipoles in arbitrary-shaped targets to be investigated. Absorption and scattering spectra as well as the electric field in the vicinity of the nanoparticles can be calculated. Results will be presented describing the effects of changing the size of the nanoparticles, the spacing between the nanoparticles and silicon, and the orientation of the nanoparticles with respect to the silicon surface. The goal of this project is to determine optimal conditions for the interaction between the nanoparticles and the silicon surface; these conditions can then be experimentally tested.

114 10:15 am

Regioselective Electrophilic Aromatic Substitution of Phenols and Anilines via Lewis base catalysis

Andrew Dinh, Chemistry (D)

Aromatics and heteroaromatics are significant functional groups in drug discovery, material science and agriculture. The halogenated aromatic precursors then become synthetically useful as they provide access to carbon-carbon and carbon heteroatom bonds through cross coupling reactions, Buchwald aminations, and nucleophilic aromatic substitution. Halogenated compounds also are important compounds for synthesizing organolithium and organomagnesium species through halogen-metal exchange reactions. As such, there is a comprehensive library of methodologies to access aryl halides, with electrophilic aromatic substitution (SEAr) in the forefront. SEAr comes with a significant number of drawbacks,

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which includes aromatic substrates containing multiple sites of reactivity can lead to a mixture of undesired regioisomers. In common aromatic scaffolds such as phenols and anilines, a mixture of para and ortho functionalized substrates is observed, usually with the para position being more favored due to a combination of steric clash and innate electronic properties. Therefore, it becomes a synthetic challenge to access the less favored regioisomers when a substrate has a strong activating electronic preference.

Classic methodologies have been developed over the past half a century to directly access the less favored ortho regioisomers for phenols and anilines; however, these strategies usually involve low regioselectivities, utilize multistep processes with transition metals, or contain harsh conditions that restricts the chemistry to a narrow substrate scope. In 2016, we reported a regioselective strategy for the ortho-chlorination of phenol utilizing a Lewis base catalyst. While the results were significant, one drawback was the degradation of the catalyst throughout the reaction; hence, the goal of the current research is to develop a 2nd generation Lewis base catalyst that provides controlled regioselectivity without degradation.

Our research began through reaction optimization for the chlorination of phenol (catalyst, solvent, various chlorine reagents, concentration, etc.) until we obtained a set of conditions that provided high ortho-selectivity for the substrate (>20:1 ortho to para). We then tested the scope of our methodologies on several different phenols and anilines, showing that our chemistry can be utilized for a variety of scaffolds. Future work will test more complex small molecules such as pharmaceuticals and drugs with our selective strategy.

Session A-4

Oral Engineering & Computer Sciences 1
Friday, February 28, 2020, 9:00 am
Location: Metztli

115 9:00 am

Prandtl-D Aerodynamic Load and Induced Thrust Validation using Stereoscopic PIV Wind Tunnel Measurements

Bradley Zelenka, Aerospace Engineering (M)

The Prandtl-D is the rediscovery of an idea in Aerodynamics first published by its namesake, Ludwig Prandtl, in 1933. Prandtl's 1933 paper faded into obscurity since he missed the defining aspect of what has been coined the Bell-Shaped lift distribution: Proverse Yaw. Representing over 20 years of work conducted by former NASA Armstrong Chief Scientist, Albion Bowers, the Prandtl-D is a proof-of-concept glider for which much investigation was carried out, including many flight test campaigns, a wind tunnel test, adaptation into a future Martian glider, adaptation into fans and propellers, and many different computational studies. The key to the design's novel nature is the presence of an induced thrust near its wingtips, as opposed to the usual induced drag. Although extensive investigation has been conducted into the design, there has not yet been a study to measure the drag distribution of the design across its span. This is the purpose of the present research.

Our work will use Stereographic Particle Image Velocimetry (SPIV) to determine the aerodynamic loads acting on the design and verify is there is a presence of induced thrust near the wingtips. Further, we will use PIV to measure the downwash angle (deflection angle) curve across the span of the wing so as to fully characterize the Prandtl-D wing design.

116 9:15 am

Flow Visualization of Patient-Specific Right Heart Models in a Mock Circulatory Loop

Jacob Steiner, Bioengineering (M)

Diseases which affect the right heart are commonly attributed to the presence of pulmonary artery hypertension (PAH). While about half of PAH cases are associated with other causes such as heart failure (HF), the other half are idiopathic. Due in part to its delayed and difficult diagnosis, PAH causes 6.5/100k deaths in the US annually. The earlier the disease can be identified, the higher the chance of survival. Therefore, this project aims to create a patient-specific model for blood flow visualization through the right heart to observe abnormalities which could suggest the presence of cardiovascular disease.

Contrast-enhanced CT images were taken from patients at UCSD undergoing pre-surgical planning for right ventricular assist device (RVAD) placement. The images were segmented by compartment before the right ventricle (RV), right atrium (RA), and pulmonary artery (PA) were reattached and exported for 3D printing. Once printed, a thin silicone model can be fabricated using a dip-molding process. The artificial silicone heart model is then inserted into a mock circulatory system along with bio-prosthetic tricuspid and pulmonary. By pumping a glucose solution with properties similar to those of blood through the model, the hemodynamics can be observed. Pressure inside the RV is measured with a catheter-tip pressure transducer (Millar, AD instruments) and monitored continuously alongside RA and PA pressures, RA inflow, and RV outflow. Simultaneously, particle image velocimetry (PIV) is used to visualize the blood flow through the system in order to observe flow patterns, namely vortex formation. By performing stereoscopic PIV, 3D patterns can be monitored and analyzed for out-of-plane velocities.

A pilot study achieved a mean RV pressure of 4.5mmHg, mean PA pressure of 12.3mmHg, and mean PA flow rate of 2.81L/min. The 2D PIV results, however, were inconclusive due to the 3D nature of the flow field. The system for 3D imaging is currently being investigated, meaning that more conclusive results can only be drawn once the system has been finalized.

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117 9:30 am

Wind tunnel testing for hydrodynamic load characterization of icosahedron-shaped coral reef arks

Mohamed Amine Abassi, Aerospace Engineering (D)

Coral reefs play an important role in maintaining the balance of the marine ecosystem. They provide shelters to many marine species, protect coastlines from the damaging effects of waves and tropical storms, serve as a source of nitrogen and other essential nutrients for marine food chains and help in the process of their recycling. To promote the growth of coral reefs, an artificial structure named coral reef arks is being proposed. The arks, taking the shape of an icosahedron with a diameter of 3 meters, need to withstand ocean currents ranging from 0.5 to 2.0 m/s when deployed. To ensure the structural integrity during the arks design, wind tunnel force measurements for one solid and one hollow icosahedron models are conducted at free stream tunnel speeds of 27.2, 38.6 and 47.3 m/s, respectively, aiming to investigate the hydrodynamic characteristics of the structures. Based on the model diameter of 0.152m, the tunnel speeds give rise to corresponding Reynolds numbers of 0.26, 0.37 and 0.45 million, which correspond to ocean current speeds of 0.10, 0.14 and 0.17 m/s, respectively. The test result shows that the drag force coefficient is reduced from 0.46 to 0.37 when the test model is changing from solid to hollow icosahedron shapes. Power spectrum analysis indicates that the dominant frequencies at Strouhal numbers of 0.24 and 0.50 for the solid icosahedron model are reduced to Strouhal numbers of 0.16 and 0.19 for the hollow icosahedron model. The “pinging test” clarifies that these dominant Strouhal numbers are induced by the flow rather than the natural frequencies of the structure themselves.

118 9:45 am

Aortic insufficiency during Heartmate3 Left Ventricle Assist Device support: a mock loop study

Vi Vu, Mechanical/Aerospace Engineering (D)

Aortic valve (AoV) insufficiency (AI) is a severe complication in Left Ventricle Assist Device (LVAD) patients, which decreases cardiac output and systemic perfusion. Even initially normal AoV has developed moderate AI following long-term LVAD support and has been associated with the worst patient outcome. The goal of this study was to develop a repeatable and reversible mild-moderate AI model in a mock circulatory loop and study the effect of LVAD support on the clinical indices associated with worsening AI.

A silicone model of a dilated left ventricle was attached to a rotary LVAD (Abbott) and tested for a Pre-LVAD baseline (BL) condition of 20% ejection fraction and at three LVAD speeds. Moderate AI was created with a small 3-D printed stent that was non-obstructive to forward flow but prevented the AoV from fully closing. LV and aorta pressure, as well as LVAD and distal aorta flow, were recorded at 200 Hz (LabChart). At BL, the mean aortic pressure was 62±2 mmHg with 2.1 L/min cardiac output. AI maintained a similar pressure but reduced flow to 1.4 L/min, producing a 38% regurgitant fraction, which is considered mild-moderate AI. At 6400rpm LVAD support, the BL total systemic flow was 4.8 L/min, and 3.9 L/min for AI. The reduction of systemic flow accompanying by LVAD flow of 5.2 L/min indicates the presence of a regurgitant loop. Net forward flow through the AoV decreased progressively with LVAD speed, with 22% of the total at 4400rpm, 8% at 5400rpm, and 0% at 6400rpm. AI reduced forward flow and increased backward flow that progressed with LVAD speed, such that the net forward flow was -11% at 4400rpm and -31% at 6400rpm. This reduction resulted from a combination of decreased forward flow through the AoV during systole and increased backflow during diastole.

Overall, the results showed that an initially mild-moderate level of AI worsened with LVAD support before any remodeling, simply due to the altered biomechanics of the AoV. These findings provide a foundation for new LVAD control strategies that can restore the AoV biomechanics and reduce the impact of AI on patients with LVAD support

119 10:00 am

Hermeneutic Quran Classification using Machine Learning

Dhaha Nur, Big Data Analytics (M)

Classical Arabic text classification presents difficult challenges due to the sparsity in tools, the high dimensionality of text data, and the complex semantics of the language. Most text classification algorithms using categorization are based primarily on keywords in the text to determine the best suitable associated topic. This study will attempt to use the most appropriate machine learning algorithms, related methods, and text analysis tools for the most significant impact to the end results. This research assumes that the semantic value of a verse is a function of its constituents, and likewise, the corpus is a function of its verses. Historically Quranic exegesis is concerned with the interpretation of specific verses, relying on other verses for the interpretation - a hermeneutic circle if you will. What is the relationship between these individual verses, and the Quran as a whole? This research aims to explore the approach of using a hermeneutic approach to the classification of the Quran. The classification is developed using machine learning according to predefined themes and topics. The thematic subjects will be centered around time tense, the past, present, and future. Topics will then be related to a specific theme. Stories of the pious, prophets or historical lessons will be categorized in the past theme. Issues regarding rules and regulations by which people may practice the Quran will be compiled within the present theme. While matters concerning prophecies, or unforeseeable events will be within the future theme. Summarization or the preliminary work will use predefined topic indicators, such as the names of the prophets to identify verses belonging to the said topic. By using the Quran as an interpretation of the Quran this will allow us to represent the relationships between classifications and develop a new ontological representation of the Quran.

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

120 10:15 am

Economic Wireless Multimedia Communication QoE Modeling: A Prospect Game-Theoretic Approach

Krishna Murthy Kattiyan Ramamoorthy, Computational Science (D)

Multimedia Quality of Experience (QoE) is a prominent factor that drives customer satisfaction and user experience in wireless communications. The QoE perceived by customers has been measured objectively in terms of throughput and latency, until recently, emphasis has been on subjective metrics such as smoothness of video streaming and Peak Signal to Noise Ratio (PSNR). In this research work, we have explored the nuances of Prospect Theory to quantify the QoE from a human psychological standpoint and developed an economic multimedia communication framework to improve the customer QoE, provider revenue and reduce network congestion. A typical wireless multimedia transaction between the service provider (sells multimedia content) and customer (requests multimedia data) has been investigated using the proposed prospect-theoretic framework. Firstly, we define the utility equations for the provider and customer mathematically. Secondly, the interaction is translated into a game-theoretic problem by defining provider as leader and customer as follower in Stackelberg leadership model. Finally, an equilibrium strategy, such that both players have no incentive of deviating from that strategy, has been derived using concave optimization techniques. A comprehensive parametrized algorithm has also been presented to implement the proposed framework. Simulation studies conducted using H.265 multimedia data indicated a significant boost in customer QoE and reduction in network congestion, thereby, maximizing the utilities of both provider and customer.

Session A-5

Oral Education 1

Friday, February 28, 2020, 9:00 am

Location: Templo Mayor

121 9:00 am

Collaboratively Cognitive: High School Students' Perceptions of Collaborative Problem-Solving

Al Schleicher, Education (D)

Recent pedagogical shifts in K-12 teaching have led to more collaborative group work, inquiry-driven curriculum, and project-based learning in U.S. schools (Nagel, 2008). Students are assessed more often through group work as they become investigators in their own learning experiences. While preservice teachers are taught to use group work and collaboration in classroom settings as part of their teacher credentialing, assessing this type of student learning is difficult to measure (von Davier & Halpin, 2013). However, while teaching and learning experiences have changed to increase collaboration in the classroom, students' learning is continuously assessed based on individualized state-mandated tests. Unfortunately, this disconnect between pedagogical shifts in instruction and the lack of appropriate collaborative learning assessments creates questions as to whether these techniques are working to increase students' cognitive learning.

The purpose of this study is to investigate the benefits of collaborative problem-solving (CPS) through the 2015 Program for International Student Assessment (PISA). Created by the Organization for Economic Co-operation and Development (OECD), PISA added a CPS assessment to the international science, mathematics, and reading tests. Students from the United States do not typically score well on international assessments (von Davier & Halpin 2013). However, the United States sample of students did relatively well, scoring 13th in the world on the CPS portion of the examination. Currently, there is no explanation for the discrepancy in rankings of achievement based on the U.S. sample.

This research study used a quantitative, correlational design using secondary data analysis. Descriptive and inferential statistical analysis was employed using the student survey (n =5,712) to study student attitudes toward collaborative problem-solving in the classroom. Significant predictors will be discussed, along with implications for further research on collaborative cognition from continued instructional shifts and their validation for student learning achievement.

122 9:15 am

Students' Personal Concept Definitions of Linear Independence

Ernesto Calleros, Mathematics and Science Education (D)

A mathematics learner may construct a personal concept definition, the set of words they use to specify a mathematical topic. This is in contrast to a formal concept definition, the set of words used by the broader mathematical community to specify a topic. Prior research indicates a learner's primary understanding of a topic is not necessarily informed by that topic's formal definition. Thus, personal concept definition is an important construct because it seeks to capture the meaning students have for particular math topics. This study investigates undergraduate students' personal concept definitions of an important topic in linear algebra, namely linear independence. In interviews conducted with undergraduates, I found students' initial descriptions of linear independence often varied substantially from the language of the concept's formal definition, which is very abstract. I used the analytical tool of personal concept definition in order to highlight this distinction in student responses. Through grounded analysis, I identified recurring personal concept definitions that students provided for linearly independent sets: namely, a set of vectors is linearly independent if and only if: (a) the set (conceptualized as a matrix with the vectors as its columns) reduces to the identity matrix; (b) no two vectors in the set are scalar multiples of each other; and (c) the set contains at least one vector that is a scalar multiple of another vector in the set. I also present results regarding affordances and limitations of each personal concept

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definition category, emphasizing how each concept definition supported or constrained student reasoning in determining whether or not a given set of vectors was linearly independent. Although neither of these personal concept definitions was completely accurate mathematically, they were useful notions within particular conditions or highlighted important mathematical ideas. Drawing on these results and additional evidence, I establish potential factors leading to students' personal concept definitions: rote learning, formal logical fallacy, and students' linguistic resources. I conclude with implications for teaching, including concrete ways for promoting students' conceptual understanding of linear independence, facilitating students' logical generalizations in this topic, and building on students' linguistic resources to promote a productive, culturally-relevant learning environment!

123 9:30 am

Defining as an Introduction to Set Theory

Michael Foster, Math and Science Education (D)

The purpose of this project was to apply the Defining as a Mathematical Activity (DMA) framework to the advance mathematics topic of Set Theory through the use of an online GeoGebra applet. Set Theory is the branch of mathematics focused on treating sets as units, and exploring properties of those units. Traditionally, students do not take a class on Set Theory until college, and these students are usually mathematics or computer science majors. This leaves sets, a topic that we argue to be foundationally related to mathematics, to a very small subset of the population. The primary research question for this project was: What is the evolution of students' constructed definitions for sets and set operations, as they explore set properties through the use of an applet?

To frame this question, we begin with a review of key philosophy of mathematics arguments from Platonism and intuitionism that rely on sets as fundamental to the emergence and truth of numbers. From the metaphorical language we use (Lakeoff & Núñez, 2000) to the apparent intuitions underlying our experiences (Maddy, 1980), sets are a part of our mathematical and everyday lives. Leveraging these experiences early in student's mathematical education can reposition mathematics as a subject grounded in experience.

To answer our research question, a teaching experiment (Steffe, 1991) was conducted with two high school students. Analysis focuses on their generation and evolution of a definition for set. Open coding (Strauss & Corbin, 1990) was used to categorize the progression of their definition through the four activities types posited within DMA: situational, referential, general, and formal. Each activity type was defined in relation to the applet. The applet was informed by design considerations from the Dynamic Geometric Environments (DGEs) literature. Namely, the applet utilizes construction and manipulation features. These features allow the participants to generate and test conjectures. A clear shift occurs in participants definition. Defining as a mathematical activity worked to engage students in a process, that once a realizable context was introduced, led to a clear shift in students conceptions.

124 9:45 am

Visualizing Girlhood

Darielle Blevins, Education (D)

African American girls in K-12 are suspended 6 times that of their White peers (Civil Rights Data, 2014). During the middle and high school years Black girls with school discipline records are more likely to experience formal and informal discipline from adults on campus than non-black students as described in recent research conducted by (Wun 2016, Evans-Winters 2011). When relationships are characterized by tension and conflict, which can be a result of school discipline, they can cause adverse outcomes for children's identity development. Studies indicate Black girls mental health and self concept are impacted by gendered-racial discrimination experienced in school and society. Ahn 2011 suggests, Self-identity is molded and shaped by interactions with one's environment and experiences therefore it is necessary to understand how girls understand their identity in relationship to their teachers.This study seeks to understand how Black adolescent girls visualize their identities and understand their relationships with their teachers.

Visual based methods provide an opportunity for children to exercise agency in expressing their own experiences in the context of traditional power hierarchies. This study employed drawing elicited interviews based on 10 adolescent girls self generated dual self-portraits. The portraits consisted of one side representing how she feels about herself on the inside and the other side how she believed her teacher viewed her. Visual Discourse Analysis and Constant Comparison were employed to analyze the visual texts and contribute to uncovering themes. Major themes included girls visualizing their invisibility in their classrooms evidenced by the portraits of their inner selves being incongruent with their depiction of how their teacher views them. The second theme identified was "hyper visibility", as girls depicted themselves as targets of disproportionate discipline and bullying by teachers. A pleasing finding was the visualizations of girls who feel seen, loved and cared for by their teachers. These girls drew portraits that looked like celebrations and conveyed happiness. Implications and recommendations for visual methodology and classroom practice were offered.

Ahn, J. (2011). Review of children's identity construction via narratives. Creative Education, 2(05), 415.

DataQuest (CA Dept of Education). (n.d.). Retrieved February 06, 2018, from https://data1.cde.ca.gov/dataquest/

Evans-Winters, V. E. (2011). Afterthought: New directions in research and writing the lives of Black girls. Counterpoints, 279, 171-177.

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125 10:00 am

Unpacking LGBQA: Experiences and Supports for Queer Spectrum Students in Math

Matthew Voigt, Math and Science Education (D)

Queerness is an entity which often defies categorization and as such it can be hard to unpack notions of queerness; furthermore, this becomes increasingly difficult when one considers queerness in the context of Mathematics. In this study we draw on large scale survey data and iterative categorization to understand and unpack students' self-described sexual identity. Specifically, we present data from students enrolled in introductory math courses at 22 universities across 898 classrooms. Queer spectrum students, those identifying in some way with the sexual minority, represented 10.0% (n=2,454) of the total student responses in the study (n=24,327). Quantitative analysis reveals a pattern that Asexual students report the most positive instructional practices (instructor interactions, peer interactions, math affect, sense of community) while Bisexual and Queer+ (e.g., queer, pansexual, multiple queer identities) students report the lowest levels of positive instructional experiences. Insights from this analysis and follow-up student interviews provide recommendations for programmatic supports for queer spectrum students.Queerness is an entity which often defies categorization and as such it can be hard to unpack notions of queerness; furthermore, this becomes increasingly difficult when one considers queerness in the context of Mathematics. In this study we draw on large scale survey data and iterative categorization to understand and unpack students' self-described sexual identity. Specifically, we present data from students enrolled in introductory math courses at 22 universities across 898 classrooms. Queer spectrum students, those identifying in some way with the sexual minority, represented 10.0% (n=2,454) of the total student responses in the study (n=24,327). Quantitative analysis reveals a pattern that Asexual students report the most positive instructional practices (instructor interactions, peer interactions, math affect, sense of community) while Bisexual and Queer+ (e.g., queer, pansexual, multiple queer identities) students report the lowest levels of positive instructional experiences. These differences are mostly related to interactions between queer students and instructors and peers. Drawing on qualitative student interviews we provide recommendations for programmatic supports for queer spectrum students and evidence of mathematical discourses that erase queer-spectrum identity from STEM environments.

Session A-6

Oral Biological & Agricultural Sciences 1

Friday, February 28, 2020, 9:00 am

Location: Visionary Suite

126 9:00 am

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

Ana Gomez Ramirez, Biology (U)

Seabirds are often key species in their coastal and island ecosystems since they utilize both terrestrial and marine ecosystems. Many seabirds forage in the ocean for fish, crustaceans, and aquatic invertebrates, and then form dense nesting aggregations on nearby islands or shores. As a result of this behavior, seabirds heavily subsidize terrestrial ecosystems with marine nutrients through the accumulation of guano and deposition of marine prey carcasses onto the ground. This subsidy is reflected in the entire community, since the added nutrients get passed to many organisms through trophic interactions. Seabirds are known opportunistic feeders, and changes in their diet could easily alter the nutrient balance of the island communities where they nest. Our work will study the relationship between nutrient shifts in an island community and changes in subsidy inputs due to consumption of anthropogenic food sources by seabirds. We hope to have a better understanding of these linkages through the use of stable isotope analysis of historic and contemporary plant and animal material from the island. We will combine this data with observational studies of seabird foraging and nesting behaviors to fully examine the temporal and spatial factors affecting the island's ecosystem.

127 9:15 am

An integrative approach to assess the conservation status of the binationally distributed Mission Manzanita (Xylococcus bicolor)

Kyle Gunther, Evolutionary Biology (M)

The California Floristic Province (CFP), a biodiversity hotspot and area of conservation concern, is home to over 2,600 endemic plants, including the Mission Manzanita (Xylococcus bicolor). This ecologically important shrub is narrowly distributed from Los Angeles County to the mid-peninsula of Baja California and is being heavily impacted by human development. Consequently, Xylococcus bicolor has been predicted to lose up to 88% of its habitat by 2080, yet this shrub is understudied, and little information exists to inform any conservation efforts for this species. We seek to fill this gap in knowledge by 1) re-visiting habitat suitability by modeling updated climate change scenarios, 2) establishing gene pool boundaries, 3) estimating genetic differentiation, genetic

diversity, and inbreeding of each gene pool, and 4) analyzing differences in population-level leaf morphology. Preliminary results show a drastic loss of suitable habitat under both RCP 4.5 and RCP 6.0 scenarios, with the most suitable habitat remaining in Tijuana and Ensenada. There appears to be at least two distinct gene pools corresponding to populations north and south of the Vizcaino Desert, with potential sub-structuring in the northern populations. Smaller, disjunct populations contain less alleles and lower observed heterozygosity. Leaf morphology measurements are still underway, but there are noticeable differences in leaves from Catalina Island and Sierra San Francisco compared to those from the bulk of the distribution. We hope that the results from this study will provide information for land managers and conservationists to help preserve this endemic shrub of the CFP.

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128 9:30 am

What can Phyloregionalization tell us about Middle American Herpetofauna? Region Formation Utilizing the Evolutionary History of Reptiles and Amphibians

Dillon Jones, Evolutionary Biology (M)

Phylogenetic regionalization (phyloregionalization) is a novel methodology whereby biogeographic regions are inferred by explicitly incorporating the evolutionary (phylogenetic) history of a selected group of organisms. Through phyloregionalization, we are able to visualize the spatial and temporal processes that give rise to biodiversity of defined regions. Previous phyloregionalization studies have discovered overlooked regions of unique evolutionary history, provided evidence for the processes that gave rise to the diversity of these regions, and explored how regions are formed as well as how these regions may change. This study investigates the evolutionary history of Middle American herpetofauna (reptiles and amphibians) by utilizing a phyloregionalization approach.

Middle America stretches from Mexico to Panama and holds some of the highest biodiversity on the planet. However, the processes that gave rise to this diversity are still poorly understood. Many theories have been posited to explain this phenomenon, however, few works have examined this region as a whole. Other works have attempted to delimit herpetofaunal biogeographic regions in Middle America primarily based on geography and did not take their unique evolutionary history into account. Through the creation of phyloregions, we hope to uncover distinct biogeographic regions that have been previously overlooked and provide evidence for the processes that gave rise to this diversity.

Phyloregionalization requires a phylogeny and distribution information of the species in question. In order to conduct our analysis, recently inferred phylogenies for reptiles and amphibians were obtained from the literature, and distribution data were processed from GBIF databases and IUCN range maps. In total, this dataset encompasses over 1000 species from Middle America. From this information, a pairwise distance matrix of phylogenetic beta diversity is created and subsequently clustered to create the phyloregions. Preliminary results have shown a number of distinct Middle American biogeographic regions that have not been highlighted in previous studies, as well as provided information on processes that lead to their formation. We hope that this work will provide a greater understanding of Middle American biogeography and the processes that have shaped the species as they stand (or slither) today.

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129 9:45 am

An investigation of a hybrid zone using geographic cline analysis

Aubtin Rouhbakhsh, Biology (U)

Hybrid zones are regions where separate taxa mate, producing hybrid offspring. These areas of overlap provide insight into how processes such as speciation and selection interact. Two hummingbird species, the Allen's (Selasphorous sasin) and Rufous (S. rufus) Hummingbird form a hybrid zone in southern Oregon and northern California. Their hybrids express various traits representative of both parent species in addition to intermediate characteristics. During courtship, males of both species perform a J-shaped dive, where they make a diagnostic dive sound based on wing and tail feather morphology. In Allen's, the fundamental frequency of the dive sound spans from 1.6-1.8 kHz while in Rufous it spans from 700-900 kHz. Hybrid males express fundamental frequencies that are intermediate between both parent species. We compared and contrasted 20 phenotypic characters, including behavioral and morphological traits across both parent species' ranges and the hybrid zone via geographic cline analysis. Using field data from numerous localities along a coastal and inland transect, we created clines that modeled the gradient for each character and the degree of hybridization. We were able to visualize how strongly selection acted on these phenotypes. We also estimated cline center, which located where the highest degree of hybridization took place, and mapped the extent of hybridization across the zone. The shape of the cline gives insight into how selection acts on each character, with steeper clines indicating stronger selection. We found that selection was stronger on courtship displays rather than other morphological traits. Thus, these traits are likely under sexual selection and important in speciation.

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130 10:00 am

Metabolic Serum Profile of Three Captive Shark Species

Asha Goodman, Cellular and Molecular Biology (D)

As near-shore shark species experience abrupt die-off events and habitat loss directly resulting from anthropogenic forces, the need for more specialized conservation efforts for coastal dwellers grows critical. Our research project aims to develop a health metric and subsequent preventative health care strategy for Chondrichthyes. The growing field of metabolomics provides a qualitative approach by identifying potential biomarkers in sharks, particularly those

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in the circulatory system. Sharks in captivity provide an ideal opportunity to study healthy individuals: aquariums maintain long-term shark inhabitants with individual veterinarian records encompassing blood chemistry and pathology reports that span several years. One such organization is the San Diego Birch Aquarium at Scripps in La Jolla which houses several species of Elasmobranches, including leopard (Triakis semifasciata), horn (Heterodontus francisci), and swell (Cephaloscyllium ventriosum) sharks. Untargeted metabolic data sampled from these resident sharks has provided over 9,906 significant ($p \leq 0.05$), tentatively identified molecules of interest including imidazole acetaldehyde, pregnenolone, homocarnosine, and bupropion. The presence of sex hormones such as pregnenolone may be indicative of imminent mating events while bupropion, an antidepressant, may reveal pharmaceutical pervasion in an environment resulting from human proximity. Furthermore, blood metabolic profiles belonging to swell and leopard sharks exhibit similarity while horn shark samples are distinct, signifying species-specific metabolites. The field of Chondrichthyes blood metabolite composition is data deficient and possible dysregulation of serum metabolites between shark species is an additional unexplored area of research. These molecules will serve as a foundation for potential indicators of shark health and fitness and will be implemented in the future sampling of wild organisms.

Session A-7

Oral Interdisciplinary 1
Friday, February 28, 2020, 9:00 am
Location: Legacy Suite

131 9:00 am

Sociodemographic, Psychosocial, and Behavioral Correlates of Medical Mistrust in Latino Sexual Minority Men

Isaiah Jones, Psychology (U)

Medical mistrust (MM) has been studied in the context of various minority populations, including the Latino community and sexual minority men; however, little research has focused on MM among Latino sexual minority men (LSMM). This study explored the associations of demographic, psychosocial, and behavioral factors with MM among LSMM. 136 LSMM participants, between the ages of 18 to 29, were recruited through Grindr to complete an online survey concerning sexual, psychosocial, and identity topics. Among other measures, participants reported sociodemographic, behavioral, and psychosocial variables. Binary variables were created for sexual orientation (gay vs. bisexual), education (some college vs. below), housing (stable vs. unstable), cigarette use (none vs any) and other substance use (none vs. at least once). A two step hierarchical multiple regression was performed. Sociodemographic variables comprised Step one, including age, ethnicity, citizenship, sexual orientation, education, income, housing stability, and insurance status. Step two included the behavioral and psychosocial variables of machismo and caballerismo traits, depression, alcohol use, cigarette use, and other general substance use. The analyses revealed that in Step one, sexual orientation and unstable housing contributed significantly to the model, $F(8,127)= 4.52$, $p< .001$, and accounted for 17.3% of the variance in MM when adjusted. Introducing the behavior/psychosocial variables in Step two explained an additional 18.4% of variation in MM ($F(6,121)= 7.01$, $p< .001$). Within Step two, unstable housing was no longer significant, but sexual orientation did remain significant. The behavior/psychosocial variables of machismo, caballerismo, depression, and substance use significantly contributed to the overall model also, $F(14,121)= 6.36$, $p< .001$, and explained 35.7% of the variance when adjusted. Among this sample of LSMM, behavioral and psychosocial factors, including machismo and caballerismo, depression, and substance use, were found to account for significantly more variance in MM than commonly used demographic variables. This evidence may further support the notion that cultural factors and personal beliefs play a key role in determining levels of MM, rather than background or demographic characteristics.

132 9:15 am

Sociodemographic and Behavioral Factors Associated with Students' Initiation of the MenB Vaccine During a University Outbreak

Nicholas Lucido, Public Health (U)

Introduction: Meningococcal meningitis (meningitis), caused by the bacteria Neisseria meningitides, results in swelling of membranes surrounding the brain, spinal cord and/or blood infections. Meningitis is spread by person-to-person contact, coughing, kissing, or sharing saliva. In September 2018, a meningitis serogroup-B (MenB) outbreak was declared at a California university after three confirmed MenB cases among students. This study assesses whether socio-demographic characteristics and previous vaccine behaviors are associated with students' initiation of the MenB vaccine series during an outbreak.

Methods: Using convenience sampling, 150 students, ages 18-24 years (mean: 20.8 years; 73% female), completed a self-report survey assessing initiation of the MenB vaccine series, vaccine-related behaviors, and socio-demographic characteristics. Chi-square tests examined associations between socio-demographic variables, vaccine-related behaviors, and receipt of MenB vaccines during the outbreak. A t-test evaluated differences in age between students who initiated the MenB vaccine and who did not.

Results: Fifty-nine percent of students obtained a MenB vaccine during the outbreak. Students who received a MenB vaccine were significantly younger (mean: 20.4 years) than those who did not (mean: 21.3 years; $t = 2.9$, $p = .004$). The proportion of students who received the vaccine decreased with subsequent years in college; 74% of first-year students received it compared to 33% of fifth+ year students ($c2 = 9.8$, $p = .044$). Twenty-three percent of students who did not receive the MenB vaccine had previously refused a vaccine, compared

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to 8% who received the vaccine (c2= 6.9, p=.008). Similarly, 18% of students who did not receive the MenB vaccine reported a parent/caregiver previously refusing a vaccine for the student, compared to 5% who received the vaccine (c2 = 7.4, p =.007).

Conclusion: During a MenB outbreak at a California university, students who were older, in higher academic years, who previously refused a vaccine, and whose parents previously refused a vaccine were less likely to obtain MenB vaccines, putting them at higher risk for MenB. This study provides evidence that previous personal and parental/caregiver childhood vaccine refusal may put college students at risk through vaccine avoidance. Future outbreak response teams should consider targeted interventions for vaccine hesitant and older students.

133 9:30 am

Traditional Machismo, Caballerismo, and the Pre-exposure Prophylaxis (PrEP) Cascade among a Sample of Latino Sexual Minority Men

David Rivera, Psychology (U)

From 2010 to 2017, HIV diagnoses increased 17% among Latino sexual minority men (SMM) while decreasing 19% among White SMM and stabilizing among African American SMM. Traditional machismo is characterized by aggressiveness/power; caballerismo consists of family values/chivalry. Latino SMM high in traditional machismo may avoid seeking PrEP to avoid being stigmatized as effeminate. Latino SMM high in caballerismo may be more likely to use PrEP to remain healthy for their family and/or partners. The current study explores the association between traditional machismo and caballerismo with four steps of the PrEP cascade. Participants were 151 HIV-negative Latino SMM living in San Diego, California (M = 24.18 years old) who completed an online study. Traditional machismo was associated with low odds of PrEP awareness, willingness, and adherence. Caballerismo was associated with greater odds of PrEP awareness, willingness, use, and adherence. High levels of traditional machismo among Latino SMM may be a barrier to PrEP. Caballerismo may be a facilitator of PrEP awareness, willingness, use, and adherence. Programs which serve to move Latino SMM through the PrEP cascade may benefit from discussing culturally-relevant masculinity given the potential for their differential association with PrEP variables.

134 9:45 am

"Dude, check yourself": A Quantitative Analysis of Mental Health in Masculine Same-Sex

Stetler Brown, Communication Studies (M)

With the increase of mental health as a topic in daily life, many college students are becoming more open to discussing their mental health. With the release of the American Psychological Association (APA) report on toxic masculinity and the link to health problems for men's mental health research, it provides exigency to investigate how mental health conversations affect masculine identities. In this project, it is hypothesized there is a link to self-esteem stability and discussing mental health among male same-sex friendships on college campuses. Utilizing social penetration theory as a framework, the hypothesis was tested by surveying college students (n = 225) at a Hispanic-serving four-year university in the Southwestern United States through a research participant system. Utilizing adapted measures adapted and items created to measure conversation quality, time, and frequency, a small negative correlation to time of conversation and self-esteem stability was found when Pearson's r was calculated. There was no significant correlation among time or quality, but a weak, negative correlation was found for frequency to self-esteem stability. Thus, the hypothesis was not supported. These results underscore a need to investigate mental health as a topic in masculine dyads, and where in these relationships communicators feel comfortable bringing up the topic in juxtaposition to their identity.

135 10:00 am

Sex You Want: PrEP Campaign Messages and Safe-Sex Intention

Gumaro Sanudo, Communication (M)

The purpose of this study was to apply constructs found in the theory of planned behavior (TPB) to examine the association between participant attitudes about PrEP campaign messages and the effect it has on their attitudes about safe-sex behavior. PrEP is a pre-exposure prophylaxis medication that is taken once daily for HIV prevention. However, its increase in use and prevalence in public discourse has put it at the center of controversy. This study is important to the population of interest, as Queer+ men are the most effected by HIV infection. Undergraduate students (n= 79) on a college campus using the universities research participation system, SONA, and users on the internet discussion website, Reddit, who self-identified as Queer+ were asked to complete an anonymous survey where they reported on their attitudes about PrEP campaigns and their safe-sex behaviors. The measure used for this survey was an adapted Likert-type scale with items that measured participant attitudes and beliefs about explicit PrEP campaign messages. Participants were also asked to report on their personal use of PrEP and safe-sex practices. TPB constructs were also modified to ensure the focus of our analysis was solely on the participant. Pearson's r correlations found significantly weak relationships between PrEP attitudes and safe-sex intentions (r= .234, p= .042), as well as intentions to use PrEP and similar intentions to practice safe-sex behavior (r = .241, p = .038). The results obtained from this study advances the small number of research studies on PrEP campaigns and safe-sex behaviors, along with the scope of TPB, to include safe-sex campaigns, prophylactic use and intentions, homosexuality norms, and heterosexual influence. The implications of this study can benefit future creators of PrEP campaign messaging and better educate the general populous about PrEP and how it is communicated in public spaces.

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136 10:15 am

Vaccination and Healthcare Mistrust Among Low Socioeconomic Minority Adults

Cassandra Wilson, Anthropology (M)

To date, most US vaccination uptake research has focused on populations with high socioeconomic status (SES) levels, even though low SES minority populations consistently vaccinate less than higher SES populations in America. The causes of this trend are unclear, although some research has indicated the perception of prejudicial encounters with health practitioners drives vaccine avoidance. Furthermore, research outside of the U.S. suggests that vaccination policies do not function as well in communities with a history of oppression. I am collecting information regarding the perceptions of vaccinations held by low SES minority adults. In its current state, my research has expressed consistency with these former related studies. In keeping with the formative nature of the research, I am using focus groups and interviews to collect qualitative data regarding personally held beliefs concerning vaccinations, as well as social network norms on the topic. My questions address perceptions of vaccine efficacy, trust in government health programs, perceptions of vaccine safety, and the influence of political structures on vaccine hesitancy. My selection of these topics is informed by the framework of Critical Medical Anthropology, which prioritizes structural factors in causal explanations. Findings will contribute to explaining the foundations of vaccination hesitancy in low SES minority groups. This will enable the development of better informed programs for targeting vulnerable populations.

Session A-9

Poster Engineering & Computer Sciences 2
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

137 9:00 am A

Data Analysis of Passenger Counts at SDSU Shuttles Stops

Emmanuel Millan, Civil Engineering (U)

Changes were made to San Diego State University's Red & Black Shuttle service at the beginning of the Fall 2018 semester including an increase to the routes that the shuttle service followed. This resulted in an expansion of the service area from 12 stops on only one route to 18 stops spread among three routes. The service is supported by the San Diego State University Police Department (SDSUPD), with community service officers driving five shuttle buses on the three different routes. The Red route, Black route, and Green route pick up and drop off passengers at stops south of the campus, east of the campus, and on campus, respectively. A count of the number of passengers shows that the number of students using the shuttle service has increased from previous years. To determine the effectiveness of the changes to the route, the passengers picked up and dropped off at each stop were counted and tabulated. From that data, trends in the amount of pick ups and drop offs at certain location implies that certain stops are more popular than others. The existence of these trends suggests that improvements to the existing routes in the Red & Black Shuttle service can be made to improve efficiency and resource use.

138 9:00 am B

Optimal Emergency Planning for Urban Drone Traffic

Kevin Ayala, Aerospace Engineering (U)

As engineering and computer science around the world advances, we see the rapid use of autonomous systems exponentially increase. Collision avoidance is and will always be essential and necessary in the study and application of autonomous aerial vehicles(AAV) and vehicles that take off and land(VTOL) in a populated environment. With macro usage such as machine production in factories, sorting robotics in Amazon facilities, autonomous vehicles flying in the sky and driving on the roads, to micro usages such as vacuum cleaners. Ultimately, we need to know that they can be reliable and trustworthy. In this paper, we will highlight the basic types of scenarios in which collision avoidance algorithms are necessary and prove reliability and confidence on future engineering.

139 9:00 am C

Trajectory Prediction at Intersections Using Inverse Reinforcement Learning

Mohammad Sadegh Jazayeri, Civil Engineering (M)

In order to plan their movements, automated vehicles need to be able to predict the path that other vehicles in their environment are going to take. Accuracy in these predictions is important as errors may lead to accidents. This problem is especially salient at intersections where the risk of collision as well as the complexity of the scene is higher. According to the National Traffic Safety Administration, between 2014 and 2018 about 40 percent of all crashes and 24 percent of fatal crashes occurred at intersections. In this research, we are developing a method for trajectory prediction based on inverse reinforcement learning (IRL). IRL is an imitation learning framework that allows control behavior to be learned from demonstration. For our research we are using the NGSIM dataset from which we have extracted trajectory data at three signalized intersections and combined them with singal timing data to construct traffic scenes from the perspective of every vehicle. Each scene as seen from the perspective of each vehicle constitutes a training sample which we use to train an IRL model. Each training sample consists of parameters such as the positions, headings, and velocities of vehicles, street markings, and the state of the traffic signals at the intersection. At each instant in time we use these parameters to predict the changes in the heading and velocity of each vehicle present in the scene. These predicted changes are then used to construct the state of the scene in

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the next time step. By repeating this procedure, we are able to predict how the scene evolves over time and predict the trajectory of the vehicles present at the intersection.

140 9:00 am D

Assessing the Safety Impact of a Narrow Automated Vehicle-Exclusive Reversible Lane on an Existing Smart Freeway

Anagha Katthe, Civil Engineering (Transportation) (M)

With the advent of cutting-edge research in self driving technology, safety and quality of travel will see order of magnitude improvement with Automated vehicle (AV) entering the mass market. However, deploying AVs in today's world is a challenge as there is constant interaction between AVs and human-driven vehicles. The main objective of this research is to evaluate the safety impact of an innovative infrastructure solution for safe and efficient integration of Automated Vehicle (AV) as an emerging technology into an existing transportation system. Given the research on effect of AV technology on infrastructure standards is limited, this research aims to fill the gap by evaluating whether AVs could operate safely in a narrow lane next to existing regular traffic lanes on an expressway. In this paper, I-15 express lanes (EL) in San Diego is taken as the focus of study where implications of adding a 9-foot exclusive bidirectional reversible AV lane adjacent to two 12-foot lanes for HOV and FasTrack vehicles is investigated. In order to understand the state-of-the-art and limitations of AV technology, a literature review on various AV attributes such as Lane Keep Assist (LKA), Lane Departure Warning (LDW), Lane width (LW), Automated Lane Centering (ALC) is conducted. Data is collected from transportation officials and industry manufacturers through expert interviews to investigate AV technology elements impacting lane specifications. In addition, analysis from consumer questionnaire database is carried out to understand the technological challenges faced by AV vehicle owners. Crash data analysis is performed to investigate the history of different crash types on I-15 EL and the potential causes that are at least partially attributable to AV system operations. Results from traffic simulation models are used to quantify safety impacts of the narrow AV lane on existing smart freeway and provide practical recommendations and guidelines usable for practitioners and professional organizations pertaining to AV development.

141 9:00 am E

Developing an Intelligent Transportation Management Center (ITMC) with a Safety Evaluation Focus

Alireza Darzian Rostami, Transportation Engineering (M)

Transportation management centers (TMCs) are entities responsible for monitoring, managing, and optimizing the transportation system. TMCs perform various tasks such as incident management, traffic signal control, traffic management, and roadways surveillance. With the vast amount of data generated continuously from cameras, smartphones, and connected vehicle equipment, transportation management tasks are going to be more complicated. Nonetheless, TMCs with the current state do not have the tools and capabilities to address the complex and ever-changing issues of the future smart cities. This study focuses on building and developing an Intelligent Transportation Management Center (ITMC) that utilizes advanced machine learning algorithms, big data science, and image processing to proactively assess safety at signalized intersections. In this study, we aim to use video footage from several traffic cameras at signalized intersections to collect necessary data for proactive safety monitoring. The traditional method of safety evaluation at signalized intersection measures the crash risk by dividing the crash frequency by some exposure measures such as traffic volume. This method has several shortcomings, including limitations in sample size, the extended period of data collection, and the inability to assess newly implemented countermeasures. This study adopts Surrogate Safety Measures (SSMs), such as Time-To-Collision (TTC) and Post Encroachment Time (PET), to analyze traffic conflict and near-crashes that happen more frequently on the roadways. The proposed ITMC will utilize these measures to proactively assess safety at intersections. This proactive approach can assist transportation agencies in identifying high-risk locations and measuring countermeasure effectiveness in short periods of time.

142 9:00 am F

Behavior modeling of drivers in the presence of automated vehicles-exclusive lanes

Aryan Sohrabi, Computational Science (M)

The goal of this research is to evaluate the mobility and safety impact of an emerging Automated Vehicle (AV) roadway design (a narrow AV exclusive lane) on the behavior of drivers in regular lanes. Through custom-designed driving simulator scenarios, mimicking real San Diego I-15 smart corridor lane reconfiguration, this work will investigate the driving behavior of human-driven vehicles driving on a regular lane adjacent to a narrow AV-exclusive lane. The mobility and safety are analyzed for different AV-exclusive lane widths (9 and 12 feet), different headways of AVs(1 and 3 seconds), presence or lack of presence of traffic on the non AV-exclusive adjacent lane, age, and gender through the measurements of speed, lateral distance, workload, and driver comfort. The design of the experiment includes both within-subject(headway and traffic presence) and between-subjects(lane width, age, and gender) variables and their relationship with the dependent variables is given by a generalized linear mixed model. The significance of the model is analyzed thorough ANOVA statistical tests, and different behaviors are clustered with an unsupervised learning method.

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143 9:00 am G

Python Simulation of Core Autonomous Robot Functionality and Algorithms

Onat Gungor, Electrical/Computer Engineering (D)

Robot platforms and sensors are not easily accessible and require profeciency in low-level, often hardware specific, programming languages. There exist high fidelity simulators of robot sensing and dynamics, such as Gazebo, Bullet, or MuJoCo, but these tools are also challenging to use requiring a lot of prior programming and robotics algorithm experience. To accelerate research and education in robotics, our work is developing a python simulator that abstracts hardware and physics simulation details in a free easy-to-use programming environment. Our API provides basic robot shapes (circle, rectangle, car, quadrotor), sensor types (lidar, camera) and 3-D environments and allows users to easily create new environments or robot types. Our work is also focusing on providing baseline implementations and tutorials of core robotics algorithms, including Monte Carlo Localization, Occupancy Grid Mapping, and classic motion planning algorithms, such as Bug, Dijkstra, and A*. Our environment is open-source, easily accessible, and easily modifiable, allowing the user to add new robots, maps, sensors, and algorithms. Our future work will focus on developing a low cost robot car, equipped with a GPU and depth camera, to accompany the python simulation and allow demonstrating these capabilities directly in real world applications.

Session A-10

Poster Interdisciplinary 2

Friday, February 28, 2020, 9:00 am

Location: Montezuma Hall

144 9:00 am H

Factors Explaining High Mortality Rates Among Hispanics after Melanoma Diagnosis

Marlene Crespo, Psychology (U)

A melanoma diagnosis occurs less often among Hispanics than non-Hispanic Whites, yet the prognosis for Hispanics is worse. This survival disparity is a growing concern because Hispanic melanoma cases have been increasing. This literature review explored factors that may explain the poorer prognosis of Hispanics diagnosed with melanoma.

A narrative review of the literature was conducted using articles published since 2009. MEDLINE, PsycINFO, CINAHL, and ERIC databases, and the Google Scholar search engine were used. The key search terms used were melanoma, skin cancer, Hispanics, Latinos, mortality, socioeconomic status, knowledge, awareness, perception, late stage diagnosis, and screening.

Studies identified clinicopathologic, socioeconomic, and psychological/behavioral factors that may contribute to the lower melanoma survival rate among Hispanics than non-Hispanic Whites. Hispanics are likely to present with melanomas (1) with greater Breslow thickness or regional and distant spread, (2) occurring in the lower extremities, and (3) of more aggressive histologic subtypes. Also, Hispanics with lower income and education levels, and Medicaid coverage, may present with more advanced melanoma. Furthermore, Hispanics with low socioeconomic status may perceive themselves to be at low risk and not engage in sufficient prevention and screening behaviors.

Hispanics diagnosed with melanoma may suffer poorer outcomes than non-Hispanic Whites because of late stage diagnosis related to healthcare disparities. However, these variables do not fully explain the survival disparity. Further study of the effects of comorbidities, genetic profile, and treatment choices on melanoma survival among Hispanics is needed.

145 9:00 am I

Assessment of developmental toxicity from embryonic exposures to the emerging contaminant Tris(4-chlorophenyl)methanol (TCPMOH)

Julian Navarrete, Biology (U)

Tris(4-chlorophenyl)methanol (TCPMOH) is an emerging water contaminant with unknown etiology, but is believed to be a byproduct of DDT manufacturing. It is highly persistent in the environment and bioaccumulates, and is commonly found in marine mammals around the world. TCPMOH has also been measured in human breast milk which poses a risk for developing infants. However, almost no toxicity data is currently available. In this study, we investigate the hazard posed by developmental TCPMOH exposures using the zebrafish model (Danio rerio). Zebrafish (Danio rerio) embryos were exposed to 0, 0.1, 0.5, 1, or 5 μM TCPMOH beginning at 24 hours post fertilization (hpf). QPCR was utilized to assess gene expression of enzymes in phase I and phase II metabolic pathways, namely the cytochrome P450 family. Developmental exposure to TCPMOH decreased overall expression of cytochrome P450 (Cyp) 1A1 (Cyp1a1) at 0.1 and 0.5 μM ($p < 0.05$), but increased Cyp1a1 expression in the 0.5 μM compared with the 0.1 μM group ($p > 0.05$). This observation occurred with similar readouts in Cyp1a1 induction activity through the application of the ethoxyresorufin-O-deethylase (EROD) assay ($p < 0.05$). These results demonstrate that higher exposure concentrations activate xenobiotic metabolic enzymes, whereas lower concentrations down-regulate Cyp1a1 activity. The expression of Cyp1a1 is up-regulated by ligand activation on the aryl hydrocarbon receptor (AhR). AhR gene expression was assessed through qPCR. 0.1 and 0.5 μM TCPMOH up-regulated AhR activity ($p < 0.05$). Overall, this study demonstrates that TCPMOH is activating xenobiotic metabolism in the developing zebrafish. Further studies are required to elucidate the mechanisms of toxicity.

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146 9:00 am J

Assessment of e-vape waste as a contaminant and hazardous waste material and creating recommendations for its proper disposal based on components of the product

Hailey Weinberg, Environmental Science (U)

A recent trend has surfaced especially among teenager and young adults to replace the traditional disposable cigarette – e-cigarettes. As these products contain hazardous chemicals and are constructed from materials such as plastic, cotton, stainless steel, and lithium batteries, it is currently unknown how these materials will combine and interact with the environment as they are discarded. Disposal warnings included in instruction manuals for these products are extremely generic and not at all user friendly, containing advice such as "do not discard or dispose of this product in general waste cabin, please follow the local law and regulations." With only the vaguest of instructions and no penalty for improper disposal, batteries, used coils, mostly empty cartridges, and much more are being disposed of in a dangerous way. Throughout this study, we will attempt to evaluate how this product's disposal can be regulated through pre-existing regulation regarding certain chemicals, batteries, etc. We will also be conducting a field survey to analyze the general public's habits regarding disposal of e-cigarette waste and their opinions and knowledge of the potential environmental dangers that can be caused by improper disposal methods. Results of the survey can help to begin to raise awareness for the public about the potential hazards of improper disposal, as well as can begin to lead a path to create legitimate and specific regulation on this type of product for the first time.

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147 9:00 am K

Relationships between digital deterrents and access to health information among older adults

Jeffrey Jimenez, Public Health, Health Management and Policy (M)

The ability to access the internet and search for health information has become increasingly important to control factors that contribute to the social determinants of health. Health information sources are used by individuals to learn about new treatments, prescriptions, options, or healthy behaviors. However, access to this technology is not available to everyone that needs it. In particular, older adults struggle concerning use and access to technology that meets their needs.

Objective: We aim to investigate the relationship between access to technology and self-rated health among older adults. We will examine how socioeconomic status, insurance status, and internet access factors drive this relationship.

Methods: We analyzed cross-sectional survey data for older adults aged 65 and older using the American Community Survey (2013-2017). We used bivariate and multivariable analyses to estimate the prevalence of and factors associated with access to technology and self-reported health status by multiple technologies, social, and demographic factors.

Results: We expect to find a significant relationship amongst older adults with and without access to technology. Further, this access will significantly influence their self-rated health. This outcome will be mitigated by those with protective factors such as access to insurance and higher educational attainment, among other factors. While those from ethnic minority backgrounds, lower-income, and with limited English proficiency will experience persistent poorer outcomes.

Conclusions: We expect these findings to indicate the value in technological structure (access to the internet, computer in the home, broadband speed) to help develop stronger evidence to inform policies and programs geared toward technological infrastructure improvement for vulnerable populations.

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148 9:00 am L

Effects of Aging on ADAS-Cog and Odor Memory Performance Between Genders

Conner Frank, Psychology (M)

The Alzheimer's Disease Assessment Scale-Cognitive Subscale (ADAS-Cog) is a neuropsychological assessment designed to measure cognitive disturbances observed Alzheimer's Disease (Rosen, Mohs, & Davis, 1984). The Cognitive Subscale consists of 11 tasks, including immediate word recall, object recognition, and word recognition, as well as 2 optional items, number cancellation and delayed word recall. This assessment, along with an odor identification task and a spatial-odor associative memory task designed to target medial temporal lobe functioning, were administered to 90 adults, including 32 young adults (18 female and 14 male) and 58 older adults (31 female and 27 male). Preliminary analyses with one-way ANOVA comparing young and old performance on each measure of the ADAS-Cog and odor components was conducted separately for each gender. Male ($n = 41$) participants had significantly different responses between age groups on the delayed word recall ($F(1, 39) = 12.50$, $p = .001$), ideational praxis ($F(1, 39) = 7.29$, $p = .01$), number cancellation ($F(1, 39) = 26.49$), spatial-odor associative memory ($F(1, 39) = 8.95$, $p = .005$), and odor identification tasks ($F(1,39) = 12.94$, $p = .001$). Female ($n = 49$) participants were significantly different between age groups in the command ($F(1 ,47) = 4.74$, $p = .035$), delayed word recall ($F(1, 47) = 6.57$, $p = .014$), word recognition ($F(1, 47) = 4.04$, $p = .050$), number cancellation ($F(1, 47) = 14.28$, $p < .001$), spatial-odor associative memory ($F(1, 47) = 9.29$, $p = .004$), and odor identification tasks ($F(1, 47) = 14.94$, $p < .001$). Poorer performance on delayed recall, number cancellation, spatial-odor associative memory, and odor identification could serve as strong evidence that delayed recall, attention, and olfaction are strongly implicated in the aging process for both men and women.

Conner Frank was supported by SDSU Summer Undergraduate Research funds. Supported by NIH grants R01AG04085-26 and R01AG062006-01 to CM.

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149 9:00 am M

Electronic Cigarette Twitter Sentiment Analysis

Karen Robinett, Geographic Information Science (M)

In the past few months, there has been a surge of hospitalizations and health concerns related to the use of electronic cigarettes because of health issues and deaths associated with the devices use. A shift in public opinion can have a large effect on policies and laws created around a topic. As part of a research project, we are interested in researching and analyzing the effects that the recent hospitalizations and health concerns have had on people. Twitter, a social media platform with millions of users who post millions of tweets per day can be a good way to establish what that public opinion is. We have been collecting data and storing it in CSV format from 6 cities in California based on keywords related to electronic cigarettes. Using a Naïve Bayes Classifier machine learning program to classify the various tweets as positive, neutral, or negative can help with determining public sentiment and reduce the amount of time needed to classify the thousands of tweets collected. The program uses a library created from over 800 tweets that were individually classified by a person. The program functions with an accuracy up to 68%. These results show promise and can continue to be improved to show a higher degree of accuracy with some adjustments and more work.

150 9:00 am N

Secondhand Exposure Assessment to Electric and Conventional Cigarettes via Silicone Wristbands and Non-Targeted Chemical Analysis

Pamela Olguin, Environmental Health Science (M)

Secondhand smoke (SHS) is the involuntary exposure to the chemicals released at the end of a cigarette or exhaled by a smoker. SHS contains more than 7,000 chemical constituents including, Polyaromatic hydrocarbons (PAHs). PAHs are organic substances consisting of fused benzene rings that result from incomplete combustion, such as the burning of tobacco smoke. Exposure to these compounds can occur by dermal absorption, oral ingestion, or inhalation. Several PAHs have been established as being a probable carcinogen by the U.S. Environmental Protection Agency (EPA), International Agency for Research on Cancer (IARC), and U.S. Department of Health and Human Services (HHS). A novel method to quantify the secondhand smoke exposure using silicon wristbands is used in this research.

Silicon wristbands in this research are the method to quantify the accumulation of contaminants that children are exposed to in a week-long period in households of electric and conventional cigarettes smokers. The wristbands are extracted for all contaminates that were collected and analyzed by GCxGC/TOF-MS with the novel non-targeted analysis method. From the analyzed data, a comparison of PAH contents in the wristbands for children that live in conventional cigarette and electric cigarette homes is completed.

The data collection is completed from the GCxGC/TOF-MS however, the analysis of the data is still in progress. Overlap of chemical exposure between the conventional and electric cigarette exposure individuals does seem to occur. This research could further validate the novel methods of non-targeted analysis by GCxGC/TOF-MS and silicon wristbands for tobacco related research.

Session A-11

Poster Physical & Mathematical Sciences 2
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

151 9:00 am O

Fluorescent labeling and enzyme kinetics of tricyclic cytidine nucleosides with reverse transcriptases

Julian Cizmic, Biology (U)

Fluorescently labeled nucleic acids are important tools for studying the structure and function of DNA and RNA in cells. However, many methods for fluorescently labeling nucleic acids require cell fixation or conjugation with bulky fluorophores, which allow only single time point measurements and perturb natural nucleic acid structure. Tricyclic cytidine (tC) analogues are inherently fluorescent mimics of cytidine, the natural C nucleoside, and remain fluorescent and exhibit natural B-form structure in duplex DNA. To better understand how tC analogues might be enzymatically incorporated into the nucleic acids of living cells, we have tested the insertion of tC and 8-diethylamino-tC triphosphates by three viral reverse transcriptases (RTs). We performed in vitro kinetic measurements using tC triphosphates and reverse transcriptases under steady-state conditions to produce Michaelis-Menten models for these single insertions. Our data showed that RTs from two oncogenic retroviruses exhibited 1.5- to 50-fold increases in catalytic efficiency when inserting tC analogues in place of natural cytidine. Additionally, HIV RT produced a 1.3 fold increase in catalytic efficiency when using a DNA template as compared to RNA. The kinetic data established from our study may be pivotal in further understanding nucleic acid metabolism in reverse transcriptases and better informing studies of the retroviruses that produce them.

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152 9:00 am P

Using Silk-like Peptides to Study Native Spider Silk Protein Assemblies

Steven Decker, Biology (U)

Spider silk is an impressive natural protein known for its exceptional toughness and is being studied for potential applications in the medical, industrial, and defense fields. There are two primary proteins that are used to produce dragline silk, major ampullate spidroin 1 (MaSp1) and MaSp2. These proteins are large (250 and 312 kDa, respectively) and highly repetitive. They primarily consist of poly(Ala) regions that are connected by regions of a repeating Gly-Gly-X sequence, where X is Tyr, Gln, Ser, or Arg. It is hypothesized that the crystalline poly(Ala) regions are responsible for the overall strength of the silk while, the disordered Gly-Gly-X region is responsible for the extensibility and overall toughness. Recently it was discovered by our group that the proteins are not stored as single monomers but as complex, hierarchical nanoassemblies that are composed of micellar subdomains. These structures were found to be involved in the initial proteins' transformation into micrometer scale silk fibers. We are using synthesized peptides in order to investigate the differences in secondary structure and organization at native concentrations. Using a combination of computer simulations, protein synthesis, dynamic light scattering (DLS) and nuclear magnetic resonance (NMR) spectroscopy, we will use data gathered on these synthesized proteins to inform experiments on native spider silk proteins.

153 9:00 am Q

Using CE-SELEX to evolve a ssDNA Aptamer or Nicotine Capture

Catrin Law, Chemistry (U)

Third-Hand Smoke (THS), is a complex and harmful mixture of chemicals from tobacco smoke that remains on surfaces in environments, such as a car or a home for weeks to months after the cessation of smoking. These chemicals can persist even after treatment with harsh household cleaning products. For those concerned about THS exposure a detection method for the residue is necessary particularly in environments such as rental housing, where past smoking behaviors may not be apparent to new tenants. Though THS analysis can be done with laboratory equipment, such resources are inaccessible and prohibitively costly to most individuals. We aim to create a simple testing device, akin to a home pregnancy test, available for consumers to use to test their homes and obtain semi-quantitative data about potential nicotine contamination (the most abundant molecule in THS). This poster will present our work of finding a nicotine aptamer through Capillary Electrophoresis-Systematic Evolution of Ligands by EXponential enrichment (CE-SELEX). This is the process of identifying random oligonucleotide ssDNA sequences from within a large library of ssDNA and selectively evolving the sequences that bind to nicotine with higher affinity. Once a selective aptamer has been identified we will incorporate it into a disposable device which exploits complexation reactions between nicotine and the ssDNA aptamer to quantify the nicotine contamination.

This project is currently taking place in the lab of Dr. Christopher Harrison, with partial funding by the NIH through the Initiative for Maximizing Student Development (IMSD) Program –Grant #5R25GM058906

154 9:00 am R

Utilizing capillary coatings in capillary isoelectric focusing to exploit differences in fresh and stored red blood cells to determine blood doping.

Madison Noroña, Chemistry (U)

The use of external drugs in order for athletes to enhance physical performance is prominent, despite being banned by most sports organizations worldwide. One method, autologous blood doping, or blood transfusions from the same individual, remains undetected due to the nearly identical properties of the fresh and stored red blood cells (RBCs) and thus rife for abuse.

During an autologous blood transfusion, an athlete removes and stores their blood in an anticoagulant solution. After the time of transfusion, RBCs within the body will replenish per usual. Before a sporting event, an athlete can transfuse the stored RBCs back into their body, resulting in an increase in the number of RBCs in the bloodstream. This allows for more oxygen transport throughout the body, and therefore better endurance performance. Because the RBCs from an autologous blood transfusions are nearly identical to the RBCs in the athlete's body, the process can go undetected. However, the anticoagulant solution used in blood storage typically has a high sugar concentration, causing minute biochemical differences including the non-enzymatic glycosylation of the RBCs.

Capillary isoelectric focusing (cIEF) is a technique utilized to separate proteins by their isoelectric points, and this can be extended to cells. Due to the non-enzymatic glycosylation of stored RBC surface proteins, the isoelectric point of stored versus fresh blood should differ, and eventually provide a fast and low waste detection of autologous blood doping. To accomplish a cIEF separation, the electroosmotic flow (EOF), or the movement of the liquid due to the applied voltage, must be suppressed in order to effectively focus the cells at their isoelectric points.

In this poster we will present the preliminary results on the effectiveness of various capillary coatings (most recently a linear polyacrylamide) at suppressing the EOF and consequently their effectiveness at focusing the fresh and stored RBCs at their respective isoelectric points.

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156 9:00 am T

Thirdhand smoke-Colormetric detection of nicotine using dyes

Arrion Smith, Biochemistry (U)

The dangers associated with smoking, and secondhand smoke are widely known. However, the health risks associated with thirdhand smoke (THS), the chemical residue left behind by smoking, are not as evident to most. Research on third hand smoke has confirmed that it can affect pregnancies, child development, and overall health of an individual. The purpose of this study is to create a portable, cost-effective, colormetric analysis approach that can be used in homes by unskilled individuals to obtain a semiquantitative measure of THS levels.

Though THS residue is composed of a wide range of compounds from tobacco smoke, and their subsequent reaction products, the most abundant THS compound is nicotine. Proper characterization and quantitation of all THS compounds requires careful sample collection (dust, surface wipes) and expensive analytical instrumentation (i.e. LC-MS). However a semiquantitative method, that can detect nicotine, may be sufficient to rapidly assess the magnitude of the risk posed by THS residue in a living space, and may be able to be performed by the resident.

To render the detection of nicotine instrument-free we are exploring the complexation of nicotine with a range of dyes. It has been shown that aqueous nicotine will complex with methyl orange, and selectively partition into chloroform. We are optimizing this process in order to obtain the most sensitive analysis of nicotine from dust and surfaces. Thus far we have been able to successfully identify as little as 8 ng of nicotine, by eye, via this approach with the liquid chromatography. We are looking to get within the 3-5mg range for detection. We are also looking into testing different pHs with our citric acid-disodium phosphate buffer to get a more sensitive detection within the desired range.

157 9:00 am U

The effects of acetylation mimics on isocitrate dehydrogenase 1 (IDH1)

Vinnie Widjaja, Biochemistry (U)

Isocitrate dehydrogenase 1 (IDH1) mutation and amplification can lead to cancers including gliomas and leukemias. IDH1 catalyzes the conversion of isocitrate to alpha-ketoglutarate with NADP+ as a cofactor. Mutant IDH1 gains the ability to convert alpha-ketoglutarate to D-2-hydroxyglutarate, a known oncometabolite. While we and others have characterized the catalytic features of these reactions, it is not well understood how IDH1 is regulated. By establishing mechanisms of regulation, we can better understand how IDH1 drives tumorigenesis. Post-translational modifications (PTMs), which include acetylation, are an effective means of regulating proteins. Based on evidence that acetylation regulates IDH2 catalysis, we hypothesized that IDH1 acetylation will inhibit IDH1 activity, thus decreasing its catalytic efficiency. In order to test this hypothesis, we heterologously expressed and purified three mutants: K224Q, K321Q, and K81Q IDH1. These mutants, which affect residues predicted from proteomic data to be acetylated,have a lysine mutated to a glutamine to mimic acetylation. After performing steady-state kinetic analysis on these mutants, we found a decreased rate of alpha-ketoglutarate production in the mutants, when compared to wild type (WT) IDH1. We also conducted experiments treating WT IDH1 with various amounts of acetyl-CoA, which can non-enzymatically acetylate lysines. Surprisingly, addition of acetyl-CoA did not show a significant decrease in enzymatic activity of the WT IDH1 enzyme. Ultimately, these studies suggest that acetylation may not directly regulate IDH1 activity, but we have identified new residues that appear to play a role in IDH1 catalysis.

Session A-12

Poster Behavioral & Social Sciences 2
Friday, February 28, 2020, 9:00 am
Location:Montezuma Hall

158 9:00 am V

Is Reading Attitude related to Oral Reading ability in Monolingual Vietnamese Speaking Children?

Michelle Harrison, Speech Language and Hearing Sciences (U)

According to the Center for Vietnam and Southeast Asia Studies, overall each Vietnamese person only reads an average of 1.2 books a year, excluding textbooks (VNN, 2016). Libraries in Vietnam often lack the resources to reach children in lower income areas, which raises concerns about children's reading habits in secondary school (Hossain, 2015). This study aims to investigate how children's attitudes towards reading affect their reading ability. This study examined Vietnamese children's reading attitudes and reading fluency in the early school years. Participants were 83 typically developing monolingual children from northern Vietnam. Data were collected longitudinally in grades 1 and 2. Reading attitude was examined using a translated version of the McKenna's Elementary Reading Attitude Survey, consisting of 20 questions on attitudes toward academic and leisure reading (10 items each) (Mckenna & Kear, 1990). An examiner read the survey questions aloud to individual children (e.g. How do you feel when you read a book on a rainy Saturday?), who responded by choosing a picture that depicted very happy, happy, unhappy, or very unhappy. Reading attitude was measured as each child's average leisure score, academic score, and combined score (leisure and academic). Reading fluency was examined using the Vietnamese version (Vu, Tran, & Tran, 2016) of the Early Grade Reading Assessment (Gove & Wetterberg, 2011), which consisted of two reading

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passages. In this task, the child was given 60 seconds to read each passage aloud as quickly and as accurately as she/he can. Reading fluency was measured as the number of accurate production per second. Findings from this study indicated that reading attitude decreased from Grade 1 to Grade 2. Attitudes towards academic reading were shown to be the main contributor to this decline. Despite a decline in reading attitude, there was an increase in rate and accuracy of reading from Grade 1 to Grade 2. Lastly, we found that there was a weak relationship between reading attitude and reading fluency. Thus, reading attitude may not be a reliable predictor of a child's reading ability.

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159 9:00 am W

Grammatical Productions in Vietnamese Children using a Novel Sentence Formulation Task

Lena Pham, Speech, Language and Hearing Sciences (U)

Sentence formulation tasks, such as the Formulation Sentences subtest from the Clinical Evaluation of Language Fundamentals-5 (CELF-5, Wiig, Semel & Secord, 2013), have been used as a way to assess proficiency in fluent production of grammar and syntax. This type of assessment allows Speech-Language Pathologists to know which areas to target in treatment in order to strengthen children's spoken and written discourse skills (Wiig, Semel & Secord, 2013). While Vietnamese is the fifth most commonly spoken language in the United States (U.S. Census, 2017), there are currently no published studies on sentence formulation tasks in Vietnamese. This study pilots a new Sentence Formulation task for Vietnamese-speaking children. From this task, we seek to identify the grammatical features that most children produced correctly and which features most children produced incorrectly. We piloted the sentence formulation task on 43 monolingual Vietnamese-speaking second graders in Hanoi, Vietnam. Children were typically developing; they scored within normal limits on a non-verbal intelligence test and had no parent or teacher concern for language learning. The sentence formulation task included 25 items targeting grammatical features in Vietnamese that are considered simple (e.g., subject-verb-object sentences) and more complex (e.g., aspect: Pham, 2013). Participants were shown black and white line drawings, heard 1-2 target words, and were asked to produce complete sentences that included the target words.
The responses were audio and video-recorded and scored based on a modified version of the CELF-5 scoring (i.e,. 0 = incorrect use of grammatical feature or contains 2 or more grammatical errors, 1 = correct use of grammatical feature, but contains one grammatical error, and 2 = correct use of grammatical feature and no grammatical errors). Data analysis is ongoing. Results will help identify which grammatical features are difficult for this group of typically developing Vietnamese children, which can serve as a reference point to study Vietnamese children with a language disorder.

160 9:00 am X

The Relationship between Teacher-reported Proficiency and Language Ability Measures in Spanish-English Bilingual Preschoolers

Cristal Toscano, Speech Language and earing Sciences (U)

Background: Previous research has identified the need to better understand the relationship between bilingual children's language proficiency and their performance on language assessments (Bedore, Peña, Gillam, & Ho, 2010). One standardized assessment, the Bilingual English-Spanish Assessment (BESA; Peña, Gutiérrez-Clellen, Iglesias, Goldstien, & Bedore, 2018) measures language domains such as grammar and vocabulary and uses teacher reported questionnaires (ITALK) to assess a child's proficiency in English and Spanish (Peña et al., 2018). Other culturally valid non-standardized methods like language sample analysis, also yield multiple useful measures to measure grammar (mean length utterance in words (MLUw)), and vocabulary (number of different words (NDW)) (Rojas and Iglesias, 2009).

Previous research has analyzed the relationship between standardized assessments and non-standardized assessments and found significant correlations between these two methods. This study aims to extend this line of research by analyzing the relationship between teacher reported proficiency and measures of language ability in both English and Spanish. Thus, the results of this study will provide more information on the connection between proficiency and performance on language assessments in Spanish-English preschool-aged bilinguals.

Methods: Participants included 29 Spanish-English preschool-aged bilinguals who were administered a range of assessments of grammar. Participants were engaged in play and completed language samples (LS) in English and Spanish, which were transcribed and analyzed for MLUw, NDW and intelligibility. For proficiency ratings, teachers from the children's classroom completed the ITALK for both English and Spanish.

Preliminary Results: Results suggest that proficiency on the English ITALK was significantly correlated with performance on LS measures and the BESA (range: $r = .547 - .716$, $p < .002$). Significant relationships were also found among Spanish ITALK and LS measures and the BESA (range: $r = .415 - .654$, $p < .028$).

Implications: The results of this study demonstrate that measures provide unique information therefore, multiple assessments are important in fully characterizing a child's language profile. The significant relationship between teacher ratings of proficiency and performance in each language further supports the idea that proficiency must be taken into account when interpreting a bilingual child's language performance.

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

161 9:00 am Y

Cross-Linguistic Activation and Interference during Naming in Bilinguals with Aphasia: An Eye-Tracking Study

Valeria Garcia, Speech, Language and Hearing Sciences (M)

During word retrieval, parallel activation of bilinguals' two languages results in interactions between languages that can be facilitatory or can cause interference at the semantic and phonological levels. For example, false cognates (words that are phonologically similar but semantically different, e.g., English-Spanish goat-gota) can create cross-linguistic interference. Bilinguals require inhibition skills to overcome such cross-linguistic interference. We aim to examine how bilinguals with aphasia (BWA) accomplish word retrieval after a stroke. We hypothesize that BWA will have more difficulty inhibiting interfering information than unimpaired controls.

Due to a scarcity of studies that measure real-time language processing abilities in BWA, the current study investigates the online processing of word retrieval abilities when presented with cross-linguistic interference (e.g., competitors) in Spanish-English individuals with aphasia (n = 2) as compared to unimpaired controls (n = 3), using an eye-tracking, visual world picture-naming task for language production. Eye-tracking indexes real-time activation and decay of lexical targets and their distractors during word production. Participants are presented with pictures and distractor words in text opposite of each other on a screen across four quadrants. Target pictures are presented with distractors in each of three conditions including false cognates (picture of a goat, Spanish cabra/distrator text "gota", English drop), identity (picture of a goat/distractor text "cabra") and unrelated (picture of a goat/distractor text "pared", English wall).

Results provide insight into the impact of left hemisphere stroke on online processes needed for word retrieval in

BWA. Preliminary results show that the unimpaired controls showed more activation of (i.e., looks to) the target and less activation of (i.e. looked away from) the distractor text in the false cognate condition compared to the other two conditions (i.e., identity, unrelated). This suggests that they were able to inhibit the false cognate distractor. However, BWAs showed greater difficulty in inhibiting the false cognate distractor text and instead spent more time activating the target and the distractor simultaneously. Initial findings support our hypothesis that BWA show more difficulty in inhibiting interfering information as compared to unimpaired bilingual controls. More data will be collected to confirm these patterns.

162 9:00 am Z

Cross-linguistic Interaction During Word Selection for Bilinguals with Aphasia: An Electroencephalography Study

Linda Nadalet, Speech Language and Hearing Sciences (M)

Bilingual individuals simultaneously activate both languages during comprehension and production. During word retrieval, this parallel activation results in interaction between the two languages that can facilitate or interfere with retrieval. Word retrieval can be facilitated for cognates (words that are orthographically and semantically similar e.g. pear/pera). However, false cognates (words that are orthographically similar but semantically different e.g. goat/gota) can cause interference. Bilinguals require inhibition skills to overcome cross-linguistic interference during word retrieval. This study aims to examine how bilinguals with aphasia (BWA) accomplish word retrieval after a stroke. We hypothesize that BWA will have more difficulty inhibiting interfering information than unimpaired bilingual controls.

To examine the time-course of the brain processes associated with word retrieval in BWA (n=2) compared to bilingual controls (n=6), we used scalp electroencephalography (EEG) as participants named images in a picture word interference (PWI) task. Target images were presented with distractor words in 3 conditions: false cognate (FC), identity (ID), and unrelated (UR), and reaction times were measured at the time of vocal onset.

Preliminary results for the PWI task suggest that both bilingual controls and BWA had longer naming latencies for the FC condition than the UR condition. The ID condition elicited faster naming latencies than the UR condition in both groups. EEG results for the control group showed a medial-frontal negative going component peaking around 300ms before vocal onset, previously associated with response selection processes. It was largest in the FC condition, followed by the UR then the ID condition. Results for the patient with aphasia did not show this pre-vocal onset component. Instead, the patient's results showed a large post-response component resembling an Ne-like component associated with speech monitoring, which was not sensitive to the experimental manipulation.

The results from the control participants indicate that response selection, as indicated by EEG components preceding vocal onset, is more effortful when bilinguals' other language is strongly activated (in the FC condition) and facilitated in the ID condition. The patient's results suggest that different processes may be engaged in word retrieval after a stroke to the left hemisphere.

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

163 9:00 am AA

The Crosslinguistic Cognate Effect in Bilinguals Across the Lifespan: A Systematic Literature Review

Carmen Nguyen, Speech-Language Pathology (M)

Cognate words between two languages share similar meaning, orthographic forms, and phonological forms (e.g., English pear - Spanish pera). Research on bilinguals has shown a cognate effect, in which cognate words are named and understood with better accuracy and faster reaction times compared to noncognate words (e.g., English table - Spanish mesa). The current systematic literature review and meta-analysis explores the cognate effect in bilinguals across the lifespan, including three groups: (1) unimpaired young adult bilinguals, (2) unimpaired older adult bilinguals, and (3) impaired older adult bilinguals with aphasia. Search queries for relevant studies included the keywords “cognate effects” and “aphasia”. Studies were matched across the three groups according to languages spoken by study participants, tasks employed to capture the cognate effect, and in some cases location (and sociolinguistic context) where the study was conducted. For each study examining bilinguals with aphasia, matching studies with unimpaired younger and unimpaired older bilinguals were identified. For studies that reported on bilinguals with less common languages, studies including similarly-structured languages were chosen (e.g., Hindi-English bilinguals compared to Bengali-English bilinguals, as Hindi and Bengali are both Indo-Aryan languages). Finally, studies from our search queries were only included if they involved adult participants and included publication of cognate and noncognate accuracy. Initial review suggests that bilinguals with aphasia mostly demonstrate higher naming and comprehension accuracy for cognates than noncognates. Unimpaired younger and unimpaired older bilinguals also demonstrate higher accuracy for cognates than noncognates, which becomes most pronounced in their less-preferred languages. Magnitudes of cognate effects will be examined more closely across groups, with the hypothesis that aging and impairment from bilingual aphasia does not consistently reduce cognate effects.

In summary, the identified cognate effects across studies suggest that cognate effects may be robust across the adult lifespan and remain fairly robust with language impairment subsequent to stroke. Thus, in languages that share cognate words, cognate treatment for an aphasia impairment at the lexical-semantic level may benefit both languages because of shared and facilitated processing at this level (e.g., Van Der Linden et al., 2018; Lalor & Kirsner, 2001; Edmonds & Kiran, 2006; Kohnert, 2004).

Session A-13

Poster Biological & Agricultural Sciences 2

Friday, February 28, 2020, 9:00 am

Location: Montezuma Hall

164 9:00 am BB

Catalytic Activity of tumor relevant mutant Isocitrate Dehydrogenase 1 (IDH1)

Nalani Coleman, Biochemistry (U)

Isocitrate dehydrogenase 1 (IDH1) is found commonly mutated in grade II and III gliomas and secondary glioblastomas. Normally, IDH1 catalyzes the conversion of isocitrate and NADP+ to a-ketoglutarate and NADPH. However, in mutated form, IDH1 catalyzes a-ketoglutarate and NADPH into NADP+ and D-2-hydroxyglutarate, an oncometabolite. D-2-hydroxyglutarate is toxic to cells and drives a number of pro-tumorigenic pathways. To understand the molecular mechanisms of how mutated IDH1 can lead to brain cancer, we created point mutations in IDH1 to understand the effects on enzyme activity. We hypothesized that point mutations will affect the catalytic efficiency of mutant IDH1. Site-directed mutagenesis was used to generate mutations at residue 132, the most common site of mutations in cancer patients. Wild type (WT) IDH1 and mutant IDH1 were heterologously expressed in bacteria. Following purification of IDH1 mutants using affinity column chromatography, steady-state kinetic assays were used to compare the catalytic activity of WT versus mutant IDH1. By elucidating the types of mutations at R132 that facilitate D2HG production, we can have a better understanding of how IDH1 mutations affect prognosis and therapeutic response.

This work was funded by a Research Scholar Grant, RSG-19-075-01-TBE, from the American Cancer Society (CDS), National Institutes of Health R00 CA187594 (CDS), National Institutes of Health U54CA132384 (SDSU) & U54CA132379 (UC San Diego), MARC 5T34GM008303 (SDSU), and IMSD 5R25GM058906 (SDSU), and the California Metabolic Research Foundation (SDSU).

165 9:00 am CC

Analyzing, within Humans, the Presence of Crassphage: A Highly Abundant Bacteriophage Found Around the World

Julia DePillo, Chemistry/Biochemistry (U)

CrAssphage is an omnipresent bacteriophage that is predicted to be present in about half of the human population around the world. CrAssphage lives in the gut, so there could be a great relationship between the presence of crAssphage in a human’s microbiome and their overall health. We previously tested individual human volunteers to determine whether their microbiome contained the crAssphage virus. We monitored these volunteers over a five week period to understand the

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effect it may have on human health as they acquired and lost the virus. This was done by extracting DNA from fecal samples provided by the volunteers and using this DNA as the templates for our PCR. The PCR products were then sequenced through gel electrophoresis. This showed that half of the participants gained or lost crAssphage during the study. The outcome of this study showed that there may be a limit of detection in the assay used. To confirm this we are re-analyzing the DNA gathered in the aforementioned study using qPCR, and comparing the results to the positive/negative readings from the agarose gels. Analyzing these samples using qPCR would give us a quantitative amount of how much crAssphage was present in each sample rather than PCR which only shows whether or not crAssphage is present and could have a limit of detection. This process will determine the amount of crAssphage that is gained or lost during a specific period of time, and potentially identify a limit of detection in the previous assay. Finding if there is a limit of detection on the previous assay could help show that all humans may have crAssphage in their microbiome, but the amount in their microbiome changes over time. Knowing this could help determine what crAssphage does for human health.

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166 9:00 am DD

Investigating the role of tetrabromopyrrole production in Pseudoalteromonas luteoviolacea on marine invertebrate metamorphosis

Iman Shaikh, Biochemistry (U)

Marine invertebrate organisms undergo a transition from free-swimming larvae to adult through a process called metamorphosis. Certain bacteria have associated settlement cues, serving as environmental indicators for these larvae to settle down onto the seafloor. The marine bacterium Pseudoalteromonas luteoviolacea is a strong inducer of larval metamorphosis, and produces three distinct factors capable of inducing metamorphosis in different organisms. First, a contractile injection system, called Metamorphosis-Associated Contractile Structures (MACs), that induce Hydroides elegans metamorphosis through functional knockout assays. Second, a small chemical called tetrabromopyrrole (TBP) that induces tubeworm and coral metamorphosis as a chemical extract. Finally, a currently unidentified third factor that stimulates Hydractinia metamorphosis. While extracted TBP can induce metamorphosis in tubeworms and corals, no study has shown that whole bacteria producing the same chemical can reproduce these results.

The bmp gene cluster in P. luteoviolacea is required for the production of brominated natural products, including TBP. Because P. luteoviolacea is capable of producing other brominated natural products that may not induce metamorphosis, I will construct a new strain of P. luteoviolacea where the bmp5-7 genes are knocked out, which I hypothesize will only produce one brominated product, TBP. I also will construct a strain of P. luteoviolacea that knocks out the bmp5-7 genes in addition to the macB gene that encodes for the production of MACs to see the full effects of TBP alone on tubeworm metamorphosis. The strains will be confirmed using Liquid Chromatography- Mass Spectrometry and will be tested for their effects on tubeworm and coral metamorphosis using bacterial biofilm assays.

I hypothesize that the production of TBP alone in the Δbmp5-7 strain will produce significantly more TBP than the wild type strain. Furthermore, the Δbmp5-7 strains will be sufficient to induce metamorphosis in both tubeworms and corals when tested in biofilm metamorphosis assays. This research can be used to help combat biofouling from marine tubeworms, which is the accumulation of marine organisms on the hull of a boat. In the future, genetically modified P.luteoviolacea could serve as an important tool to help enhance coral larval settlement for coral restoration techniques, such as coral reseeding.

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167 9:00 am EE

Untargeted Metabolomic Analysis of Performance Enhancers

Heather Vettel, Biochemistry (U)

According to studies performed at the NIH with 1,248 students 16 years or older in five U.S. colleges and universities between 2009-2010, discovered that 66% of the students reported that they utilized dietary supplements; 20% of the users used it to enhance muscle strength, 19% used it for performance enhancements, and 7% used it for increased endurance. But how do these performance enhancers affect our gut microbiome? In our experiment, we focus on mental performance enhancers, specifically caffeine, L-dopa, and N-acetyl L-tyrosine. Caffeine causes an increase in energy metabolism throughout the brain decreases cerebral blood flow, inducing a relative brain hypoperfusion. Additionally, it also activates noradrenaline receptors and affects the local release of dopamine. N-acetyl L-tyrosine is the fastest absorbed and most bioavailable form of L-tyrosine. L-tyrosine is converted to two different neurotransmitters: dopamine and norepinephrine. L-dopa enters the central nervous system and is converted into dopamine by the enzyme DOPA decarboxylase. Using liquid chromatography and high resolution mass spectrometry to look at the effects of these stimulants on metabolite production in different types of bacteria (Lactobacillus rhamnosus and Bacteroides fragilis, individually and in combination), we aim to gain a better understanding of the secondary effects these performance enhancers have on our internal bacteria and gut microbiome health.

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168 9:00 am FF

Kinetic and Cellular Consequences of pH on Metabolic Enzyme Activity

Lucas Luna, Biochemsitry (D)

Changes in the intracellular environment, such as changes in pH, oxygen levels, and oxidative stress can reroute metabolism by altering the activities of metabolic enzymes like isocitrate dehydrogenase 1 (IDH1). IDH1 is responsible for catalyzing the reversible NADP+-dependent oxidative decarboxylation

of isocitrate (ICT) to a-ketoglutarate (aKG) and NADPH. This reaction provides NADPH that drives anapleurosis and lipid metabolism. The reverse reaction, the conversion of aKG to ICT, is a key step in the reductive metabolism of glutamine that drives the growth of many cancers. Amplification of IDH1 is associated with cancer, including 65% of primary glioblastomas. However, the most well-established role of IDH1 in cancer is a single point mutation at position R132. Protein activity in health and disease can be regulated by the cellular environment to respond to the needs of the cell often through post-translational modifications (PTMs). Protein protonation, an underappreciated PTM, is a modification that can play an important role in protein-protein interactions, protein-ligand interactions, stability, and activity. Amino acids that sense the changes in surrounding pH via protonation and deprotonation are termed pH sensors and typically have pKa values shifted to near physiological pH. That change in pKa stores the potential energy that drives a structural/functional modification. Using a previously developed computational algorithm, pHinder, we have identified potential pH sensors at residues K217 and D273, which are buried within IDH1. Here we present a thorough analysis of IDH1 catalysis at varying pH. We show that the kinetic parameters of the reverse reaction are buffer-dependent. We show that the kcat the forward reaction does have a reliable dependence on pH, and that when D273 IDH1 is mutated to a non-ionizable residue, there was a loss in activity. Overall this work identified new residues that are important for IDH1 catalysis that may be sensitive to changes in pH, elucidating novel molecular features of enzyme turnover.

169 9:00 am GG

In vitro characterization of a multi-subunit Drosophila melanogaster IκB kinase complex

Samantha Cohen, Biochemistry (D)

In Drosophila, the IMD pathway is indispensable for proper innate immune responses. In this pathway, infection by gram-negative bacteria elicits a signaling cascade culminating in the rapid induction of antimicrobial peptide gene expression by the NF-κB transcription factor Relish. Signal-dependent activation of Relish is an essential component of the IMD pathway and is regulated by the Drosophila melanogaster IκB Kinase (DmIKK) complex. DmIKK is composed of two subunits: the catalytic subunit DmIKKβ (homologous to mammalian IKKβ) and non-catalytic subunit DmIKKγ (homologous to mammalian NEMO/IKKγ). Although there has been extensive research into the signaling components within the Drosophila innate immune response, the molecular details of regulation are still poorly understood. As part of our effort to understand the biochemistry, substrate specificity and activation mechanism of this kinase complex, we have undertaken recombinant expression, purification and biophysical characterization of the Drosophila melanogaster IKK complex. Here we show that the DmIKK complex can be co-expressed in Sf9 insect cells and purified to homogeneity through nickel-affinity chromatography, anion exchange chromatography and size-exclusion chromatography. In vitro kinase assays and LC/MS-MS show that this purified recombinant complex is catalytically active towards its substrate Relish. We utilized biophysical methods such as multi-angle laser light scattering (MALLS) and analytical ultracentrifugation (AUC) to characterize the nature and assembly of the complex.

Session A-14

Poster Behavioral & Social Sciences 3
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

170 9:00 am HH

Preliminary Findings on Video-based Messaging Around Mood and Body Image

Boyu Wei, Psychology (U)

Introduction: Past literature indicated that exposure to thin-ideal images via a conventional mass media (i.e., magazine, television ads or music videos) increases body dissatisfaction (BD) and negative affect (NA) among women. However, recent studies found that there is a decline of conventional mass media use and an increase in contemporary online media use (i.e., social networking, Facebook, Instagram and YouTube) among women. Specifically, YouTube has become a popular video-based social media platform among teenagers, adults and health professionals. The misleading information (i.e. pro-anorexia videos) exist in the social networking can negatively impact individual's BD, self-esteem and NA. Acceptance-based intervention approach has shown to significantly decrease BD, increase weight and appearance satisfaction and decrease NA. Therefore, this study is interested to examine the efficacy of an acceptance-based approach compared to a pure neutral condition and an attention matching control condition on BD and NA in a subclinical sample via a YouTube vlog format. It is hypothesized that the acceptance condition will significantly individual's BD and NA compared to control conditions.

Method: This study is in preparation. We are aiming to recruit 60 undergraduate females through SDSU SONA. The BICI will be used to determine individual's eligibility in prescreen.

Eligible participants (PTs) will be contacted and invited for an in-person visit. PT will be informed consent and be randomly assigned to one of the three conditions: a) acceptance, b) pure control c) attention matching control. Researchers will create two 10 minutes videos in a vlog format. The content of the video will correspond with the experimental and control conditions. PTs will be asked to complete BICI before the experiment and complete a battery of questionnaires (e.g. BISS, PANAS, VAS) before and after experimental condition.

Planned Analyses: Generalized linear models will be employed, controlling for pre-exposure values, an independent categorical

variable of 'condition' will be entered, with dependent variables of body dissatisfaction and negatively affect, respectively. Generalized linear models allow for estimate of normal and non-normal distributions, which will be explored prior to inferential statistics are employed. If a significant effect of 'condition' is revealed, post-hoc comparisons will be calculated between study conditions. Cohen's d will also be calculated as an index of effect size.

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171 9:00 am II

The Longitudinal Relationship Between Sexual Satisfaction and Processing Speed in Older Men

Riki Slayday, Psychology (U)

Background: Processing speed is one of the first cognitive processes to decline as we age (Salthouse, 1996), and those with blood pressure issues have shown exacerbated decline. Erectile dysfunction is associated with risk for developing cardiovascular disease, a well-established casual factor of cognitive dysfunction (Hachinski, 2008). Further, the presence of vascular problems is associated with lower sexual satisfaction and, for men, erectile function can be a critical factor of sexual well-being. We hypothesized that there would be bidirectional associations between sexual satisfaction and processing speed over time and that slower processing speed would be associated with poor sexual satisfaction over time. Method: We examined 804 men from the Vietnam Era Twin Study of Aging across three time points (mean age 56, 62, and 67, respectively). Sexual satisfaction was measured using questions from the International Index of Erectile Function. Participants rated their overall, relationship, and intercourse sexual satisfaction using a 5-point Likert type scale. Ratings of the three items were aggregated into a total sexual satisfaction score. The processing speed factor score comprised six measures from three tasks: the number of correctly named stimuli for the word and color conditions of the Stroop, time to complete the number sequencing and letter sequencing conditions of the Delis-Kaplan Executive Function System Trail Making Test, and left- and right-hand simple reaction time. Results: Sexual satisfaction was moderately correlated over time (r's= 0.47 and 0.48, respectively, p's<0.001). Processing speed was highly correlated over time (r's= 0.80 and 0.79, respectively, p's<0.001). Sexual satisfaction at Time 1 was significantly associated with processing speed within time (r's ranged from 0.10 to 0.15, p's <0.01) and over time (r's= 0.11, p's<0.01). Additionally, processing speed at Time 1 and Time 2 were associated with satisfaction at Time 3 (r's= 0.07 and 0.12 respectively, p's<0.05). Conclusion: Preliminary analyses support the hypothesis of a bidirectional relationship between sexual satisfaction and processing speed. Sexual dissatisfaction may be an early indicator of biological problems that could be indicative of cognitive change. The findings imply the importance of sexual health discussions between physicians and their older patients.

172 9:00 am JJ

"Hey Google, What's a 'Vape God'?" An Analysis of Characteristics Emulated by "Vape Gods" on YouTube

Rebeca N. Navarrete, Spanish (U)

Statement: The Centers for Disease Control and Prevention (CDC) reports a total of 60 vape related deaths, also known as the "lung injury outbreak". Among the 2,668 of vape-related cases, 52% were under the age of 24. Individuals in this age group are also frequent users of social media, such as YouTube. Ninety percent of this group currently use YouTube, yet it remains unclear if and how YouTube may be contributing to attitudes about vape products. This study examines YouTube videos about vape products in order to understand characteristics of shared content that may be shaping social and cultural literacy of youth surrounding this issue.

Methods: Data was collected in November of 2019 from YouTube. Quantitative and qualitative characteristics from the top 50 most viewed YouTube videos using the keyword search "vape god" were coded. A content analysis codebook with 14 thematic variables (based on the Urban Dictionary's top 3 definitions of a "vape god" and "hipster") was developed. A separate set of variables were developed to code for YouTube videos' quantitative and qualitative characteristics. SPSS was used to perform all preliminary analyses.

Results: Preliminary results suggest that YouTube videos with a high message sensation value and no strong presence of background music are associated with the Urban Dictionary definition of a "vape god". In addition, YouTube videos with verified checkmarks, product links, and join buttons appear to be associated with greater public attention in the form of views. Similarly, YouTube videos with verified checkmarks and join buttons seem to be associated with stronger public engagement in the form of likes.

Conclusion: YouTube currently exceeds 2 billion views per day from users who repeatedly access, share and interact with publicly uploaded content. Additionally, social media has the potential to reshape attitudes and the syntactic construction of language surrounding vape products. Therefore, an understanding of characteristics of YouTube videos and informal term valence such as "vape god" is crucial for designing health promotion campaigns targeting populations vulnerable to initiation and sustained use of vape products in the current sociocultural era.

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173 9:00 am KK

A systematic review of the use of Intersectionality in Research on Tobacco Use among Sexual and Gender Minorities

Jezmin Afroze, Psychology (U)

Sexual and gender minorities (SGM) experience a disproportionate burden of tobacco-related health disparities relative to their non-SGM peers. These disparities are thought to be driven by chronic exposure to minority stressors and

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sociocultural factors. Limited research suggests that SGMs with other minority statuses, such as SGMs of color, may experience even greater disparities due to their multiple, intersecting minority identities and associated minority stressors. Intersectionality theory emphasizes how intersecting systems of oppression shape experiences and well-being. The goal of this systematic review is to examine how intersectionality has been used as a theoretical and methodological tool in empirical research on tobacco use among SGMs, published between 2000-2019. To identify articles to be included in the review, we searched a variety of databases for peer-reviewed literature (e.g., PsycINFO, PubMed, Google Scholar) and reference lists of articles deemed eligible for inclusion in the final review. We identified relevant articles by using specified search terms (e.g., intersectionality, tobacco, sexual and gender minorities), restricting to research published in English. We included relevant articles that reported on qualitative or quantitative research. Articles deemed appropriate were then included in a full text review. Two reviewers independently read each article, extracting information related to sample demographics, guiding theory/theories, methods, analyses, and findings. Preliminary review results suggest that researchers have rarely examined tobacco use among SGMs with more than two minority statuses and intersectionality is much more commonly used as a methodological tool in qualitative, rather than quantitative, research. These findings have implications for future research on tobacco use among diverse SGM communities.

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174 9:00 am LL

Relations between Youth Cognitive Style and Parenting Behavior

Alexandra Argiros, Psychology (U)

Depression has been shown to run in families with transmission that occurs both biologically and environmentally through parenting behaviors. Parenting behaviors may be particularly important in the development and maintenance of adolescent cognitive style, which has been shown to predict adolescent depression. We hypothesized that parenting behaviors would be related to youth cognitive style in a sample of adolescents at familial and personal risk for depression.

The study included 316 adolescents (M=14.79 years, SD=1.35; 59% female; 24% racial/ethnic minority), who participated in a randomized trial of a cognitive-behavioral depression prevention program. The current analyses focus on baseline associations between adolescent perceptions of parenting behaviors (CRPBI-30), race/ethnicity (non-Hispanic White vs. other), and adolescent cognitive style. Youth cognitive style is comprised of self-esteem (RSES), hopelessness (BHS), dysfunctional attitude (DAS), and attributional style (CASQ-R).

Univariate linear regressions were used to examine the relation between each parenting dimension (i.e., acceptance, psychological control, monitoring) and each measure of adolescent cognitive style. Higher levels of acceptance were significantly related to higher ratings of RSES (b=.280, p<.001) and CASQ-R (b=.025, p<.001) and lower ratings of BHS (b=-.222, p<.001) and DAS (b=-.252, p =.003). Higher levels of psychological control were significantly related to lower ratings of RSES (b=-.305, p<.001) and CASQ-R (b=-.026, p<.001) and higher ratings of BHS (b=.255, p<.001) and DAS (b=.610, p<.001). In multivariate models that included all three parenting domains, acceptance remained significantly related to self-esteem (p<.05), hopelessness (p<.05), and DAS (p<.05). Psychological control remained significantly related to CASQ-R (p<.05) and DAS (p<.05).

Results indicated significant relations between parenting behaviors and youth cognitive style. Future studies should investigate this relationship using an ethnically diverse sample in order to determine if race/ethnicity, or minority status serves as a moderator.

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175 9:00 am MM

Marital Quality in the Third Year of Marriage: Effects of Premarital Cohabitation, Ethnicity, and Gender

Ana Duarte, Psychology (U)

Evidence suggests that premarital cohabitation has negative effects on marital quality if partners subsequently marry. The rate of cohabitation before marriage is 8% for both Mexican American and White couples, but almost no research is available that examines how premarital cohabitation with a subsequent spouse affects multiple dimensions of marital quality among Mexican Americans, compared to White couples, and investigates potential differences due to gender. The purpose of this study is to determine the effects of premarital cohabitation,ethnicity (Mexican American/White), and gender on 9 dimensions of marital quality, as measured by the Marital Satisfaction Inventory-Revised in the third year of marriage. Those who cohabitated before marriage, Whites, and women are expected to have lower to have lower marital quality scores.

Sample: Participants include 63 Mexican American (126 participants) and 35 White couples (70 participants) in their third year of marriage.

Materials: Marital Satisfaction Inventory-Revised (MSI-R, Snyder, 1997); and demographic questions, such as age, education level, etc.

Procedure: Couples were recruited from the community through media ads, flyers, email lists, and in-person solicitation at community events and community colleges in Southern California. Each partner in a couple was interviewed separately in either face-to-face, telephone, or self-administered interviews. The couples were then re-interviewed in the third year of marriage and results in this study are based upon these third year data.

Results: A multivariate analysis of variance found significant main effects for premarital cohabitation, in that it significantly affected 5 dimensions of marital quality, with lower marital quality scores for those who cohabitated; ethnicity, in that it significantly affected 5 dimensions of marital quality, with lower scores for Whites than Mexican-Americans; gender, in that itaffected 2 dimension of marital quality with lower scores for men than women.

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

Discussion: Discussion focuses on how, despite the increase in premarital cohabitation, it continues to negatively affect dimensions of marital quality, even into the third year of marriage. Ethnicity and gender also play a role in this relationship and potential implications of these results for marriage counseling and therapy interventions for both Mexican American and White couples are presented.

Session: A-15

Poster Education 2
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

176 9:00 am NN

Evaluation of First-Generation Status and Supplemental Instruction Attendance as Predictors for Grade Distribution

Joanna Arroyo, Kinesiology (U)

Supplemental Instruction (SI) is a voluntary, peer facilitated, nation-wide program that seeks to improve students' understanding of difficult course material through active learning strategies. It was first implemented at San Diego State University in Fall 2015 for psychology 101, and has since been expanded to serve students in other classes with high drop/fail/withdraw (DFW) rates. SI identifies high-risk classes and offers interactive and creative learning strategies to struggling students to help reinforce difficult course material and prepare them for exams. Previous SI studies have shown that students who attend more SI sessions consistently during the semester will earn better final grades compared to students that do not attend regularly.

In this study, we want to evaluate if first-generation student status and SI attendance are valid predictors for grade distributions in Psychology 101, an introductory-level psychology course. For our study we define an SI attendee as a student that attended ≥4 sessions throughout the semester. This definition assumes that this student attended one or more sessions for each of the three midterm exams and one final exam. Students are identified as first-generation (FG) students if they are the first in their family to attend a college or university. Students were further divided into four groups: SI and first-generation (SI and FG), SI and non first-generation (SI and NFG), Non-SI and first-generation (NS and FG), or Non-SI and non first-generation (NS and NFG). Our study used Chi-Square analysis in order to focus on the relationship between the defined student identifiers and grade distributions for the Fall 2017, Spring 2018, and Fall 2018 semesters. Within all of those subgroups there will be students that receive a repeatable grade and other students that receive a non-repeatable grade. If a student has a non-repeatable grade then, for our research purposes, we define that student as successful because they will receive credit in that course. When analyzing repeatable grades compared to non-repeatable grades, there was a statistical relationship between the groups. Therefore, we can conclude that SI is beneficial to first generation students.

177 9:00 am OO

Voices from the "Third Space:" Students Experience with Auto-Ethnography as Research

Reychel Robles, English (U)

The focus of this study is to demonstrate how the process of writing an auto-ethnography benefits first-generation college students who have been historically underrepresented in higher education. The seven authors of this study are self-selected from among fifteen students from different academic majors who were part of a collaborative intensive seminar essential to an undergraduate research program supported by The Health Careers Opportunity Program at San Diego State University in 2019. We identify as Latinx (5), Filipina (1), and Anglo-Saxon (1). All of us are Pell eligible and have benefited from work-study tutoring in underserved public schools during the academic year (2018-19). The study analyzes our seven auto-ethnographic works as well as our shared responses to the process of writing our individual auto-ethnographies. To inform our narratives, we were influenced by scholarly works dealing with the pedagogy of the oppressed, neoliberalism, intersectionality, and examples of auto-ethnographies published in juried journals that served as resources for writing the research. We were guided by our research faculty mentors. We all engaged in a process with self-reflection and reflexivity to conduct self-inquiry into who we are as historically underrepresented students in higher education. We began learning how to use N-Vivo as a tool to analyze qualitative data. Using these tools and resources, we were able to find our positionality in higher education and gain insight into who we are as individual students. Through critical questioning, we also gained insight into our personal identities as daughters, sons, and members of our communities of reference. Although each of our individual stories are unique, the process of writing our auto-ethnographies developed our self-awareness about social, cultural, structural systems and helped us better navigate and negotiate our relationship to the university and to advocate for ourselves. The data we present from our summer research experience demonstrates that we as first-generation college students can benefit from investigating the varying circumstances that have propelled us into higher education through writing an auto-ethnography.

178 9:00 am PP

Assessing Student-Created Videos

Kathryn Beckhard, Mathematics (U)

Given the recent push to enhance traditional, lecture-based teaching with more active learning, new innovations in assignments are more important now than ever. Student-generated videos have previously been shown to be an effective active learning approach through the lens of students'

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

reactions and feedback to the assignment. However, there has been little research, until this study, that has explored a link between producing videos and measuring learning that may or may not have occurred as a result of this assignment. This study also presents a framework for evaluating the conceptual basis of each student created video. Our study took place in a calculus-based introductory physics class, composed of 523 students, in a large southwestern university. Their task was to create an explanatory video that solved one of two physics questions assigned each week. Students were compiled into groups of three to four resulting in 172 video groups. Each week, 7 groups posted a video covering the first question, while another 7 groups posted a video explaining the other. Videos were then assigned a score out of ten based on the conceptual framework developed to assess each video. To measure if learning occurred, the instructor of the course included one of the two questions assigned each week on exams with almost the exact same wording. This resulted in a total of 12 target questions spread across the four exams and final. We found that students who produced a video that scored higher than five were roughly twice as likely to get the target question correct than those who produced a video that scored lower than five. In addition, no component of the framework was shown to solely affect the chance of answering the target question correctly. In other words, students must focus on all of the components to reach the full potential of this activity. In summary, this research contributes to the field of knowledge surrounding the implementation of active learning lessons: First, students should be provided with explicit recommendations for problem-solving practices; second, instructors should reinforce and emphasize these practices during lectures.

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179 9:00 am QQ

Effects of Physical Activity on Student Behavior: When Should Schoolchildren Engage in Physical Activity?

Giannela Gonzales, Liberal Studies (U)

Researchers have previously investigated the positive effects of varying levels of physical activity on academic success among schoolchildren (Grieco et al., 2016). The purpose of this study was to investigate the time of the school day in which students should engage in physical activity to elevate their focus and elicit appropriate classroom behavior.

The researcher observed the on-task behavior of 36 fourth-grade students in a general education classroom on two different days during the school week: one in which students began the day outdoors and engaged in physical activity; and one in which students immediately started their day in the classroom. In addition, a survey was conducted to examine student focus on both days, and the classroom teacher was interviewed about her observations of differences in student behavior. Results indicated more on-task behavior when students begin their day engaged in physically active learning. Moreover, a majority of the students reported being more focused and ready to learn when they started the school day with physical activity. However, the classroom teacher communicated her struggles in maintaining student engagement after integrating physically active learning only at the beginning of the school day.

These results suggest the importance of starting each school day with some level of physical activity to stimulate student thinking and allow students to be more mentally prepared for the academic day. As demonstrated by the teacher's struggles, allotting only one small portion of the school day for physical activity is not enough to consistently keep students engaged. Thus, an implication for educators is the integration of movement activities throughout the academic day to maximize student focus and maintain good behavior.

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180 9:00 am RR

Implementation of Ethno-Studies Curriculum in Barranquilla, Colombia: Towards Inclusivity of the Afro-Colombian Populations

Hannah Sandoval, Latin American Studies (M)

Colombia is a multicultural nation with a diverse indigenous and Afro-Colombian population, evidenced by some 80 individual indigenous languages being spoken today. Colombia's history of slavery, together with endemic civil war, has made indigenous and Afro-Colombian populations particularly vulnerable to violence and discrimination. The civil war displaced over 7 million people, with the ethnic populations representing 30% of those displaced, showing that even though indigenous and Afro-Colombians are a small portion of Colombia's total population they are disproportionately affected by the violence. While many scholars agree that although Colombia has made improvements by adding ethnic education, language, rights and protection to the Colombian Constitution the policies are not being fully implemented and the government's main focus is on bilingual education, meaning Spanish-English. In response, my preliminary research identified key features of ethnic studies curricula and observed how ethnic studies schools are adapting curriculum to better serve the Afro-Colombian population. Research methods consisted of viewing lesson plans, interviews with teachers and directors, attending a meeting at the Secretary of Education office and classroom observations. The qualitative research increased understanding of multicultural education, demonstrated the enforcement of the state-run ethnic-school policies and showed how adaptation to curriculum can help address of xenophobia and discrimination of a marginalized population.

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

181 9:00 am SS

High School English Learner Desertion

Azar Robles, Education Dual Language & English Learner/ Critical Literacy and Social Justice (M)

According to the U.S. Department of Education (2019), English Learners' graduation rate in the years 2015-2016 was 67 percent. Although the graduation rate has increased, English learners continue to desert school at a higher rate than the rest of the high school population. The literature review has shown that the most common factors are: not having a sense of belonging, low academic achievement and a lack of mentors. However, there is very little research that explores this phenomena from the perspective of the English Learners themselves. The purpose of this study is to explore how these variables have contributed to high school English learner desertion. The findings from this study will help us understand desertion from the student's point of view so that strategic programs can be implemented to lower the desertion rate of high school English learners in Southern California.

182 9:00 am TT

Investigating Mathematics Teachers' Knowledge of the Line of Best Fit

Kevin Pelaez, Mathematics and Science Education (D)

The emerging field of data science and widespread availability of data has influenced statistics education. This has sparked an interest in exploring mathematics teacher's statistical knowledge for teaching (SKT), including knowledge about the content as well as the pedagogical moves used to teach the content. This study builds on this research by investigating five Grade 9 high school mathematics teachers' SKT about the line of best fit (LOBF). Of particular interest was exploring: (a) teachers' understandings of the LOBF as measured by how they informally estimated the LOBF, and (b) the instructional moves teachers reported using to help students develop an understanding of the LOBF. Data included written responses, videos, and transcripts of clinical interviews with the five teachers. The analysis revealed patterns across the teachers that help characterize different understandings and instructional moves that teachers reported using to teach about the LOBF. The understandings included that the LOBF has the same slope as the points, that the LOBF passes through as many points as possible to reduce the residuals, and that the LOBF minimizes the residuals but does not have to pass through any points. The instructional moves included using Desmos or referring to formulas, definitions, or rules. These patterns build on past research about student and teacher understandings of the LOBF as well as provide implications for preparing mathematics teachers to teach statistics.

Session A-16

Poster Behavioral & Social Sciences 4

Friday, February 28, 2020, 9:00 am

Location: Montezuma Hall

183 9:00 am UU

Verb Learning Strategies in Typically Developing Children

Elaine Peralta, Speech Language and Hearing Sciences (U)

Typically developing (TD) school aged children can add nouns to their vocabulary through learning from context strategies. Learning and properly using verbs is more challenging because they do not have a similar cross-situational effect in English. Generalizing the meaning of verbs is crucial or academic and social learning goals of school-aged children.

This study examined the types of word learning errors made by typical developing children to identify strategies used during word learning. The ultimate goal of this research is to guide appropriate treatment necessary for word learning.

Methods: Participants in this study included 13 right-handed monolingual English speaking children. They all had normal cognition and language and were between the ages of 8-13.

All participants completed a World Learning from Context task where they listened to sets of three sentences in which the final nonsense word was a target novel word to be learned. The sentence triplets comprised two conditions: Meaning, in which triplets were designed to establish a meaning for the novel word, and No Meaning, which was a control for repetition. Each triplet was followed by a question, "What does the word mean?". Child responses were coded in two different ways: 1) related to the sentence the response best matched and 2) related to the target response. This study focuses on the Meaning condition.

Results: The results of this study are on going and will be completed by the end of January.

184 9:00 am VV

Examining Peer Interactions during an Intervention for Spanish-speaking Children with and without Developmental Language Disorder

Megan Douglass, Speech Language and Hearing Sciences (U)

Peer interaction has been an effective strategy to increase learning opportunities for typically developing children (Brinton et. al., 1997). There has been an increase interest in pairing children with language impairment with their typically developing peers to reap similar benefits (Robertson & Weismer, 1997). Our study seeks to understand peer interactions in intervention, specifically pairing of a child with developmental language disorder (DLD) with a child who is typically developing (TD). Data in this study is from a larger intervention study that targeted Spanish vocabulary in bilingual children (Dam et al., under review). Participants,

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

aged 6-8, worked with a clinician in dyads (dyad = TD, DLD) to complete a four-week vocabulary intervention in Spanish for three days a week. Using video recordings of intervention sessions, we divided 7-minute video clips into 30-second intervals, and coded for the frequency, type, and direction of interactions. We asked whether the dyads differed in the total number of interactions and/or in the types of interactions that occurred (i.e., child-child or child-adult). Within child-child interactions, we also studied the direction of interactions (i.e., TD to DLD or DLD to TD). Preliminary results are based on two dyads that were observed in general to be highly interactive (Dyad A) and minimally interactive (Dyad B). Our results showed that the dyads were actually similar in the total number of interactions; however the type and direction of interactions were different. Dyad A had more child-child interactions, whereas Dyad B had more child-adult interactions. Findings from this study can contribute to a better understanding of how bilingual children with developmental language disorder interact with peers.

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185 9:00 am WW

Electrophysiological Analysis of Neural Processes Underlying Verb Learning in Typical School-Aged Children

Savannah Kennedy, Speech, Language and Hearing Sciences (U)

Verbs are known to be more complex than nouns for processing and acquisition due, in part, to the additional cognitive demands and informational requirements needed to understand their meaning. Previous studies evaluated the way that school-aged children learn nouns using a combined behavioral – electrophysiological methods approach. However, we know less about the process of verb learning in this population. Here, we examine if the event related potentials (ERPs) of children learning verbs reflect the increased difficulty related to verbs versus nouns. Specifically, we ask whether the N400 ERP component, related to semantic processing, changes during verb learning. Looking at the ERPs when meaning was assigned to the novel verb, the N400 component is expected to attenuate across sentences less than it would during a noun learning task. Additionally, the children are predicted to gain less understanding about the meaning of verbs than nouns.

In this study, twelve typically developing children aged 9-13 completed a battery of standardized language assessments. Additionally, while they participated in an experimental word learning task, their brain activity was recorded by electro-encephalogram (EEG). EEG was used because it indicates whether a child gains understanding about a word even if they cannot identify the meaning themselves. In the word learning task, children were presented sets of three sentences with a novel verb at the end. They were asked to determine if the novel verb had meaning or not, and what they believed the meaning to be. We analyzed the N400 ERP from each presentation of a novel verb that did represent a real, meaningful word, and filtered out each presentation that did not have meaning. Through this, we can determine, without looking at the children's behavioral responses, whether a child successfully gained more knowledge about the meaning of the novel verb throughout the three sentence presentations.

Across each sentence presentation that a child hears, we predict that the N400 will decrease in amplitude, but not as much as in a comparable noun learning task. This reflects the difficulty children have in learning verbs, but still shows a slow accumulation of knowledge about novel verb meaning.

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186 9:00 am XX

Saving the Best for Last: A Word Final Complexity Study

Julia Moluf, Speech, Language and Hearing Sciences (U)

Background: Over 90% of speech-language pathologists (SLPs) treat children with speech sound disorders (American Speech Language and Hearing Sciences Association, 2016). Evidence indicates that complex treatment targets result in positive outcomes for children who struggle with speech sounds (Gierut, 2004). For example, treating consonant clusters such as /stɹ-/ in stripe result in more widespread change than targeting a singleton like /s/. Traditionally, cluster treatments have been targeted word-initially (e.g., stripe). However, in English, word-final clusters are crucial for expressing grammar (e.g., we walk vs. he walks).

This study explores the effects of word final complexity treatment for improvement in speech sound production in children with speech sound disorders.

Methods: Participants included four English-speaking monolingual children (three males, one female), ages 3–5 years, diagnosed with speech sound disorder (e.g., each child scored below normal limits on the Goldman Fristoe Test of Articulation; mean = 50; SD = 11.8). Participants demonstrated difficulty in producing word final consonant clusters (e.g., /-ks/ in 'kicks').

Data was collected at the SDSU Speech-Language Clinic over the course of 18 treatment sessions.

Participants' progress was evaluated with a structured speech sound probe (Protocol for the Evaluation of English Phonotactics; Barlow, 2012). Measures from the probe included (1) Percentage of Consonants Correct (PCC), a global measure of performance (Shriberg, Austin, Lewis, McSweeny, & Wilson, 1997) and (2) analyses of word final consonant cluster repertoires. Additionally, parent report of child intelligibility (Intelligibility in Context Scale; McLeod, Harrison & McCormack, 2012) provided qualitative impressions of the children's performance. Each measure was collected at the beginning and end of treatment.

Results: While the global measure, PCC, did not improve for any of the participants, other measures indicated progress. Parent ratings of intelligibility increased from an average of 2.98 to an average of 3.57 (maximum score = 5). Further, participants demonstrated growth in either the number of clusters produced or the accuracy in which they produced them.

Results suggested that phonological complexity presented at the end of a word may lead to broader phonological learning in the form of speech production improvement beyond treated sounds, an indication of efficient therapy.

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

187 9:00 am WW

Word Learning in Children Based on Frequency and SES Status

Amber Henmi, Speech, Language and Hearing Sciences (U)

Children from low socioeconomic status (SES) homes enter school with lower vocabulary compared to children from high SES homes. This gap continues to widen once children enter grade school. It has been recognized that children from low SES homes are less effective at identifying the meanings of unknown words versus children from high SES homes. What is unknown is whether specific words are more challenging for children from low SES homes to learn, specifically, if there is an effect of whether the word is more or less frequent. This question could guide vocabulary training for children from low SES homes with the aim of bridging the vocabulary gap. In this study, two groups of 14 monolingual children ages 10-14 years were sorted by SES based on whether the child qualified for a free or reduced lunch. Each participant completed a word learning from context task. In this task they listened to 100 sets of sentences presented in triplets where a nonsense word was given at the end. Half of the nonsense words represented a target noun while the other half had no meaning. Participants were asked to identify if the nonsense word had meaning and, if so, what the nonsense word meant. The frequency of target nouns were obtained from a database, the iWeb Corpus, which is composed of 14 billion words from 94,391 websites methodically selected to accurately represent the English language. Accuracy of meaning identification will be compared across groups considering word frequency. We hypothesize that children from low SES homes will learn fewer low frequency words in comparison to their high SES peers. Conclusions will focus on the hypothesized relationship between word frequency and whether specific word were learned, comparing children from low and high SES homes.

188 9:00 am ZZ

Representation of Implicitly-learned Words in School-aged Children with and without Language Disorders

Ashley Goussak, Speech, Language and Hearing Sciences (M)

Typically developing school-age children are able to learn new words implicitly (i.e., using context rather than direct definitions), while children with developmental language disorder (DLD) best learn words when taught explicitly (e.g., directly defining a word). However, explicit teaching of every new vocabulary word is impractical for school-based clinical services. Thus, it is important to better understand the breakdowns in implicit learning in children with language disorders. The present study examines the behavioral and neural responses during recognition of implicitly-learned nonsense words in school-age children with DLD (n=11) and typically developing peers (n=12).

While recording EEG, the participants completed two tasks: 1) an implicit learning task and 2) a word recognition task. In the implicit learning task, participants listened to sentence triplets with the same nonsense word at the end (semantically equivalent to a noun); some of the novel words had meanings attached (Meaning condition) and some did not have a related meaning (No Meaning condition). The word recognition task directly followed the implicit learning task and asked the children to identify, by indicating yes or no via button press, if they had previously heard the word in the implicit learning task. In the word recognition task, there were three conditions: previously-heard with meaning (Meaning condition), previously-heard without meaning (No Meaning condition) and not previously-heard (New). Each participant heard 200 nonsense words: 100 previously-heard (Old: 50 Meaning, 50 No Meaning) and 100 novel (New), following the description above. This study focused on the word recognition task results. EEG data were processed to examine the N400 and P200 ERP components, associated with semantic and attentional processing respectively.

Overall, the results revealed that children with DLD had poorer behavioral recognition and different patterns of neural engagement during recognition compared to typical peers. Further analysis revealed less effortful semantic processing (N400) for the TD participants as compared to their DLD peers. Conversely, DLD peers had less effortful attentional processing (P200) of each nonsense word. Results suggest that implicit learning may not result in robust word learning outcomes in teaching children with DLD.

Session A-17

Poster Engineering & Computer Sciences 3
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

189 9:00 am AAA

Water Table Experiment: Interaction of a cloud of particles with a hydraulic jump

Devin Burke, Aerospace Engineering (U)

The interaction between particles in a supersonic, shocked environment is a complex system that is difficult to predict theoretically. To better understand the interaction of particles with a shock wave, experimental testing is necessary to provide data which will assist in validating computational models of experiments conducted by past researchers. These models are necessary for the development of next-generation aerospace applications, and to obtain a better understanding of the natural phenomenon. To mitigate the monetary costs associated with supersonic testing and provide a larger window of time to capture data, a water table is introduced. Using the hydraulic analogy, an attempt is made to model a particle-laden shocked aerodynamic environment by the use of a water table. The relationship between shallow water and air exhibit many similarities to shock theory and correlates with the hydraulic analogy. The speed of a hydraulic jump in shallow water is measured by a Froude number which directly correlates to a Mach number in a gas. The water table layout, and the interaction of particles and a hydraulic jump will be discussed. The utilization of the water table proves to be a promising method to model the effects of a shock wave interacting with a cloud of particles.

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

190 9:00 am BBB

Analysis of Unmanned Aerial Vehicle Imagery along the Southernmost Elsinore Fault Zone

Faith Burkett, Environmental Geosciences (U)

We collected very high-resolution Unmanned Aerial Vehicle (UAV) imagery along the southernmost Elsinore fault in the Coyote Mountains, Imperial Valley, California, to identify and resolve displacements of offset Holocene alluvial bars and channels. We employed a DJI Phantom 4 Pro at a flight altitude of ~25 m to collect aerial imagery, and processed the images with Agisoft software to produce a point cloud, DEM, slope map and orthomosaic with sub-cm resolution. We identified evidence for three late Holocene surface ruptures in Alverson Canyon, and we compare our results to those interpreted from previously collected aerial photography, total station and tripod-based LiDAR surveys, and field-based tape measure estimates.

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191 9:00 am CCC

Synthetic Jet

Elmer Carrillo, Aerospace Engineering (U)

The performance of airfoils at high angles of attack is degraded by flow separation which leads to losses in applications, such as turbomachinery and wind turbines. Synthetic jet actuators have been shown to be an effective technology to control flow separation and improve the performance of airfoils at post-stall angles of attack by re-energizing the boundary layer. A certain class of synthetic jet actuators employs piezoelectric drivers to create a zero-net-mass-flux jet within an airfoil. In this application, a conventional ceramic-based piezoelectric diaphragm oscillates within a cavity of the airfoil and emits stabilizing vortical structures through an orifice. This study builds on the data and recommendations of previous research through the integration of a novel polymer disk, generates new experimental results from Particle Image Velocimetry testing, and will provide more accurate boundary conditions for subsequent Computational Fluid Dynamics simulations. The polymer, Polyvinylidene difluoride, exhibits the desired piezoelectric properties of the ceramic composite disk and superior electromechanical performance. Its incorporation into the synthetic jet actuator system has the potential to yield the level of performance necessary to advance towards commercialization.

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192 9:00 am DDD

Single Barrier Discharge Plasma Actuators for Flow Control on an Aerospike Nozzle Engine

Stephen Yu, Aerospace Engineering (U)

The objective is to investigate the wake physics of a truncated aerospike nozzle and the potential effects of integrating single barrier dielectric plasma actuators to the aerospike nozzle, which could minimize the drag that the aerospike experiences, and thus improve the performance of the engine. Currently, a small-scale experimental model is being developed that will use compressed air to simulate the supersonic exhaust of an aerospike nozzle engine. Testing will be performed on linear aerospike nozzles with different truncation levels and base pressure and thrust coefficients will be measured under varying nozzle pressure ratios with and without the plasma actuators. Schlieren imaging will be taken and analyzed and the data gathered will be compared with the results from computational flow dynamics (CFD) simulations in ANSYS Fluent on the test model. Validation of a model that properly captures the physics of wake transition under the effects of plasma actuators can lead to the further understanding of using plasma actuators for flow control and the development of industrial applications.

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193 9:00 am EEE

3D-printing and consolidation of 316L tainless steel powder components

Ifeanyichukwu Olumor, Mechanical and Aerospace Engineering (D)

A unique binder jetting method is employed in printing 316L stainless steel components with the aim of improving both the green density of printed parts and subsequently sintered components. In this method, a water-soluble binder is premixed with 316L stainless steel powder before printing. During printing, water is jetted unto the powder/binder mixture to selectively activate the binder, layer b layer. The effects of printing parameters on the green density and sintered components are investigated. Results show that layer height and nozzle temp affect the density and dimensional accuracy of the green compact. Results show that on reducing layer height, green density increases. However, the dimensional accuracy of the printed samples decreases, especially in the Z-direction.

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194 9:00 am FFF

Unmanned Aerial Systems: Nonlinear High-Fidelity Aeroelastic Analysis

Enrico Santarpia, Engineering Science (Structural) (D)

Insects present excellent flight performance and are the ideal candidate for bio-inspired flapping unmanned aerial system (FUAS). An effective design of FUAS will try to reproduce the essential aspects of the insect biological features required for efficient flight with focus on the maximization of the payload and minimization of the power required to flap the wings. In previous studies it has been shown that to achieve a high efficiency of flight the wing must not be rigid. The goal is to introduce a numerically efficient nonlinear aeroelastic model for simulation of Unmanned Systems to study the effect of wing structure on the flight performance.

SRS

Abstracts of Presentations

Session B

SAN DIEGO STATE UNIVERSITY

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

Session B-1

Oral Humanities, History, Literature, Philosophy 2
Friday, February 28, 2020, 11:00 am
Location: Pride Suite

195 11:00 am

State, Sect, or Sons: Iraqi Identities as Byproducts of Sociopolitical Structures

Abdullah Haki, Political Science (U)

Over the course of the 20th and early 21st centuries, the national identity harbored by the inhabitants of the Iraqi state has fluctuated between periods of strong expression and of apparent non-existence. The priority of one level of identity over another, be it national, sectarian, kin-related, or ethnic, is in Iraq constantly shifting. In this paper, I study three different periods in modern Iraqi history in order to illuminate the socio-economic and socio-political incentive structures which affect the type of identities predominant among Iraqis within each period. These periods, specifically, are 1) the monarchial era of the Iraqi state spanning from 1920-1958, 2) The Saddamist Baathist era spanning from 1979-2003, and 3) The post-war period of 2003-2017. I argue that every specific identity is inextricably related to an accompanying socioeconomic or sociopolitical structure, and that the existence of that structure is a necessary, though not sufficient, condition for the existence of that identity. With this understanding, a national identity in Iraq cannot exist in the absence of coherent state and socio-economic structures that are inherently limited by national borders, but is not guaranteed to exist even if such structures exist. Furthermore, the dominance of one form of identity over another (i.e. national over sectarian) within Iraq is dependent upon the coercive strength and ideological reach of the sociopolitical structure to which it is linked, with the most socially pervasive and physically dominant structures being most able to impose their accompanying identities on the whole populace. Thus, a national identity is much more likely to be extant and predominant among Iraqis if the state is omnipresent, able to impose its will using force, and able to spread its sponsored identity through civil institutions such as schools and courts. Where other structures are as, or more, pervasive as the state structures, national identity will be less dominant.

196 11:15 am

Koi Kaleidoscope

Diana Phan, Creative Writing (M)

Koi Kaleidoscope is a short story part of my manuscript series SWA Punk broken up into an episode or 'radio' story in which characters from similar stories appear in other scenarios. The story is about Jin Malachi, a young gay Vietnamese American transgender man who loses his family swords to an executioner while travelling in Japan with his mentor, General Cosmo Phoenix. Jin ends up being forced to team up with a female yakuza boss he befriends to get his swords back from the executioner.

In the scene presented the audience is introduced to the two heroes, Jin and Cosmo. Adding a feminist lens onto the scene, masculinity is explored through Asian Americans and questioned through the representation of Asian males. Like, with the character Jin who is fully a Vietnamese American gay transgender male is juxtaposed to Cosmo who is a straight biracial cisgender man. By examining the interactions between Jin and Cosmo, one can see how masculinity is defined by the character's morals. As for a queer lens, the story follows Jin who is both transgender and gay and the narrative explores Jin's moral compass throughout the story. Not to mention the genre of the story is Queerpunk and Science Fantasy. Finally, the Asian American lens the story takes by putting Vietnamese characters into another Asian country like Japan and watching the interactions especially with the focus on Jin. By approaching the narrative with a humorous and absurd tone, I want to both entertain the audience and make the audience think about racial and LGBTQ+ issues.

For the presentation, I will be reading the scene while through PowerPoint there will be visual illustrations shown with text boxes. What I hope to do in this presentation is to entertain and show how characters can rise above their identity politics and be relatable while at the same time demonstrate the diversity of characters and representations.

197 11:30 am

Othering Eastern Women in Frankenstein

Reyam Rammahi, English and Comparative Literature (M)

In Frankenstein; or, the Modern Prometheus, Mary Shelley depicts Eastern women based on the contemporary Western perception of the East. As much as the Turkish harem forms the basis of knowledge for many Western writers to write about the treatment of women in the East, the same emphasis on this sphere is made by Shelley. Additionally, Frankenstein is profoundly affected by travel accounts like Volney's The Ruins; or, Meditation on the Revolutions of Empires: And the Law of Nature, a text that Shelley's monster reads among other sources to educate himself. Shelley's family circle is another source for her knowledge about the East, as well as major works like A Vindication of the Rights of Woman by Mary Wollstonecraft and Enquiry Concerning Political Justice by William Godwin.

Safie, a minor character in Frankenstein, is depicted as the ignorant Arabian who runs away from the tyrannies of her father and the oppressive Middle Eastern society to join her French lover, Felix. Once the young woman arrives, Felix starts teaching her language, law, and many other subjects from works by Volney and other authors. The story of the fictional Safie is closely related to a story of a real Turkish Sultana, named Safiye Sultan. As the names suggest, these two women have a lot in common, including the fact that both

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are Albanians by birth, with the history of being Christian slaves taken by the Ottomans.

In her text, Shelley presents, through Safie's story, the harem as an oppressive sphere where any chance of education or accomplishments made by women is impossible. Women of the harem, according to her, are solely concerned with satisfying the sexual needs of the sultan. In my research, I provide historical evidence about the prominent status of Eastern women who made a significant impact on political and social life and were invested in women education and maintaining good diplomatic relations with other countries. I use, for this purpose, Safiye Sultan as an example to show this impact and to disrupt the stereotypical image about Eastern women in widely read texts like Shelley's.

198 11:45 am

The German Reunification War Scare

Eugene Phillips, History (M)

In the summer of 1950, West Germans and Americans feared an eventual war for German reunification after North Korea invaded South Korea in a conflict which falsely proved to Washington and its allies that Soviet-inspired communist aggression would lead to greater wars for expansion. Korea and Germany were occupied by the United States and the Soviet Union after World War II and both were divided as a result of the Cold War. Washington and Bonn believed the superficial parallels between Germany and Korea forewarned of a greater war against the Soviets and East Germans which would be conducted similar to North Korea's invasion. West Germans increasingly questioned the US's ability to defend its allies against the USSR as the Korean People's Army defeated the American-led forces which retreated into the Pusan Perimeter in South Korea. Using the Korean War as a model to understand how West Germany and Berlin were largely defenseless, Bonn and Washington overestimated the danger of an East German and Soviet invasion as they prepared for a military incursion, foreign-sponsored insurgencies, and a refugee crisis while the current American, British, and French military deployments to occupy Germany were unprepared for defensive combat. Washington and Bonn proposed numerous plans through August 1950 to defend West Germany which included the establishment of a federal police force, the formation of paramilitary units, Berlin's reinforcement, and some predetermined strategies to delay offensive forces as suggestions were made on how the Federal Republic could provide a military contribution to the American alliance network. By late September, the US had retaken Seoul and launched offensive operations in Korea which started to repair American prestige in West Germany around the same time that a Foreign Ministers Conference concluded in New York by agreeing to most proposals for German defense. The German reunification war scare during the Korean War ultimately strengthened the US-West German alliance while the Bonn government gained greater autonomy and an international debate on its rearmament.

199 12:00 pm

Sugar and Spice and Women's Rights: The Historiography of US Women's Rights Groups during The Women's Liberation Movement of the 1960s to 1980

Jade Connolly-Cepurac, History (M)

In its current state, the field of the American Women's Liberation Movement has developed a crucial bottom-up women's history; however, I will highlight some subsections of the history that could be more developed and centralized in the future scholarship. My research covers the increasing substantial intersectional work and analysis over time, which has, in some instances such as, the influence of Black women, has entirely flipped since its foundational research. As the field currently stands, there is a lack of analyzing the influence of historical actors in the LGBTQ+, Latinx, Black, Asian, Indigenous, and non-Judeo-Christian communities on the movement, they have been added more but not fully centralized into scholarship. Also, there is a lack of historical research of feminist spiritualist religions, particularly "goddess religions" that spawned during the movement, this may be in part because of how private "alternative religions" because of the stigmatization of non-Judeo-Christian religions are in American culture.

Session B-2

Oral Physical & Mathematical Sciences 3

Friday, February 28, 2020, 11:00 am

Location: Park Boulevard

200 11:00 am

Constraints on the Properties of Superdense Matter from Astrophysical Observations of Neutron Stars

Kara Whitaker, Physics (U)

Neutron stars are super-dense remnants of massive stars that blew apart in catastrophic supernova explosions. They are typically around 20 kilometers across and spin rapidly, often making many hundred rotations per second. Depending on mass and rotational frequency, gravity compresses the matter in the core regions of neutron stars to densities that are several times higher than the density of ordinary atomic nuclei. A thimble full of neutron star matter would thus have a mass of one billion tons! At such extraordinary densities atoms themselves collapse, and atomic nuclei are squeezed so tightly together that neutrons and protons begin to dissolve into their constituents, the quarks, and/or transform to other types of novel particles such as hyperons. This research project uses the latest data provided by astrophysical instruments such as NICER (Nuclear Interior Composition Explorer) and the gravitational-wave detectors LIGO and VIRGO to shed light on the properties of super-dense matter and on neutron stars.

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201 11:15 am

Using computational modeling to predict pulmonary function in cystic fibrosis lungs

Amanda Lee, Mathematics (U)

Cystic fibrosis (CF) is an autosomal recessive genetic disorder that leads to mucus accumulation in the lung, poor pulmonary function, and early mortality. A commonly used metric to access pulmonary function is forced expiratory volume in one second, or FEV1. Lower than normal FEV1 readings are an indicator of restricted breathing and poor pulmonary function. Though poor pulmonary function is a major factor in CF, it remains unknown how mucus distribution regulates FEV1. This study aims to improve our understanding of FEV1 readings by accessing CF severity as a function of both FEV1 and mucus distribution in the lungs. A novel MATLAB image processing algorithm is implemented that automatically quantifies the spatial distribution of mucus that is defined as having a tissue density greater than 10% from a research MRI image of normal and CF lungs at full inspiration. The MRI research scans were obtained from four mild, six moderate, and four severe CF patients and fourteen age- and sex-matched controls. These scans have been designed to create quantitative maps of tissue density. The algorithm edge detects, binarizes, and then segments mucus clusters in the lung. The area, location, and density of mucus throughout the lungs are then computed and incorporated into a mathematical model. Using differential equations and curve fittings, we have developed a functional relation between FEV1 and mucus distribution. The model gives insight as to how the distribution of mucus is altered throughout the progression of CF disease and provides new information on the ideal mucus distribution for optimal FEV1 readings in both control and CF patients. This study is the first of its kind to access pulmonary function in differing severities of CF patients and healthy controls as a function of mucus distribution and allows for a better understanding of the effects of CF severity on patients' everyday lives.

202 11:30 am

Improving Foreground Modeling in Searches for the 21cm Reionization Signal

Kelcey Davis, Astronomy (U)

The Twenty-one centimeter emission has the potential to trace the ionization of neutral Hydrogen in the early universe and map its structure. Detection of the signal will require a model of the radio bright foreground. The foreground, which is mostly radio galaxies, is 4-5 orders of magnitude brighter than the signal and will therefore play a crucial role in its detection. Previously, most radio sources have been modeled as bright points to be subtracted from the data and used in calibration. Our approach combines observations of various objects over multiple nights to build more accurate models of the radio sky. We do this by using a software package called FHD (Fast Holographic Deconvolution), which models objects with complicated internal structures as several points. We combine these point sources over multiple observations by treating them as Gaussian surfaces. We believe that using our new models for calibration of the observations could reduce contamination of the reionization signal from foreground emission. Although this research was conducted as part of the HERA (Hydrogen Epoch of Reionization Array) group, the data used was taken at the MWA (Murchison Widefield Array). The MWA has a much higher resolution than HERA and allows for the creation of better models. If successful, this approach will help narrow the probable limits for 21cm detection.

203 11:45 am

Ultraviolet and visible photoluminescence of aluminum-doped zinc oxide multilayered metamaterial

Bethany Campbell, Physics (M)

Aluminum-doped zinc oxide (Al:ZnO) is a type of transparent conducting oxide (TCO) that is of high research interest due to its low optical losses, high transparency and transmittance, low toxicity, low cost to manufacture, and abundance. We are interested in the properties of multilayered Al:ZnO/ZnO, the studies of which are limited. Multilayered samples have been previously manufactured using both Pulsed Laser Deposition (PLD) and Atomic Layer Deposition (ALD). We investigated the photoluminescent properties of Al:ZnO/ZnO using a set of six coupled rate equations representative of a three-level system, solved using fourth-order Runge-Kutta in Python. Additionally, we studied how the pulse duration and pump intensity affects the ultrafast dynamics of the ultraviolet and visible photoluminescence. Finally, we investigated the contributions of the bandgap renormalization and the Burstein-Moss effect. We found that visible photoluminescence is suppressed with increasing aluminum doping (~1018cm-3); we observed that doped samples with pump pulses ~1 ns exhibit an order of magnitude increase in ultraviolet photoluminescence intensity; and we found that for low doping (~1017cm-3), the pump energy is the primary driving factor behind the behavior of the ultraviolet/visible intensity ratio. This work has potential applications in photonics, information storage, medical therapeutics, and smart building technology.

204 12:00 pm

A mathematical model describing the role embryonic nutrition plays in overall growth

Ashley Schwartz, Applied Mathematics (M)

Embryonic nutrition plays a vital role in the growth and development of a human fetus but increased levels of chemical pollutants in our environment may hinder this process. In vivo studies of zebrafish, a model vertebrate animal, yield key information about the interaction between common pollutants, embryonic nutrition, and overall growth in an observational manner. This common analysis lacks the sophistication and robust conclusions computational science can bring. This study develops mathematical models of the developmental

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processes to begin the use of in silico experiments and minimize the extensive effort of in vivo. A two-dimensional ordinary differential equation mathematical model is proposed that demonstrates the relationship between nutritional uptake and overall growth in the zebrafish. Experiential data is matched using a sum of square error analysis to validate the model's construction and assumptions. The addition of pollutant interaction extends the model even further, allowing the analysis of various chemical interactions during embryonic development. Our results show the direct correlation between embryonic nutrition and overall growth. As a result, the model may be used to determine how toxicant introduction at various doses may affect embryonic growth and overall health and longevity.

Session B-3

Oral Interdisciplinary 3

Friday, February 28, 2020, 11:00 am

Location: Tehuanco

205 11:00 am

Role of E3 ubiquitin ligases Mindbomb and Neuralized in tissue regeneration

Madison Balagtas, Cellular and Molecular Biology (U)

The Notch pathway is a conserved cell-cell signaling pathway that regulates cell fate and differentiation during development and adult tissue homeostasis. Notch has known roles in regulating neuronal, cardiac, immune, and endocrine development. Notch is a cell-surface receptor that transduces short-range signals by interacting with transmembrane ligands, including Delta and Serrate, on neighboring cells. In signal-sending cells, ligands must be endocytosed to activate Notch in signal-receiving cells. Ligand endocytosis is promoted by two E3 ubiquitin ligases, Mindbomb (Mib) or Neuralized (Neur), which marks ligands for internalization. We are using the planarian Schmidtea mediterranea to investigate the roles and targets of Mib and Neur in homeostasis and tissue regeneration because planarians possesses a large population of adult pluripotent stem cells that allows it to completely regenerate after nearly any injury. We identified in planarians five mib and five neur homologs by performing BLAST using human Mib and Nuer sequences as queries. We cloned these planarian homologs into a vector appropriate for both RNAi and riboprobe synthesis. To identify in which tissues and cell types that Mib and Neur signaling is acting in planarians, we used in situ hybridization to visualize expression of mRNA for these genes. We found that during homeostasis, Mindbomb-like-3 and Mindbomb-like-4 were expressed in the gut and periphery of planarians, Mindbomb-1 was expressed in the gut and central nervous system (CNS), and Neuralized-3 was expressed in the gut. RNA interference (RNAi) was performed to reduce gene function to screen for regeneration phenotypes. Initial knock down experiments of the five mib and five neur genes did not show defects in patterning or regeneration. The multiple copies of each of these genes in the planarian genome indicates this result could be from genetic redundancy. Thus, we are examining a single-cell RNA-sequencing database to find which ligases are co-expressed and performing multiple gene RNAi on these candidates. As mib and neur are known to regulate neuronal patterning during development in humans, we are performing in situ hybridization for known markers of various neuronal cell types after RNAi to uncover which specific neuronal populations are regulated by Notch signaling during planarian regeneration.

206 11:30 am

The relative timing of population growth and urban land use change – A case study of orth Taiwan from 1990 to 2015

Hsiao-chien Shih, Geography (D)

The relative timing of urban land use change and rural-urban migration was explored based on a case study for north Taiwan from 1990 to 2015. The study area and period were selected because of the (1) availlability of fine spatial (district level) and temporal (annual) scale population data, and (2) observation of rural-urban migration and extensive urbanization.

An efficient approach to estimating areal coverage of urban land use types over time is to generate an urbanization map labeled with the date that urbanization commenced, and then conduct an overlay analysis with an accurate land use map for the end date of study period. A novel method of identifying the starting time of urban expansion was developed and tested based on dense time series of Vegetation-Impervious-Soil (V-I-S) maps derived from Landsat surface reflectance imagery. The identified location and estimated time for newly urbanized lands were generally accurate, with 80% of urban expansion estimated within ± 2.4 years.

To derive an accurate land use map for the end date of the study period, a random forest (RF) classification routine was applied to Landsat image inputs. The top 10 most contributing features for RF classifiers were the six spectral wavebands, GLCM homogeneity of V-I-S, and V temporal variation. The Landsat image was tested with different input features, and the land use maps derived from the top 10 features yielded the most accurate map. Thus, areal coverages of annual urban land uses were derived by overlaying the urbanization map on the 2015 land use map.

The relative timing and relationship between urban land use and population dynamics was explored at the administrative district level. Linear regression was used to examine the relationship between areal extent of land use and population. Lag correlation and Min-Max scaling was applied to identify the relative timing between these two data types for districts that experienced population growth. The areal extent of Residential land use within a district was found to be significantly related to population count ($0.51 < R2 < 0.58$). Most districts were found to experience population growth prior to Residential land expansion.

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207 11:45 am

Mimicking Fibrosis and Inducing Stress into iPSC-Derived Cardiomyocytes

Emily Morgan, Biology (U)

Muscle cells known as Cardiomyocytes are the contractile cells that make up the heart; they shorten during systole and lengthen during diastole to create the rhythmic cycle that pumps blood throughout the body. (Janssens, 2017) Typically, aging and genetic mutations are non-environmental factors that can contribute to heart dysfunction, e.g. Dilated Cardiomyopathy (DCM) where the heart enlarges and ventricle walls weaken. While many homozygous mutations can lead contribute to DCM, it is less clear with heterozygous mutations. However in a family with a history of DCM, we found enhanced rates of early onset DCM, which was linked to the presence of two heterozygous mutations in the genes VCL and TPM1. (Deacon, 2019) To better understand how this specific combination of mutations contributed to disease, induced pluripotent stem cells (iPSCs) were used to create patient-specific cardiomyocytes (CMs). While baseline performance of the iPSC-CMs was reduced, we also determined to what extend additional stress could induce disease in unaffected carriers of VCL and TPM1 mutations. Cells will be placed on tunable methacrylated hyaluronic acid (MeHA) gels to mimic fibrosis that occurs post heart attack. The hypothesis of this experiment is that the performance of the iPSC-CMs derived from unaffected carriers will decrease as the MeHA gels are stiffened whereas iPSC-CMs from affected carriers and genotypically normal patients will be reduced or unchanged independent of stiffening, respectively. We anticipate that this data will highlight the need to study gene-environment connections more closely.

1. Deacon DC, HappeCL, Chen C, et al. Combinatorial interactions of genetic variants in human cardiomyopathy. Nature Biomedical Engineering. 2019;3(2):147-157. doi: 10.1038/s41551-019-0348-9.

2. Janssens, SP. Mesenchymal Cell Therapy for Dilated Cardiomyopathy. J Am Coll Cardiol. 2017 Feb, 69 (5) 538-540.

208 12:00 pm

Inhibition of enzymatic browning during protein isolation from mealworm (Tenebrio molitor) larvae

Alexandra Rosenbloom, Foods and Nutrition (U)

Mealworm has the potential to serve as a sustainable protein source due to their high protein content, well-balanced amino acid profile, efficient feed conversion rate, low environmental footprint, and ability to live off of organic waste. Despite these benefits, enzyme-catalyzed melanization of mealworm tissue occurs during protein isolation, which negatively impacts the appearance, functionality, digestibility, and flavor of the proteins. The objective of this study was to develop effective methods to inhibit browning during mealworm protein extraction.

Mealworm larvae were homogenized in 10 volumes of water or different inhibitor solutions at 30,000 rpm for 30 s. Tested inhibitors included butylated hydroxyanisole (BHA), citric acid, ethylenediaminetetraacetic acid (EDTA), phenylthiourea (PTU), and sodium sulfite each at 1 mM concentration and ascorbic acid at 1, 2, 3, 5, and 10 mM concentrations. The homogenate was filtered through a cheesecloth and kept at 20°C for a minimum of 30 min with continuous magnetic stirring. Color of the extract was determined by a Konica Minolta spectrophotometer every five minutes. One-way ANOVA and Tukey's post-hoc test were used for statistical analysis ($a = 0.05$).

PTU and sodium sulfite completely inhibited browning for over five hours. EDTA and ascorbic acid (1 mM) extended the lag time of the reaction from 5 min to 10 and 15 min, respectively, but the inhibitory effect wore off at 30 min. Citric acid exhibited a slow onset of inhibition. However, mealworm protein extract in citric acid solution had a higher ($P \leq 0.05$) L* value at 30 min (28.38 ± 0.18) than those extracted in water, 1 mM ascorbic acid, BHA, and EDTA solutions (22.57-23.53). Browning inhibition improved at higher ascorbic acid concentrations ($P \leq 0.05$). At 5 mM and above, ascorbic acid completely stopped browning for 30 min. The half maximal inhibitory concentration (IC50) of ascorbic acid was 1.82 mM. In summary, ascorbic acid (5 mM) and sodium sulfite (1 mM) can be used as food additives to effectively inhibit enzymatic browning of mealworm during protein extraction.

Our findings can improve the quality of mealworm proteins and promote their utilization as a food ingredient.

209 12:15 pm

Identifying new regulation strategies of isocitrate dehydrogenase 1

Alexandra Strom, Biology (U)

Mutations in human metabolic enzyme isocitrate dehydrogenase 1 (IDH1) drive many gliomas, glioblastomas, acute myeloid leukemia, and bone cancers. Wild type IDH1 restocks the tricarboxylic acid (TCA) cycle by catalyzing the reversible conversion of isocitrate to a-ketoglutarate. However, cancerous mutations of IDH1 acquire a neomorphic activity, the conversion of a-ketoglutarate to D-2-hydroxyglutarate, a proposed oncometabolite. Although it has been established that IDH1 is an enzymatic driver of disease, more research is necessary to elucidate the molecular mechanisms of its regulation. Post-translational modifications, such as acetylation,

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serve as an effective means of protein regulation. Here, we hypothesize that acetylation may regulate IDH1 by having a significant impact on catalytic efficiency, as this is seen in a closely related enzyme, isocitrate dehydrogenase 2 (IDH2). We employed non-enzymatic lysine acetylation in wild type IDH1 via acetyl coenzyme A treatment. Using steady-state enzyme kinetics in a physiologically relevant setting, we report a concentration-dependent decrease in the rate of the acetyl coenzyme A treatment. We then generated lysine (K) to glutamine (Q) point mutations in IDH1 (K321Q, K81Q, K224Q) to mimic acetylation and observed a decrease in the catalytic efficiency of the acetylation mimics. Our data suggests that acetylation may be a viable post-translational modification for regulating IDH1 catalytic efficiency, thus helping us understand pathways relevant to IDH1 activity.

210 12:30 pm

The effect of post translational modification on isocitrate dehydrogenase 1 (IDH1)

Viraj Upadhye, Biology (U)

Isocitrate dehydrogenase 1 (IDH1) is an enzyme found in many forms of life and catalyzes the reversible NADP+ -dependent oxidation of isocitrate to form a-ketoglutarate (aKG) and NADPH. Mutations at R132 in IDH1 lead to a neomorphic reaction resulting in the creation of the oncometabolite D-2 hydroxyglutarate (D2HG) and the depletion of NADPH rather than its production. Cells rely on NADPH for a multitude of vital functions such as the mitigation of reactive oxygen species (ROS) that occur during cellular respiration and crucial cellular processes such as lipid biosynthesis. Cells generate ROS as a byproduct of metabolism and have evolved various pathways to prevent this damage. One such pathway is through post-translational modifications (PTMs) of cysteine residues in the form of S-glutathionylation. Glutathione is a tripeptide antioxidant found in extremely high concentrations in the cell (5 mM). that consists of a glycine, cysteine and glutamate. The addition of glutathione serves to mitigate the damage done by ROS in the cell through shielding cysteine residues from irreversible oxidation. I hypothesize that glutathionylation of IDH1 is a mechanism of regulation under oxidative stress, and that increased presence of glutathione species attached to IDH1 should be observed under these conditions and affect enzymatic activity. I showed previously that addition of 10 mM glutathione causes the inactivation of WT IDH1 catalysis, but the mechanism has not yet been established. I found that immunoblot analysis indicates that IDH1 appears to be glutathionylated, and efforts to identify the affected residues are underway. By establishing the role of glutathione on IDH1 catalysis, we can better understand the cellular response to ROS.

Session B-4

Oral Behavioral & Social Sciences 5
Friday, February 28, 2020, 11:00 am
Location: Aztlan

212 11:15 am

Navigating a Sea of the Unexpected: A Quantitative Analysis of Message Manipulation through EVT

Stephany Rojas Hidalgo, Communication (M)

The purpose of this study was to understand voter support concerning party platforms and politicians better. Expectancy violations theory (EVT) is applied by manipulating message expectations by posing a conservative message, as stated by a liberal politician. EVT can be used in understanding voter support in this context as participants encounter a violation and attribute as positive or negative valence to the message determining their support for the politician. After viewing a noticeable manipulation or misrepresentation, awareness can be heightened, and the message is evaluated more critically. Through survey methodology, data was collected and analyzed for change in voter support by comparing expected with unexpected messages. Undergraduate student voters (n = 124) were asked to respond to political policy items both before and after exposure to an expected or unexpected message. An independent t-test provides answers to the question of interest and found that voters respond to manipulated messages by becoming more aware of their presence, which increases their political support if the message was expectancy confirming. This study contributes to aspects of voter support within the EVT framework that are not yet established within the existing body of political communication research. The results stated prior negates or works against the broad assumption that the U.S. voting population is not paying attention to politics. The findings here indicate that the U.S. voting population is comprised of individuals who are interested in politics, relevant politicians, and are, informed, contrary to popular belief. There is an increasing awareness about political message manipulation regarding political candidate messages on social media. This study indicates that inconsistent messages hinder candidates' support by putting audience members in an unexpected position, having to reevaluate their thoughts on a given matter. If the voting population is constantly navigating a sea of fake news to confidently become familiar with a political platform, voters become ambivalent, and support declines for the platform as a whole. This study significantly contributes to investigating this modern problem.

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213 11:30 am

"Like" Meme or Not, Sex is Important: A Quantitative Study of Sex-Positive Meme Diffusion

Laura Horton, Communication (M)

Internet memes have taken both the online and academic worlds by storm in recent years. As a communicative phenomenon comprised of textual, contextual, and visual elements, memes are uniquely positioned to introduce and disseminate messages to vast online communities. In a similar vein, the sex-positivity movement has been cropping up on social media sites and the communicative platform of memes may offer activists a uniquely appropriate way to spread their inherently explicit message. This study defines explicit elements not as crude, but as direct communication of sexual messages. For social justice message campaigns to be successful, it is necessary to gauge the attitudes of viewers, in order to understand how memes will be received and disseminated through the online community. In order to understand how the manipulation of the textual, contextual, and visual elements of memes impacts viewers' perception of and engagement with mediated social justice messages, an experimental survey design (2 x 2 x 2) was conducted with eight manipulated variations of sex-positive memes. Participants (N = 725) were largely female (81.7%) with an average age of 20 and all were a part of a convenience sample of undergraduate students enrolled at a large southwestern university. The results indicated significant differences in the perception of ($F[3, 721] = 20.34$, $p < .001$) and engagement with ($F[3, 721] = 11.92$, $p < .001$) memes with varying levels of explicit components. Tukey's Post Hoc analyses indicated that there was an apparent preference for memes with implicit, rather than explicit elements, which was further supported by the negative trend visible in the means plots. These findings raise interesting implications about what level of explicit content is acceptable by the internet community and how memes can be used to insight conversations about taboo social justice topics.

214 11:45 am

Silver Linings Breakup: A Quantitative Analysis of Social Support Received From Friends Pre- and Post-Romantic Relationship Dissolution

Courtney Meissner, Communication Studies (M)

Romantic relationship dissolutions, more commonly known as breakups, are characterized by a host of negative psychological, emotional, and physical outcomes. Breakups also leave support gaps in the lives of the newly single individuals, as intimate partners are often the largest source of social support. Alternative close others, however, could fill those support gaps. This study aimed to investigate the differences in the quantity and quality of social support received from friends pre-relationship dissolution versus post-relationship dissolution. This investigation is necessary, as support from friends is associated with positive post-dissolution adjustment and is considered to be helpful to the process of sense-making and moving forward in one's own personal life. With an overwhelming amount of Caucasian, female, freshmen level participants (N = 345), a self-report survey was used to measure the social support received by undergraduates pre- and post-breakup at a major Southwestern university. Via paired-samples t-test, the data showed that a significant increase in social support received from friends existed post-relationship dissolution when compared to pre-relationship dissolution. Questions about the quality and quantity of support from friends was asked of the participants for both pre- and post- breakup. This finding highlights that silver linings can be discovered in the aftermath of romantic relationship dissolution, as it shows that although a support gap is left in the wake of romantic relationship dissolution, it can be filled by support from close friends. Future research should be concerned with the error of memory recall that is inherent in the measures used should be minimized when replicating this study. Additionally, further research should employ a more inclusive sample that includes a wider age range, more diverse range of ethnicities, and accesses adults from different cultures and walks of life, as well as the actual evaluations of support received and broaden the role of close supportive others to include family members in addition to friends. Ultimately, this research hopes to provide a foundation for further exploration of the breadth and depth of post-relationship dissolution support from close others and inspire additional novel contributions to the literature of support and relationship dissolution.

215 12:00 pm

Hispanic Students' Perceived Prejudice in the Health Care Setting

Evelyn Puga, Communication (M)

The health care setting in the U. S. is currently lacking in ethnic diversity; doctors, nurses, physicians, physical therapists, and other healthcare professionals re not representative of the current population. With a turbulent political climate, individuals, specifically Hispanic individuals, are being discriminated against and singled out as those who do not belong. The university setting is no exception to discriminatory action that occurs every day in the U. S., especially in a state that borders Mexico. Hispanic students who are working toward a degree that would get them a job in a health care setting may live in one of these border towns, and experience discrimination brought about by threatening border rhetoric. Research currently does not address discrimination against Hispanic students in the health care setting. This quantitative cross-sectional study seeks to understand if Hispanic students face more perceived prejudice in a clinical or laboratory setting than their non-Hispanic counterparts, specifically in universities that border Mexico. Students (n = 61) that were surveyed have completed or are currently enrolled in a clinical or laboratory course that

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involves working with patients. This survey was distributed to students through an online research recruitment tool, as well as being emailed to instructor of these courses to distribute to their students. This study found that there is a difference in positive emotions and the level of rejection and threats among non-Hispanic and Hispanic students. Although, the finding were not significant there was still a difference. The topic of racial discrimination is especially important to address given the current political climate. There are implications of the ongoing racial discrimination, as well as implications for hands on education in health majors.

216 12:15 pm

Examining Organizational Readiness Determinants Using the Consolidated Framework for Implementation Research (CFIR) Framework in FQHCs to Implement Health Promotion Programs

Sophia Rodriguez, Public Health, Latin American Studies (M)

Background: Approximately one-third of adults over age 50 in the U.S. have never been screened for colorectal cancer (CRC) with the lowest adherence rates among racial/ethnic minorities, the uninsured, and patients with low socioeconomic status. Latinx CRC screening rates (50%) are significantly lower in comparison to whites (65%). The use of implementation frameworks and theories such as the Organizational Readiness to Change (ORC) theory and Consolidated Framework for Implementation Research (CFIR) may optimize the integration of Latinx CRC screening programs in Federally Qualified Health Centers (FQHC). The ORC theory asserts collective action is necessary for implementing organizational level change and CFIR strengthens the understanding and explanation of how and why implementation programs succeed or fail.

Aim: To examine ORC determinants using the CFIR framework domains—inner and outer setting—to assess levels of readiness for CRC screening program implementation.

Methods: Six semi-structured interviews were conducted with San Diego FQHC leadership, audio-recorded, and transcribed. CFIR and ORC theory informed the development of the interview guide, data collection, and analysis. The inner and outer CFIR domains were used to guide the assessment of ORC determinants. Data from the interviews were synthesized using rapid qualitative methods, analyzed against CFIR and ORC, and aggregated into domain-specific matrices.

Results: Six CFIR constructs were associated with ORC determinants: cosmopolitanism, patient needs and resources, external policy and incentives, relative priority, available resources, and receptivity to change. Cosmopolitanism, patient needs and resources, and external policy and incentives were found to determine FQHC ORC in the outer setting. Relative priority, available resources, and culture of the clinic were associated with FQHC ORC in the inner setting. Non-CFIR themes included CRC screening strategies and health education programs.

Conclusion: The scalability of CRC screening interventions should consider current/past CRC screening strategies, health education programs, and the six ORC determinants. The determinants identify challenges and facilitators prior to program development for effective integration strategies and can be utilized to build collective support from clinic staff and leadership. Assessing organizational readiness levels is critical to establishing partnerships with FQHCs to ensure CRC screening program effectiveness and adaptation.

Session B-5

Oral Engineering & Computer Sciences 4
Friday, February 28, 2020, 11:00 am
Location: Metztli

217 11:00 am

New Generation of Multi-Modal Spinal Neural Probes for Epidural Stimulation

Rita Hanna, Bioengineering (M)

While about 1 billion people around the world suffer from variety of neurological disorders, Spinal Cord injury (SCI) that causes loss of motor function is fast becoming one of the most debilitating and expensive top treat. In the meantime, studies of spinal cord stimulation on many animals have shown great potential for the spinal neurons to restore the lost motor functionality by creating the desired pathway for the action potential of inactive neurons to follow.

This research demonstrates the fabrication and characterizations of flexible neuroprosthetic devices, designed to be implanted on the surface of the spinal cord for epidural stimulation. Due to the unique properties of Glassy Carbon (GC) as a biocompatible material in bioengineering applications, chemically inert, high conductivity, electrochemically stable and patternable to various geometries, an array of Glassy Carbon (GC) microelectrodes was fabricated using photolithography procedures and analyzed via electrochemical impedance spectroscopy (EIS) in vitro and in vivo. In vitro studies, a 0.1M Phosphate Buffered Solution was used that mimics the biological fluids. Impedance values in vitro studies were in the range of kilo-ohms which made it typical for in-vivo use.

218 11:15 am

Mechanobiology of the LVAD-assisted heart

Frances Lagarda, Bioengineering (M)

Long term use of left ventricular assist devices (LVADs) has been associated with the development of aortic valve remodeling. Aortic valve incompetence, or AI, arises or progresses in over 25% of LVAD patients within 12 months post-implantation. Many of these patents exhibit “series flow” in which the native cardiac contraction is unable to boost LV pressure above aortic pressure, resulting in all of the blood exiting through the LVAD.

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In this condition, the aortic valve remains closed throughout the entire cardiac cycle, fundamentally altering the mechanical loading of the valve tissue.

The pressure difference between the LV and aorta, transvalvular pressure or TVP, determines the biomechanics of opening and closing of the valve, normally alternating between unidirectional shear and tensile stretch. However, during series flow the valve tissue is subjected to high tensile stretch continuously, and relieved from the cardioprotective shear tress experienced during aortic valve opening. These altered biomechanics activate the biochemical pathways of valve interstitial cells (VICs) that lead to an increase in extracellular matrix deposition and cell differentiation.

The goal of this study is to simulate the aortic valve tissue biomechanics in a cell culture system that exposes VICs to altered mechanical loading, identify early markers for remodeling, and understand the biomechanical mechanisms that may lead to AI.

VICs encapsulated in collagen are plated into the cell membranes and cultured for 5 days under static conditions, changing media every 24 hours. The membranes are then placed on the stretching device and exposed to loading for 24-48 hours. Cells are fixed in situ and immunostained using anti-actin a-smooth muscle antibody. Preliminary studies have evaluated a-SMA and found an increase in the VICs exposed to high mechanical stretch. a-SMA is one marker for pathological differentiation of VICs into myofibroblasts, which have been implicated in other valve disease states. This and other pathways leading to ECM deposition in valve tissue will be evaluated with this model. The broad goal is to find options for early intervention in LVAD patients to prevent the worsening of AI.

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219 11:30 am

Lactic Acid Neurotransmitter Detection using Functionalized Glassy Carbon Microelectrodes

Amish Rohatgi, Bioengineering (M)

Neurotransmitters are often referred to as the body's chemical messengers. They are the molecules used by the nervous system to transmit messages between neurons. Dopamine and serotonin are electroactive neurotransmitters and can be detected though conventional neural probes. However, lactic acid is a non-electroactive molecule that cannot be detected by these conventional probes. Lactic acid can be found in the brain as a byproduct of energy production and a buildup of lactic acid leads to lactic acidosis. Lactic acidosis can hamper normal mitochondrial functions and has been linked to seizures and can be caused by ischemia or hypoxia. In order to detect lactic acid our group at SDSU are functionalizing glassy carbon electrodes by immobilizing an enzyme to catalyze lactic acid into a molecule that is electroactive. By immobilizing lactate oxidase into a chitosan matrix we aim to cause a reaction that will create hydrogen peroxide which is an electroactive molecule with a redox potential of 1.2. We will use electrochemical methods such as fast scan cyclic voltammetry (FSCV), FTIR, and potentiostat reading to characterize, understand the chemical reactions occurring, and qualify these functionalized glassy carbon electrodes. Preliminary characterization results show a slight increase in impedance values once the immobilization matrix has been applied, but despite the increase in impedance the limit of detection has not decreased. Preliminary looks at FTIR data show an increase in functional groups for chitosan on glassy carbon compared to bare glassy carbon showing the chance of adherence.

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220 11:45 am

Nano-SCALPEL: Nanoparticle Spinning Cutting, Ablation, Lysis in Plasma Environmental Liquid for blood clot removal

Sherwin Navindaran, Bioengineering (M)

Blood clots within the blood vessel (thrombosis) are a significant concern in the medical field and left untreated can potentially lead to severe complications. Currently, the two established methods of approaching the problem are through mechanical thrombectomy or by the aid of thrombolytic drugs. Mechanical thrombectomy is an invasive procedure that usually employs a catheter and stent retriever to remove the clot. While the pharmacological method is achieved using anticoagulants or tissue plasminogen activator (tPA). Even with these two common procedures there still remains a need among certain patients to create a drugless and non-invasive technique for blood clot removal.

The purpose of our study is to develop a new way of addressing blood clots in the human body by injecting biocompatible nanoparticles (Fe3O4) at or in the site of the clot, then using a Rotating Magnetic Field (RMF) to magnetically spin the nanoparticles to break up the clot. There have been reports in the literature that show the rotation of nanoparticles driven by a strong enough magnetic field can cause cell membrane destruction. Therefore, we hypothesize that since a blood clot has weaker binding than a cell membrane, the spinning of nanoparticles can similarly result in the lysis and destruction of thrombi.

The project consists of three different tasks. The first being the fabrication of synthetic blood clots made from Polyacrylamide (PA) hydrogels with a range of stiffness. The gels are tested using a rheometer to ensure they match human blood clot elasticity and can be used as a surrogate. The PA gels are furthermore imaged under Infrared and Light Optical microscopes. The second task involves creating an RMF from a 2-axis Helmholtz coil system and a large enough corresponding homogeneous region to drive nanoparticle rotation. Finally, the last task is to build a thrombus-in-a-tube model with flow control to test our Nano-SCALPEL method experimentally. Additionally, from this experiment, we aim to perform systematic studies on the thrombus/nanoparticle interactions under magnetic actuation.

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221 12:00 pm

Glass-Based Microfabrication of Rare Cell Capture Chips

Kevin Peguero-Garcia, Mechanical Engineering (M)

The isolation and capture of rare cells, such as cancer stem cells, continues to be a difficult objective. By capturing these rare cells, researchers can further study and understand cancer. Microfluidic platforms using different techniques have demonstrated the ability to isolate and capture rare cells. In this work, we introduce a passive micro-mixing chip designed to capture cancer stem cells. We created a 16-channel microfluidic device using glass substrates. 3D chevron features were incorporated into the channel design to promote chaotic mixing. The end goal is for chaotic mixing to cause rare cells in patients' samples to collide with a hydrogel coated channel walls at one point and ultimately capture them. The innovative idea presented in this project is using borosilicate glass to create a double layer device. The isotropic etching properties of glass allows us to create channels with rounded walls, previously not possible with Polydimethylsiloxane (PDMS) devices. The rounded channel walls allow us to study new geometry to improve rare cell capture efficiency by increasing cell collisions with the walls. In addition, we take advantage of the borosilicate glass mechanical properties to create a more durable device with minimal channel deformation due to pressure. The Finite Element Analysis for the channel design will be validated by performing a flow test using beads of similar dimensions to those of cancer stem cells.

222 12:15 pm

New Platform for Detecting Non-Electroactive Neurotransmitters – Case of Glutamate

Sandra Lara Galindo, Bioengineering Biomaterials (M)

Glassy Carbon (GC) microelectrodes have shown to be a promising material in Neuroscience, specifically electrochemistry with a capability of detecting electroactive and non-electroactive species such as Glutamate.

Here we demonstrate immobilization of glutamate oxidase on a probe with a four-electrode array and subsequently using fast scan cyclic voltammetry (FSCV) where we pass a current through each microelectrode to detect the presence of neurotransmitters. Electroactive species such as Dopamine and Serotonin oxidize when they come in contact with the electroactive surface. The detection of neurotransmitters will happen at specific voltages in-vitro. Here, we focus on some recent strategies for Glutamate probes immobilization on the surface of electrochemical transducer such as adsorption, covalent bonding and Glutaraldehyde and GluOx interaction on the electrode surface for specific interaction with its complementary Glutamate target. Using Glutaraldehyde, BSA and Glutamate oxidase we were able to detect as an electrochemical reduction of O2 to H2O2. The immobilization matrix of GluOx on the GC electrode acts as a barrier that allows the electrode to give supporting electrons.

By functionalizing bare glassy carbon electrodes we have shown detection of Glutamate, non-electrode molecule. Through the chemical reaction with an enzyme happening at the surface of the electrode and cyclic voltammetry we were able to show the chemical reduction of non-electroactive of molecules.

223 12:30 pm

Fabrication of Ceramic Bone Scaffolds by Solvent Jetting 3D Printing and Sintering Towards Load-Bearing Applications

Maricruz Carrillo, Mechanical and Aerospace Engineering (D)

High porosity and interconnected pore size are crucial factors for bone scaffolds. However, since porosity is inversely related to strength, the microstructure must be optimized to achieve bone scaffolds suitable for load-bearing applications. The powder bed 3D printing method can fabricate the highly porous parts possessing the desired properties using micron-sized ceramic powders (>30 μm) and polymeric ink, however, low sinterability and, consequently, low strength is still a problem. In this study, nano-scale powders are granulated and printed by a special 3D printing method called 'solvent jetting on granulated feedstock containing binder' to achieve an interconnected macropore structure with high strength. The advantages of this method, aside from the above mentioned, include obtaining controllable porosity, high strut density, wide neck formation, and small grain size; all of which are beneficial to mechanical strength. Using this method, a purely ceramic sample with 30% porosity and compressive strength of 113.1 MPa was obtained. Furthermore, a bone scaffold prototype with total porosity of nearly 50% and mechanical strength of 30.2 MPa was fabricated. These procedures and results are described and compared to another solvent jetting method which uses micron-sized powders.

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Session B-6

Oral Interdisciplinary 4
Friday, February 28, 2020, 11:00 am
Location: Templo Mayor

224 11:00 am

Accurate Identification of Endangered Fairy Shrimp: It's All Coming Into Focus

Andrea Albarran, Biology (U)

Although vernal pools once covered ca. 200 square miles in San Diego county, an estimated 97% of them have been destroyed due to land development for housing, urbanization, agriculture and grazing. Coastal vernal pools in this region are home to the endangered "San Diego fairy shrimp" Branchinecta sandiegonensis, which is a flagship species for the vernal pool ecosystem. The "versatile fairy shrimp" Branchinecta lindahli is a generalist, that can tolerate a wide range of pool conditions, including some B. sandiegonensis pools. These species can hybridize in both laboratory and nature, leading to unclear species boundaries. Male hybrids are difficult to distinguish, but a morphological hybrid index has been developed for females. However, the female key to pure species and hybrids does not provide good photographs or visual aids to interpret the characters. With a Canon EOS 5D single lens reflex camera (SRL) mounted on a Visionary Digital BK + imaging system I demonstrated the effectiveness of different techniques. Photographs were taken from reference collection samples varying five sets of microscopy techniques: microscope use, lighting, position, motion and software enhancements that clearly differentiate both males (using – secondary antenna characters) and females (thoracic segments characters). These results will serve as reference tools for researchers and environmental consultants who seek to correctly identify fairy shrimp in coastal San Diego county.

225 11:15 am

Development of unisexual flower by abortion in Cylindropuntia wolfii

Amy Orduño-Baez, Biology (U)

Although most plants are hermaphrodites, unisexuality has evolved independently multiple times in evolutionary history as a preventative measure to selfing. There are two major pathways that drive unisexuality in plants, 1) Sterility and 2) Inception. It has been found that sterility can be attributed to Programmed Cell Death (PCD), a process of cell suicide known to control the developmental process in flowering plants. As the family of Cactaceae has wide polymorphism in sexual systems, this was considered an ideal model to study sexual reproduction in plants. Cylindropuntia wolfii has been reported as gynodioecious meaning having populations with female and hermaphrodite plants. However, in 2017 we identified some individuals with aborted ovules, leading to more unanswered questions about C. wolfii's sexual system. Our main goal is to accurately identify the sexual system of C. wolfii and understand the cellular mechanisms leading to that system. We predict that C. wolfii will be functionally dioecious driven by PCD. We have used histological approaches to confirm the sexual development and have found individuals with functional male and individuals with functional female flowers, suggesting C. wolfii has a functional dioecious system. TUNEL assay will be conducted to detect DNA fragmentation in male and female ovules and anthers to evaluate the role of PCD as the mechanism driving unisexuality in C. wolfii. By analyzing the cellular mechanism that determines sexual separation in C. wolfii we will have a greater understanding of the evolution of unisexuality and can apply it to the conservation of this endemic cactus.

226 11:30 am

Improving plant viability using methanotrophs with Boechera depauperata

Ruth Epstein, Biology (U)

Excess methane production from natural sources and human activities has contributed significantly to global climate change. Certain areas exist as sinks for methane which takes large portions of this gas out of the atmosphere. One such area is the Anza-Borrego desert because of the novel presence of a beneficial bacteria called methanotrophs. These soil microbes associate with vegetation, consume methane as their carbon source, and produce water as a by-product of their metabolism pathway. One hypothesis is this beneficial microbe allows desert vegetation to persist in drought conditions because of the microbe's ability to produce excess water. The Waters lab has been investigating the symbiotic relationship between Boechera depauperata (B. depauperata) and methanotrophs. B. depauperata is studied because it is a drought tolerant, is in the Brassica family, and is closely related to the model plant Arabidopsis thaliana. Our hypothesis is that the addition of this methanotrophic microbes and methane would enhance plant growth. The lab has determined that methanotrophs, when given methane, improve the health and viability of B. depauperata. We have divided the experiment into two treatments; one with only the addition of water and the other with water, the methanotrophs, and methane. The latter treatment has shown increased horizontal and vertical growth, increased production of new young leaves, and the improved exchange of beneficial nutrients between the microbe and plant. Determining the unique relationship between plants and their soil microbe symbionts can give greater understanding in utilizing their function to decrease excess methane in the atmosphere but also to improve global plant health.

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227 1 1:45 pm

Ferocactus gatesii & F. cylindraceus

Julia Gomez, Biology (U)

Ferocactus gatesii (syn. Ferocactus gracilis ssp. gatesii) is a cactus restricted to nine islands in Bahía de los Ángeles, a coastal bay in Mexico. Although the islands are protected and require permission to visit them, concern for the conservation of Ferocactus gatesii has been growing. In order to study the distribution and genetic variation of F.gatesii, around ten samples were collected from six of the islands and their locations were marked using a GPS. Samples of Ferocactus cylindraceus were also collected since it is an outgroup to F. gatesii and can serve as a comparison. Each sample consisted of cutting a cluster of spines with some flesh, the flesh was finely chopped and used for DNA extractions and to perform PCR analysis. The first PCR procedure used psbA-trnH primers. A second PCR was done to eight samples to prep them for Sanger sequencing, these eight samples served as a trial run. One sample of F. gatesii from each island collected was used as well as two samples of F. cylindraceus. As expected, Ferocactus cylindraceus was seen to be very distinct with significant variation of DNA when compared to Ferocactus gatesii. We also expected to see some variation in DNA sequences between islands, however, this analysis did not conclusively resolve this variation. Future analyses will work with different primers in order to better understand the differences between the populations on the islands and gene transfer between them. The ecological data we collected on F. gatesii could also be used to petition its inclusion in the Mexican Protected Species List (NOM 059) in the future, which we recommend due to its restricted distribution.

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228 12:00 pm

An In Vitro Assay to Test for Viral Proteolytic Activity on Host Proteins

Nina Barr, Cellular and Molecular Biology (M)

Arbovirus infections became epidemics in recent decades due to globalization, and climate change. Dengue Virus (DenV), belonging to the Flaviviridae family, is one of the most prevalent mosquito-transmitted viruses leading to Dengue Fever. As part of the mechanisms of infection, DenV protease (PR) is known to cleave viral and host proteins. The nonstructural protein 3 (NS3) is a serine PR that utilizes the NS2B cofactor for enhanced proteolytic activity. Previously we used bioinformatics to search for substrates within the human proteome, based on viral cleavage-site sequences. We revealed potential hits and are developing a cellular-based assay that corroborates the nature of human proteins as substrates cleaved by NS3/NS2B that are important for the viral life cycle.

The cellular assay utilizes the two domains of the Gal-4 yeast transcription factor: a DNA binding domain and a transactivating domain. When fused the domains bind to the Gal-4 promoter and allow for GFP expression which we analyze by flow cytometry. Prior experiments with HIV PR within the Gal-4 domains, monitored PR activity in cis, and showed green fluorescence only with inactive/inhibited PR. Here, we are adapting the assay for in trans cleavage. For that purpose, NS3/NS2B is supplied in trans and the putative substrates replace PR within Gal-4. We tagged the Gal-4 domains with FLAG and HA epitopes to allow for the detection of cleavage by western blotting. As proof of principle, 20 amino acids of the viral NS4B/NS5 cleavage site was used as positive control. Flow cytometry and western blotting confirmed cleavage.

MITA (Mediator of IF3 Activation), has been shown to be cleaved by DenV PR, but the specific site of cleavage remains uncertain. Our in-silico search revealed a putative novel site within MITA that we are verifying in the context of the in trans assay. Western blotting will confirm cleavage at the specific site. We have engineered a set of additional putative sites found in silico and will expand these studies in the future revealing novel substrates cleaved by DenV PR and will further our understanding of viral host interaction and lead to possible new treatments against infection.

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229 12:15 pm

Development of a cell-based assay to monitor the activities of the Chikungunya Viral Capsid Protein to identify potential antivirals

Alex Escobar, Cellular and Molecular Biology (M)

First isolated in Tanzania in 1953, Chikungunya virus (CHIKV) is a mosquito-borne disease that causes debilitating muscle/joint pain, the main symptoms of Chikungunya fever. The spread of Aedes genus mosquitos due to globalization, climate change, and viral sequence mutations in the CHIKV genome has led to both enhanced viral transmission efficiency and disease. As of September 2019, over 60 countries have reported local transmissions of the virus, and thousands of fatalities have been linked to the disease in young, old, and immunocompromised individuals.

CHIKV is a single-stranded positive-sense RNA virus, classified as Baltimore Class IV and a member of the Togaviridae family and Alphavirus genus. There are currently no vaccines or antiviral drugs to prevent the replication of the CHIKV. Hence, tools that facilitate drug discovery and contribute to a better understanding of the life cycle are essential and needed to prevent further epidemics.

Our overall objective is to elucidate the requirements for the full proteolytic activity of the CHIKV capsid protease protein (CHIKV CP), which is a crucial event in the CHIKV life cycle. The proteolytic cleavage of the capsid is necessary for the production and spread of mature, infectious viral particles, and thus considered a prime target for the development of antivirals. In order to monitor this cleavage event done by CHIKV CP, we utilize the widely used Gal4/UAS system to activate the gene expression of the biosensor Green Fluorescent Protein (GFP), which can be monitored by flow cytometry and further verified by western blotting. The Gal4/UAS system will only activate GFP when

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CHIKV CP is inactive, or non-cleaving. Thus, we have engineered various wild type, truncated, and mutant sequences of CHIKV CP within the Gal4/UAS system to provide a platform for drug discovery. We hypothesize through the use of this assay in a high throughput screen of a peptide library, potential antivirals against CHIKV replication and spread can be discovered.

230 12:30 pm

What is causing the reduced seed production in Cylindropuntia wolfii?

Niveditha Ramadoss, Biology (D)

Cylindropuntia wolfii is a species of the Cactaceae family that is endemic to the Sonoran Desert at the border of California and Baja California. C. wolfii has a functionally dioecious system with female and male flowers widely variable in color and size. Massive amounts of flowers are produced every spring; however, fruits often lack mature seeds. Seedless fruits might be the result of 1) biotic factors, e.g. lack of pollinators, 2) abiotic factors, e.g. lack of precipitation and 3) developmental factors, e.g. abortion of seeds due to inbreeding depression. The aim of our project is to determine the factors leading to the lack of mature seeds in natural populations of C. wolfii. For biotic factors, we observed pollinator visits and found that bees visit C. wolfii flowers. We evaluated whether there is a difference in the floral display. Male flowers have a larger diameter and petal width than their counterpart. To evaluate developmental factors, in vivo pollen germination was carried out on flowers for pollen and stigma viability. The pollen from male flowers was able to grow in both male and female flowers, suggesting that pollen of male flowers and the stigma of both male and female flowers were functional. We performed manual crosses and observed natural crosses in the field to test for abiotic factors. Even after supplementing plant with water, fruits produce a low amount of seed. No evidence was found to support that lack of pollinator or precipitation are the main causes of low seed production in C. wolfii, rather developmental issues might be responsible.

Session B-7

Oral Health Nutrition & Clinical Sciences 1

Friday, February 28, 2020, 11:00 am

Location: Visionary Suite

231 11:00 am

Pulsed 450 nm blue light suppresses MRSA and Propionibacterium acnes in planktonic cultures and bacterial biofilms

Paulina Cortez, Biology (U)

In our recent study, we showed that pulsed blue light (PBL) suppresses the growth of Propionibacterium acnes more than continuous wave (CW) blue light in vitro, but it is not known that other bacteria, such as methicillin-resistant Staphylococcus aureus (MRSA), respond similarly to PBL. The high potency of PBL relative to CW blue light makes it a suitable antimicrobial for suppressing bacterial growth in biofilms as well. Therefore, we determined if MRSA—a deadly bacterium of global concern—is susceptible to 450 nm PBL irradiation in vitro and ascertained whether the bactericidal effect of PBL on planktonic P. acnes culture can be replicated in biofilms of P. acnes and MRSA. In three series of experiments, we irradiated P. acnes and MRSA respectively, either in planktonic cultures, forming biofilms or formed biofilms. Compared to controls, the results showed 100% bacterial suppression in planktonic cultures of MRSA irradiated with 3 mW/cm2 irradiance and 7.6 J/cm2 radiant exposure three times at 30-minute intervals, and also in P. acnes cultures irradiated with 2 mW/cm2 irradiance 5 J/cm2 radiant exposure thrice daily during each of 3 days. Irradiation of biofilms with the same irradiances and radiant exposures that gave 100% bacterial suppression in planktonic cultures resulted in disruption and disassembly of the architecture of MRSA and P. acnes biofilms, more so in forming biofilms than formed biofilms. The antimicrobial effect on each bacterium was minimal in forming biofilms, and even less in formed biofilms. Increasing radiant exposure slightly from 7.6 J/cm2 to 10.8 J/cm2 without changing any other parameter, yielded more disruption of the biofilm and fewer live MRSA and P. acnes, suggesting that 100% bacterial suppression is possible with further refinement of the protocol. In both planktonic cultures and biofilms, PBL suppressed MRSA more than P. acnes.

232 11:15 am

Postural Control Deficits in Atypical Parkinsonism: Pilot Case Series

Kathleen Dillon, Kinesiology (U)

Progressive Supranuclear Palsy (PSP) is an atypical degenerative Parkinsonian disorder affecting the basal ganglia and brainstem. Cardinal signs include muscle weakness, oculomotor impairments, difficulty speaking, trouble swallowing, imbalance and lack of coordination. Postural control assessments using force platforms can provide an objective window into a disease mostly studied subjectively. These measurements can also be used to distinguish postural sway signatures unique to PSP from other Parkinsonian disorders. Therefore, the purpose of this study was to determine postural control deficits accompanying PSP and idiopathic Parkinson's disease (PD). 6 PSP (61-80 years), 12 PD (66-84 years) and 12 older adults (OA; 60-85 years) volunteered to participate in the study. All subjects performed a static balance assessment using a portable force plate. All testing consisted of 3 trials each of quiet unperturbed standing with eyes closed and eyes open; feet shoulder width apart and hands on the hips. Each trial lasted 20 seconds during which the total center of pressure (COP), COP antero-posterior (AP), and COP medio-lateral (ML) sway displacements were calculated. A principle component analysis was used to calculate the 95 and 99% confidence intervals (CI) of the area within which the COP would lie. Furthermore, changes in low-frequency postural

oscillations were quantified by examining the absolute wavelet power in 3 frequency bins from 0-4 Hz. We found that low frequency oscillation in postural sway varied differentially with removal of vision (eyes closed v. eyes opened) and disease (PSP vs. PD). Furthermore, these postural oscillations increase with increasing fall risk. This effect is most pronounced in the PSP>PD>OA. Furthermore, PSP and PD patients at high fall risk are highly dependent on vision for postural control when compared to healthy controls and patients at low risk for falls. Most importantly, our findings suggest that non-linear measures of postural sway are more sensitive to changes in sensory weighting and neuropathologies than standard linear measures of postural sway assessment.

233 11:30 am

Impact of Blood Flow Restriction Training on Patellar Tendon Stiffness and Patient Outcomes- A Pilot Study of Short-Term Effects

Freddy Gonzalez, Kinesiology (U)

Purpose/Hypothesis: The purpose of this study is to assess the effects of a resistance training method (Blood Flow Restriction Training (BFRT)) on individuals with patellar tendinopathy (PT). BFRT provides a means to perform progressive resistance training without the usual exercise related PT pain. BFRT for PT is expected to contribute to improved patient outcomes consisting of increased patellar tendon stiffness, increased patient-reported functional performance (FP), and decreased pain.

Number Of Subjects: Ten healthy adults (5 women) participated in the study.

Methods/Materials: Individuals age 18-40 (mean 24.7) with PT are eligible to participate in the study. Ultrasound shear wave elastography (US-SWE) is utilized to measure stiffness of the patellar tendon. Isokinetic dynamometry (ID) is used to evaluate knee extension strength. Participant reported outcomes include a numeric pain rating scale (NPRS) and the Victorian Institute of Sport Assessment scale for patellar tendinopathy (VISA-P). All outcome measurements are taken upon intake, and at 3, 6, and 12 weeks. Participants completed bi-weekly BFRT resistance training sessions for six weeks. Resistance training sessions involved performing four sets of knee extensions and lunges with a repetition scheme of 30-15-15-15 for each exercise. One-way repeated measures analysis of variance, with Bonferroni correction, were performed to evaluate for changes in each outcome measure with a significance level of $p<0.05$.

Results: Participant reported FP, assessed by the VISA-P, significantly improved from intake (X=65.1) to week 6 (X=82.5; p=0.004) and week 12 (X=85.1; p=0.003). Pain was reduced at 12 weeks (X=1.9) as compared to intake (X=5.5; p=0.028). No significant changes in knee extension strength (p=0.16) or patellar tendon stiffness were present (p=0.48).

Conclusion: BFRT resulted in improved patient-reported FP at 6 weeks. At 12 weeks, 6 weeks following completion of BFRT, patient-reported FP and pain were significantly improved.

234 11:45 am

Imposed Expiratory Resistance and Pulmonary Function in Young Healthy Volunteers

Monica Bari, Exercise Physiology (M)

Expiratory flow limitation is a primary characteristic in chronic obstructive pulmonary disease (COPD). Bronchoconstriction, parenchymal destruction, and mucus hypersecretion lead to obstruction, causing dynamic hyperinflation, dyspnea, and exercise intolerance. However, high airway resistance is just one of many abnormalities in COPD and isolating the effects of expiratory airflow limitation is challenging.

Purpose: In order to study abnormal lung mechanics in isolation, we aimed to measure pulmonary function in young healthy volunteers with and without imposed external expiratory resistance.

Methods: Forty-three participants (25.4 ± 4.5 years) completed pulmonary function testing according to the ATS/ERS standards with and without imposed expiratory loading of 7cmH2O, 11cmH2O, and 20 cmH2O. Resistance was imposed with a threshold inspiratory muscle trainer installed in reverse on the spirometer.

Results: Expiratory loading of 7 and 11cmH2O vs. control reduced all variables (n=43): FEV1 (3.23 ± 0.81 and 3.23 ± 0.80 vs. 4.04 ± 1.05 L), FVC (4.10 ± 1.02 and 4.14 ± 1.03 vs. 5.03 ± 1.34 L), FEV1/FVC (77.6 ± 8.48 and 78.7 ± 6.18 vs. 80.7 ± 5.30 %), and PEF (6.12 ± 1.73 and 6.07 ± 1.91 vs. 8.70 ± 2.87 L/s).

Additional supra-physiologic loading of 20cmH2O in a subsample (n=15) only modestly reduced FEV1 vs. control (3.07 ± 0.52 vs. 4.09 ± 0.91 L); FVC 20cmH2O vs control (3.89 ± 0.81 vs. 4.81 ± 1.10 L); FEV1/FVC at 20cmH2O vs control (78.5 ± 5.99 % vs. 81.9 ± 5.48 %); and PEF at 20cmH2O vs control (5.50 ± 1.78 vs. 8.05 ± 2.47 L/s).

Conclusions: Imposed expiratory resistance reduced key spirometric variables. A concave expiratory flow-volume relationship was consistently absent – a key limitation for model comparison with pulmonary function in COPD. It appears that imposed resistance leads to higher airway pressures, resisting dynamic airway compression.

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Session B-8

Oral Interdisciplinary 5

Friday, February 28, 2020, 11:00 am

Location: Legacy Suite

235 11:00 am

Hands on Exploration of Air Pollution in Three Regions in India: Agra, Delhi, and Odisha

Harmit Chima, Statistics/Actuarial Science (U)

Although India is known for its beautiful culture and architecture; India is a country that suffers from impacts of anthropogenic emissions on the environment, specifically air pollution. Literary studies have linked fine particulates in the air to other adverse health outcomes, ultimately leading to premature mortality in adults and children. This winter we obtained levels of fine particulate matter in Agra, Delhi and Odisha with a TSI DustTrak DRX machine by measuring average PM2.5 levels in five second intervals. From our findings and secondary source data obtained from AirNow and breezo.in (a website that collects PM2.5 values from dispersed monitoring stations in India); we compared data within India, to San Diego, and to the World Health Organization PM2.5 standard of 10 ug/m3. We travelled to five different locations within those three regions of India and computed daily means, these include: Raghurajpur with a mean of 80.96 ug/m3, Xavier University of Bhubaneswar with a mean of 131.59 ug/m3, Chandrabhaga Beach with a mean of 162.61 ug/m3, an alley market in Delhi with a mean of 220.75 ug/m3, and the Taj Mahal with a mean of 374.71 ug/m3. Medians of our secondary source data from January 2020 include: Agra with a median of 130 ug/m3, Delhi with a median of 153 ug/m3, Bhubaneswar with a median of 165.56 ug/m3 and San Diego with a median of 33 ug/m3; these measurements compared to the WHO Air Quality Index validates the poor air quality in Agra, Delhi, and Odisha. It is important to take action in regards to air pollution due to the massive difference from the WHO standard. Interpretations of data were performed using ArcGIS, Excel and R, however the analysis is still ongoing. Parameters such as highways, wind current, and population density will be correlated with the obtained averages and medians to determine how and what is causing larger levels of PM2.5 in the regions of India we traveled to.

236 11:15 am

Microfabrication and Characterization of an On-chip Reference Electrode for Neural Probes

Marina Buezo, Bioengineering (M)

In neural engineering, there are several methods being developed to stimulate neurons in the spinal cord after spinal cord injury (SCI). The objective is to be able to restore functionality to those individuals whose nerves in the spinal cord have been damaged. One approach involves the use of electrical stimulation through neural probes that consist of microelectrodes. There is increasing amount of literature data on the efficacy of this method which is now gaining traction.

So far in the literature, however, most people have been using an external reference electrode consisting of a silver wire coated with a thin layer of silver chloride for these devices that stays outside the body causing areas of potential infection. In this work, we demonstrate on-chip reference electrode with a silver/silver chloride quasi-reference electrode with a new probe design to improve functionality. To fabricate it, silver was deposited and silver chloride was grown on top with a ferric chloride solution. This type of quasi-reference electrode was chosen due to certain advantages such as: its simple construction, the manufacturing is inexpensive, its stable potential and its nontoxic components.

To simulate in-vitro the manner in which the devices would work in the body, we immersed them in 0.1M Phosphate Buffered Solution that mimics body fluids. Afterwards, we tested the devices with several methods. First of all, the quasi-reference electrodes were compared with the silver reference electrodes by multimeter testing. Second of all, electromechanical impedance spectroscopy (EIS) measured the impedance across a frequency range. Finally, scanning electron microscopy (SEM) was used to characterize the layer of silver and silver chloride.

Results from the multimeter readings indicated low voltage differences between our fabricated quasi-reference electrode and the original silver/silver chloride electrode. In addition, when using the quasi-reference electrode to test the devices with EIS, some gave similar impedance values than those acquired with the original reference electrode.

237 11:30 am

A comparison of oral hygiene behaviors among Mexican-origin, young adult men and women

Melissa Yu, Health Promotion and Behavioral Science (M)

Purpose: The purpose of this study is to quantitatively and qualitatively explore sex (male vs. female) differences in the frequency of engaging in oral hygiene behaviors (brushing and flossing) among Mexican-origin young adults.

Methods: Survey and interview data were collected in 2018 from Mexican-origin young adults, ages 21-40, from north San Diego and Imperial Counties (N=72). Participants were partner clinic patients or recruited via outreach at community events. The survey topics of interest in this secondary data analysis were: oral hygiene behaviors (OHBs), demographics, and education. The outcome was the self-reported frequency of OHBs, specifically brushing and flossing, in the past week (defined as a continuous count, and then categorized as meeting guidelines or not).

For the bivariate analyses, an independent t-test and a chi-squared test were used, for continuous and categorical versions of the outcome, respectively.

This is a work in progress: the next step will be using ANCOVA (adjusting for covariates: marital status, acculturation level, educational level, and country of origin). Qualitative analyses

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of interview transcripts in English and Spanish will include separating participants into subgroups based on sex and frequency of OHBs (whether or not guidelines were met) to explore the narratives and establish common themes and compare motivation for OHBs. Self-efficacy will be the theoretical framework used to explore the participants' experiences with OHBs.

Results: The sample had a balanced distribution of sex, language, and marital status: 46% males, 51% were single, and 54% preferred Spanish. About half (54%) were born in Mexico/another country, and 85% had ^{3} high school education. The acculturation level was more Mexican oriented (63%) than Anglo oriented (37%).

The bivariate analyses indicated no significant difference between sexes in meeting American Dental Association guidelines for brushing (^{3}14/week: p=0.346) or for flossing (^{3} 7/week: p=0.352). However, a significant difference between sexes was found for weekly frequency of brushing (p=0.014), but not for flossing (p=0.180).

Conclusion: Females brushed more frequently than men did on a weekly basis, but there was not a significant difference for meeting brushing guidelines. There were no significant differences for flossing.

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238 11:45 am

Assessing Marine Endocrine Disrupting Chemicals in the Critically Endangered California Condor: Implications for Reintroduction to Coastal Environments

Margaret Stack, Environmental Health (M)

After nearing extinction in the 1980s, California condors have rebounded in the past decades due to breeding and conservation efforts. These reintroduction efforts have established two distinct, wild California populations: inland and coastal groups. Coastal habitats are advantageous for the condors because it allows for their independence from anthropogenic food sources. Inland populations rely on a human-provided diet, such as livestock and hunted carrion, but coastal groups have access to marine mammal carcasses. However, marine mammals are highly susceptible to the bioaccumulation of persistent organic pollutants (POPs) that can biomagnify in the condors. Recent studies have indicated the occurrence of eggshell thinning in the condors as a potential result of POP consumption. If such thinning continues, coastal populations will be inhibited in becoming self-sustaining. Our study aims to identify the contaminant profiles of inland and coastal condors, along with the profiles of the marine mammal prey, through the use of novel non-targeted chemical analysis using two-dimensional gas chromatography coupled to time-of-flight mass spectrometry (GCxGC/TOF-MS). The results provide dietary exposure assessments of the two populations and has the potential to identify previously unknown contaminants that may be affecting coastal wildlife more broadly than only the condors. Results show that coastal condors contain significantly more HOCs than their inland counterparts (32 vs 8 HOCs). In both populations of condors, 59 unique HOCs were identified and 39 of these compounds, including 28 polychlorinated biphenyls (PCBs), were exclusive to coastal condors. The significantly higher number of HOCs in coastal condors indicates that their exposure, and subsequent experience of eggshell thinning, may be directly linked to their consumption of contaminated marine mammals. These data will be used to inform conservation and management decisions regarding condor reintroduction and conservation.

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527 12:00 pm

Spatial Distributions Effect on the Evolution of Arbutus in North America

Alexandra McElwee-Adame, Evolutionary Biology (M)

The genus Arbutus (Ericaceae) exhibits intercontinental disjunction with three species occurring throughout Mediterranean Basin in Europe and nine species distributed throughout North America. Historically, species within Arbutus have been troublesome to differentiate morphologically, with many individuals often displaying intermediate forms of two species occurring in the same locality (sympatry) suggesting possibility hybridization. In contrast, Arbutus menziesii, the only species occupying the western United States, does not overlap its distribution (allopatry) with any other members of Arbutus, however displays a distribution across a variety of ecoregions, subjecting this species to a variety of bioclimatic variables that may be shaping its population dynamics.

Through the analysis of single nucleotide polymorphisms (SNPs) and morphological data, our project aims to understand how the species of North America have evolved in response to two distinct cases of spatial distribution: allopatry in A. menziesii along the West Coast of the U.S, and sympatry of A. xalapensis, A. bicolor, A. madrensis, A. occidentalis, and A. tessellata in Mexico. Samples from populations in the Sierra Madre Occidental mountains outside Durango, Mexico as well as the Pacific North West were collected. DNA was extracted and genotyping was conducted for each individual using next generation sequencing. Preliminary results indicate that A. menziesii displays a genomic cline within the core of its distribution with a second possible genomically distinct population residing along the Sierra Nevada's in California. In the case of sympatric species from Mexico, a principal component analysis (PCA) revealed some separation between species on the basis of morphology with areas of overlap, reassuring the observations of intermediate forms among hybrids. Genomic structure analyses were conducted with the program STRUCTURE with an optimal clustering of five, indicating five core genomic groups with the presence of several admixed individuals. Additional genomic analyses need to be performed to determine basic population dynamic parameters, however, our preliminary results indicate strong support for hybridization playing a role on the evolution of Arbutus species found in sympatry.

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Session B-9

Poster Interdisciplinary 6
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

239 10:45 am A

Source to sensors topography covariance of sleep spindles in MEG vs EEG

Sophie Kajfez, Psychology (U)

EEG (the electroencephalogram) is the most commonly used method to monitor spontaneous and evoked brain activity, to infer neural mechanisms of cognition in healthy subjects, and to diagnose and understand disease in patients. However, its utility is limited because it is difficult to localize where in the brain EEG signals arise. A major part of the problem is that the propagation of the EEG from the cortex, where it is generated, to the scalp, where it is measured, is not completely understood. Indeed, the assumptions behind the method used to calculate this propagation have never been adequately tested except for highly focal cortical activity. In this study, we are testing the propagation of sleep spindles, which are bursts of 10–16 Hz activity that occur during stage 2 (N2) sleep. Spindles are an important EEG phenomenon that coordinate memory consolidation and are abnormal in schizophrenia. We recorded sleep spindles with scalp EEG, the magnetoencephalogram (MEG) (N = 16), and directly from the cortex in patients with electrodes implanted to localize seizure onset (SEEG: stereo-EEG). MEG and EEG are generated by the same neural activity, but they can differ due to differences in how they propagate from the cortex to the sensors. We used SEEG to measure how large and synchronous spindles are in the cortex and calculated what EEG and MEG values would be expected given the currently accepted models for propagation from the cortex to the EEG and MEG sensors. We found that while the MEG appeared as predicted, large differences were present for the EEG. The MEG calculations are less sensitive than the EEG to errors in the conductance's of different cranial tissues, and in cortical synchrony estimates. Identifying the source of this error will lead to more accurate measures of brain activity from EEG, in health and disease. Our work provides an empirical and theoretical test bed for quantification of the biophysical mechanisms and parameters relating recordings of cortical activity performed inside versus outside the head.

240 10:45 am B

Synthesizing PROTACs, Generating haloTAG cells and testing PROTACs on haloTAG cells

Ronnesha Johnson, Biology (U)

PROTACs (proteolysis targeting chimera) are small-molecules containing two different ligands that together target a POI (protein of interest) for degradation. One end of the PROTAC binds and recruits an E3 ligase, while the other end of the PROTAC binds and recruits a POI to the complex. When this complex forms, the E3 ligase ubiquitinates the POI, targeting it for degradation by the proteasome. This recent chemical biology strategy stimulated design of numerous PROTACs targeting evasive oncogenic proteins which are currently being tested in clinical trials for various cancers. However there are only a handful of E3 ligase binders used in the current PROTACs limiting the potential scope of this application. We propose a method of finding novel E3 ligase binders through development of a cell based assay to determine degradation activity of new E3 ligase binders.

To develop this assay we first transfected Hek293T cells with a known promoter and a NanoLuc luciferase gene reporter, for the cells to deliberately express NanoLuc. The expression of the luciferase Nanoluc would serve as an indicator of the amount of protein being expressed by the cells. In this system, Nanoluc serves as the POI, where by our chemically engineered PROTAC molecule possesses an alkyl-chloro motif that binds and targets Nanoluc for its degradation. This cell-based assay serves as a platform for testing of the efficacy of a new library of PROTACS with varied E3 ligase binders by monitoring luminescence where reduced levels luminescence equates to an effective PROTAC.

If successful, this approach will identify new E3 ligase binders that can be used to compliment the current E3 ligase binders (VHL and CBRN) to expand the amount of POI's this strategy can be applied to.

241 10:45 am C

Characterization of RAS/RAF interactions on the lipid bilayer

Yecenia Peraza, Chemistry (M)

RAS/RAF/MEK/ERK is part of the mitogen-activated protein kinase (MAPK) signaling pathway that is responsible for cell regulation, proliferation, differentiation, survival, and apoptosis. Activation of RAS comes from downstream effectors which consist of RAF being recruited to the cell membrane. The RAS/RAF regulation is not completely understood which has led many research groups to study the interactions between them. BRAF is one of the three RAF isoforms that is frequently found altered in different types of cancers. The insufficient knowledge of BRAF regulation and access to a full-length crystal structure has made it difficult to provide therapeutic intervention. The current standard care has limited efficacy due to the BRAF paradoxical activation of the MAPK pathway, which is the leading cause of melanoma cancer. RAF isoforms consist of a Ras-binding domain (RBD), Cysteine-Rich Domain (CRD), Serine/Threonine-Rich domain, and a kinase domain. Both RBD and CRD form a ternary complex with RAS which have been extensively studied due to its unknown association to the membrane. To determine the interactions between RAS and RAF an artificial bilayer is utilized and analyzed using fluorescence microscopy. RAS, RAF, and bilayer components in this experiment are labeled to visualize each binding interaction. Various BRAF constructs consisting of RBD and CRD will be

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used to characterize binding kinetics to Ras and its association with the bilayer. SNAP-tag technology is used to label the BRAF purified constructs to be visualized using Total Internal Reflectance Fluorescence (TIRF) microscopy. TIRF allows small molecule-membrane protein interactions to be analyzed on the cell surface. To do so, we work with bulk measurements in order to characterize these interactions and provide kinetic fitting. In sum, the data should suggest how specific BRAF domains work together to recruit RAS.

242 10:45 am D

Nontargeted Evaluation of Aerobic and Anaerobic Membrane Bioreactors for Treating Emerging Contaminants in Municipal Wastewater

Jade Johnson, Public Health (M)

Aerobic and anaerobic bioreactor, coupled to a membrane filter (MBR) are two types of technologies for decentralized wastewater treatment systems (DEWATS). DEWATS have garnered national and international interest as a sustainable wastewater treatment alternative, and water reuse technology, with minimized energy and chemical consumption. One challenge for gaining public acceptance of DEWATS for non-potable and potable water reuse schemes is verifying DEWATS efficiency at treating emerging contaminants (ECs) from wastewater. This is a critical public health and environmental health issue. ECs include chemicals from pharmaceuticals, personal care products, pesticides, and other anthropogenic markers and their byproducts. This research investigates the removal and transformation of chemicals by aerobic and anaerobic membrane treatment systems, two potential DEWATS technologies that require evaluation. The experiment was run in triplicate on a laboratory-scale DEWATS built, operated, and maintained at SDSU's Water Innovation and Reuse Laboratory. Samples were collected from the raw wastewater and three sampling points per aerobic and anaerobic system: 1) sludge, 2) bioreactor effluent, and 3) membrane permeate. For analysis, samples were extracted and concentrated, followed by unprecedented analysis of organic compounds using two-dimensional gas chromatography coupled to time-of-flight mass spectrometry (GCxGC/TOF-MS). Preliminary raw data shows a range of approximately 1,138 to 1,454 compounds per 100 mL were detected in raw wastewater. Despite a 75.9-82.5% reduction in COD concentrations through both treatment systems, 802 to 1,261 compounds per 100 mL were detected in aerobic bioreactor effluent, 488 to 566 compounds per 100 mL were detected in aerobic membrane permeate; 1,209 to 2,304 compounds per 100 mL detected in anaerobic bioreactor effluent, and 252 to 905 compounds per 100 mL were detected in anaerobic membrane permeate. The wide diversity of compounds detected in effluents of both treatment systems has important implications for water reuse.

244 10:45 am F

Lead-halide Perovskite Quantum Dots for Photocatalytic [2+2] Cycloadditions with High Diastereoselectivity

Yixiong Lin, Chemistry (D)

Photo-induced [2+2] cycloadditions are the most direct methods for construction of cyclobutanes, which are important motifs in many bioactive molecules. However, direct control of diastereoselectivity of [2+2] cycloaddition reactions has scarcely been reported, though it is highly desired in pharmaceutical drug development. Herein, we describe a method that simply employs lead-halide perovskite, a promising solar absorbing material, as photocatalysts for [2+2] cycloadditions of 4-carboxylate chalcone derivatives with exceptional diastereoselectivity. A major syn head-to-head cyclobutane products can be afforded when using perovskite photocatalysts compared to other molecular photocatalysts or metal complexes photocatalysts which produce dominated thermodynamic-controlled anti head-to-head cyclobutanes. We rationale this result to the affinity of carboxylate group to our perovskite that leads to pre-organization of 4-carboxylate chalcone derivatives on perovskite surface.

Session B-10

Poster Engineering & Computer Sciences 5
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

245 10:45 am G

Chollas Creek Rolando

Salman Almutairi, Civil Engineering (U)

Chollas Creek Rolando is a channel segment in San Diego that is lying to be flooded most of the year specially the time of heavy rainfall season. This is an important segment because it is located in a residential neighborhood full of civilians.

Through the City of San Diego's Transportation and Storm water manual for drainage design, we determined the rain intensity for a 2, 5, 10, 25, 50, and 100-year flood event. The results of phase 1 which was the analysis of as built conditions shows that normal depths of the channel respective with the above storm events were below the maximum height of 3.704 feet; thus, we expect no flooding if the channel is fully maintained. These normal heights are as follows: 2.3 feet, 2.6 feet, 3.0 feet, 3.2 feet, 3.5feet and 3.7 feet. This illustrates that flooding events were accounted when designing this channel and as such no flooding is predicted.

As for phase 2, the cross section of our channel with the most sediment blockage was investigated and analyzed through hydrology and hydraulics principles such as the rational

method. The results show that flooding will occur starting at a rainfall intensity of a 2-year storm event as the normal height of 3.7 feet is higher than the maximum height of the channel. A few options were analyzed for effectiveness and cost to mitigate the flooding of the surrounding community for existing conditions. The removing and replacement of concrete to permeable concrete will increase the amount of water that infiltrates to soil while also reducing the runoff coefficient.

246 10:45 am H

Performance Evaluation of a Decentralized Wastewater Treatment Plant in Tijuana, B.C.

Denise Garcia, Environmental Engineering (U)

Water scarcity is one of the greatest challenges in the 21st century. Decentralized treatment is an important solution for global water scarcity, as it focuses on the on-site treatment of wastewater and recycling for non-potable purposes. Tijuana's Ecoparque park operates a low-energy decentralized wastewater treatment plant (DEWATS), which collects, treats, and discharges residential sewage for non-potable water purposes on site. There is a limited understanding regarding the effectiveness of bacteria removal, changes in nutrient and chemical oxygen concentrations along the treatment train. This research evaluates the log removal of total coliforms and Escherichia coli and changes in chemical oxygen demand (COD), nitrate, nitrite, ammonium, and phosphate concentrations after treatment in trickling filter, clarifier, and wetland processes as well as concentrations in influent and sludge. We hypothesize that the constructed subsurface flow wetland would provide the greatest log removal of bacteria and decrease in ammonia and COD due to uptake by plants and interactions with the soil. We would also expect that the greatest organic matter, which is measured as COD, would occur in sludge samples. Composite sampling was conducted at five sites (influent, biofilter effluent, clarifier, wetland effluent, and sludge) over a five-month period. Using bacterial enumeration with IDEXX methods, we determined that there was a <2-log reduction of total coliform and E. coli from influent to final effluent. After conducting nutrient analyses on the same samples using HACH COD and nutrient reagent methods, we found a <20% decrease in ammonia and <85% decrease in COD. These preliminary results indicate that effluent concentrations are not yet meeting desired standards and further treatment operations should be added to improve effluent water quality. Future work will evaluate the treatment plant's addition of an anaerobic baffled reactor and high rate algal pond. The results of this study have important implications for water treatment and reuse.

247 10:45 am I

The Propensity of Flooding Events in Chollas Creek and 54th Street Concrete Channel

Minerva Munoz, Civil Engineering (U)

Chollas Creek & 54th street is an area prone to flooding due to dense vegetation growth of invasive and native plant species, sediment deposition carried by local weathering patterns, and waste from neighboring developed communities. As such, the purpose of this study is to compare and contrast the propensity for flooding events of the concrete channel located at Chollas Creek & 54th street through comparisons of as-built and existing condition. Land use areas and soil type of all land use was accounted in determining the runoff coefficient of different land use areas such as commercial, industrial, and open space. Through the City of San Diego's Transportation and Stormwater manual for drainage design, rain intensity was determined for a 2, 5, 10, 50, and 100-year flood event. The results of phase 1 which was the analysis of as built conditions shows that normal depths of the channel respective with the above storm events were below the maximum height of 3.5 feet. This illustrates that flooding events were accounted when designing this channel and as such no flooding is predicted. However, due to the lack of routine maintenance, the current condition of the channels shows significant amount of trash, sediment, and native and invasive vegetation which blocks the flow of storm water. As for phase 2, the cross section of our channel with the most sediment blockage was investigated and analyzed through hydraulics principles such as the rational method. The results show that flooding will occur starting at a rainfall intensity of a 2-year storm event as the normal height of 3.43 feet is higher than the maximum height of the channel. A few options were analyzed for effectiveness and cost to mitigate the flooding of the surrounded community for existing conditions. The removing and replacement of pavement to permeable pavement will increase the amount of runoff that penetrates the ground while also reducing the runoff coefficient. Furthermore, the installation of Silva cells along the center of the median of College Grove Dr., and the addition of bioswales are solutions that were analyzed to mitigate flooding events of our area of interests.

248 10:45 am J

Hydrologic Stability of Nine Mile Creek

Samuel Zorn, Environmental Engineering (U)

The proposed work seeks to understand the impacts of land and climate disturbance on Nine Mile Creek in the Casa Vieja Meadow, which is home to golden trout. In the interest of protecting the golden trout, which is highly sensitive to habitat disturbance, data is being collected to establish a baseline from which future habitat degradation due to erosion, cattle grazing, human influence, and other factors can be measured. Information about Nine Mile Creek will also be used to make

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recommendations guiding the future placement of drop structures or other features to prevent erosion. The data that has been collected so far is a combination of remotely sensed satellite data and manually collected GPS data. Satellite data includes Google Earth images taken from 2016 to 1995 which can provide information about any large scale changes in stream path or condition. So far, no major changes in stream path have been noted which leads to a more detailed study of localized erosion. Other remotely sensed data includes a Digital Elevation Model (DEM) provided by the United States Geological Survey which provides a 3D surface to which other data is referenced. The manually collected field data is collection of coordinates used to verify the accuracy of georeferencing, mark points of erosion and stream inlets, note the location of drop structures, verify the accuracy of satellite images, and denote any other points of interest. All current data has been compiled into a geographical information system (GIS) which is being used to display the data in an intuitive, contextual manner and perform hydrological calculations such as the longitudinal profile of the stream which can be used to find correlations between erosion and factors such as the placement of current drop structures or change in elevation.

249 10:45 am K

Concentrations and Loadings of Anthropogenic Pollutants in the San Diego River and Its Tributary During Storm Events

Federick Pinongcos, Environmental Engineering (M)

In Southern California, storm events can result in exceedances of water quality benchmarks. Often, the greatest change in the water quality of an urban river occurs after the first major storm event of the season. This is because a phenomenon called the “first flush” occurs, where accumulated contaminants in the environment are flushed into the river by the first major rain event of the season. In places with arid-mediteranean climate like San Diego, this phenomenon is magnified due to longer accumulation time of contaminants from both surface and subsurface sources. Suspected sources of anthropogenic contamination in an urban river include sanitary sewer overflows, septic tanks, wastes from homeless encampments and illegal connections and discharges.

The main objective of this research was to analyze the temporal change in concentrations and loadings of biological and chemical tracers of human contamination in the San Diego River and its tributary (Alvarado Creek) during storm events. Samples were collected during the first major storm and subsequent storm events of two hydrologic years (2018 and 2019) using ISCO autosamplers. This study monitored fecal indicator bacteria (FIB) (i.e. Escherichia coli and enterococcus), molecular source tracking (MST) markers (i.e. HF 183 and Pepper Mild Mottle Virus (PMMoV)), caffeine, and sucralose as tracers of human contamination. Dissolved organic carbon (DOC), total dissolved nitrogen (TDN), and anions were also analyzed.

Results indicate that the first major storm event of each hydrologic year tend to flush a much larger amount of accumulated (during antecedent dry periods) organic matter into waterways than a subsequent storm. Chloride to bromide ratio helped discern the vadose zone contributions from those of surface runoff during the storm event because of the clear saline signature of groundwater at baseflow. Concentrations of FIB and chemical markers peaked during the rising limb of the storm. FIB concentrations in both the river and the tributary continue to increase for the duration of the storm events. This study provides information on the temporal patterns in both concentration and loadings of different anthropogenic contaminants, which is important for identifying and managing stormwater pollution in urban Mediterranean waterways.

250 10:45 am L

Photodegradation of Emerging Chemicals in Aerobic and Anaerobic Wastewater Treatment Systems for Decentralized Water Reuse

Alma Rocha, Civil Engineering Environmental Engineering (M)

Wastewater treatment systems have evolved to meet the many demands of an area’s population; however, wastewater has changed over the years. There is an increased amount of chemicals entering wastewater systems that are not regulated or common to observe at treatment facilities called emerging contaminants (ECs). The motivation behind this project is to determine how these ECs persist and transform after decentralized treatment and exposure to climate. Non-targeted GCxGC/TOF-MS analysis (NTA) indicated which ECs were present after laboratory-scale membrane reactor treatment and compared anaerobic and aerobic conditions. With additional treatment in polishing ponds or other open water reservoirs, some ECs will undergo additional degradation due to sun exposure through photolysis. In order to optimize wastewater systems, the photo-transformations must be recognized. The permeate from each of the lab-scale systems will undergo triplicate through irradiation experiments in the Suntest CPS+ solar simulator. This machine will provide 12 h of natural sunlight, programed so that average intensities follow a schedule of 3 h at 200 W/m2 to simulate intensity from 6:00–9:00, 6 h at 600 W/m2 to simulate 9:00 – 15:00 intensity, and back to 3h at 200 W/m2 to simulate intensity from 15:00 – 18:00 in San Diego, CA. Literature indicates that abiotic photolysis reactions take place in an estimated 4 days. Samples will then be removed from the system and NTA will be performed to determine the change in quantity of 10 persistent ECs. Non-destructive sampling and analysis

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of fluorescence intensities over the experimental period will be measured to provide estimates of photolysis rates. We anticipate that ECs with aromatic and unsaturated carbons are more likely to photo-transform due to their ability to absorb light. Also, chemicals in anaerobic effluents may be more sensitive than those in aerobic effluents due to limited prior exposure to oxidation. The results collected will aid in design consideration for both wastewater treatment systems and water reuse systems especially for those that discharge directly to soil and water environments, where ECs can be a human and ecosystem health threat.

251 10:45 am M

Is recharging groundwater basins by stormwater an environmentally-sustainable idea?

Yousef Sangsefidi, Mechanical and Aerospace Engineering (D)

Groundwater depletion has become a significant concern across the world. Due to increasing water demand and climate change effects, groundwater aquifers are depleting in many regions of the world, which adversely affects environmental systems. Since groundwater is supplying around half of all water used in irrigation, the mentioned issue can also dramatically impact the largest food producing nations (including the U.S, China, and India). Therefore, recharging groundwater basins is a necessary strategy to bring these vital water resources into sustainable balance. This research will seek to know how groundwater can be recharged by stormwater in order to revive and sustain aquifers. This action can also have some other side advantages like reducing stormwater runoff in low permeable perviousness in urbanized areas. In this research, different methods for stormwater capture and use (e.g. infiltration basins, injecting wells, rain gardens) will be studied, and possible solutions for the expected challenges (e.g. stormwater pollution, high imperviousness in San Diego as the case study, limited and dispersed groundwater storage basins in urbanized areas of San Diego) will be evaluated. With this study, the following key questions are going to be answered: Does the quantity of stormwater and geophysics of the groundwater basins support a sustainable source of water supply, in terms of quantity and quality? What treatment techniques may be adopted to enhance the water quality, and are these treatment techniques cost effective? Is this entire framework environmentally sustainable? Which method (Infiltration Basins, Injecting wells, Rain gardens or etc.) can result to optimal benefits?

Session B-11

Poster Behavioral & Social Sciences 6
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

252 10:45 am N

Language Specificity in Maternal Education Revisited: Vocabulary Growth before 30 Months of Age

Oliver Lopez, Psychology (U)

Background: Socioeconomic status (SES) and maternal education are positively associated with early vocabulary size in English (Hart & Risley, 1995; Hoff, 2003; Vernon-Feagans et al., 2008). However, the relation between maternal education and early vocabulary size is less clear in Spanish (e.g., Friend et al., 2017; Hurtado et al, 2008). Hoff, et al. (2017) propose that language of maternal education is specific in its influence: Spanish vocabulary is related to mothers' highest level of education in Spanish by 30 months of age. We assess maternal education and vocabulary growth in Spanish- and English-dominant children earlier, at 16, 22, and 30 months of age, to clarify the timing of maternal education effects. We evaluate two hypotheses:

1) The specificity hypothesis: Language-specific maternal education effects emerge at the same time across languages.

2) The timing hypothesis: Maternal education effects emerge later in Spanish- than in English-speaking children.

Method: Participants were 61 English- and 53 Spanish-dominant children and their mothers. Parents completed a language exposure questionnaire, the MCDI (or IDHC), and reported the language and highest level of maternal education. Growth curve models were constructed separately for English and Spanish vocabulary.

Results: Level of education in English predicted English vocabulary at 22 months, as well as growth in vocabulary from 22 to 30 months. However, trajectories of vocabulary growth as a function of level of maternal education in Spanish did not diverge until 30 months of age. Consistent with the timing hypothesis, maternal education effects on early vocabulary emerge later for Spanish-dominant than for English-dominant children.

Conclusion: The present findings extend Hoff et al. (2017) by expanding the age range across which the effects of maternal education are evaluated in Spanish-speaking children in the U.S. These findings resolve conflicting findings on the relation between maternal education and vocabulary acquisition in Spanish-speaking children.

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253 10:45 am O

Concurrent and Predictive Relations Between Vocabulary and Narrative Ability

Tyler Haubeck, Psychology (U)

The present study compares early vocabulary scores with narrative ability. Since vocabulary and narrative ability are manifestations of the developing conceptual system, we expect vocabulary to be concurrently and predictively related to narrative ability. In one study, vocabulary at 19 months predicted reading comprehension at age 12 and vocabulary at 32 months predicted early literacy skills (Suggate, et. al, 2018). Another study found that child vocabulary and early literacy skills are concurrently related at 48 months (Dickinson et. al, 2003). Early narrative ability lays the foundation for school readiness (Schick & Melzi 2009).

Participants were 23 children (Mage = 22;2) in a longitudinal study. Total words comprehended and produced were reported by parents using the MCDI (Mwords = 68.13, Mwords = 243.83, respectively). Vocabulary comprehension was measured directly using the Computerized Comprehension Task (Mwords = 26.96). At ~48 months (Mage = 50;10) , vocabulary was assessed using the PPVT (Mwords = 72.12; Dunn & Dunn, 1997) and narrative ability was assessed on Mercer Mayer's (1969) Frog, Where Are You? using the Index of Narrative Complexity (Petersen, Gillam & Gillam 2008). Thirteen narrative elements were measured to create an overall score (M = 11.44, range = 2.00 to 19.00).

We expect significant variance in narrative scores to be explained by early vocabulary, concurrently and predictively. We also expect vocabulary to predict specific narrative elements, such as temporal markers, internal responses, and consequences. Further, we expect that children from higher SES backgrounds will produce higher quality narratives than children from lower SES backgrounds. To evaluate this relation, we use highest parent education level and income as indices of SES. We plan to code an additional 30 child narratives in order to evaluate the concurrent and predictive relations between early vocabulary and later narrative ability.

254 10:45 am P

Measuring Early Vocabulary: a Facilitating Assessment in Multiple Languages

Kiryl Kachko, Psychology (U)

Early childhood vocabulary has implications for linguistic and cognitive development. Second year vocabulary predicts language and literacy achievement through primary school (Lee, 2011). There is a recent emphasis on measuring early vocabulary directly beginning with the inception of the Computerized Comprehension Task (CCT; Friend & Keplinger, 2003). This supplements parent report of vocabulary since parents can have inconsistent standards for assessing word knowledge. The CCT uses a touchscreen device with a set of forced-choice trials consisting of two pictures, a target and a distractor. We are updating and extending the CCT in English, Spanish, French, and Danish. Over 88% of American children speak a language other than English, making the availability of the CCT in many languages essential (US Census Bureau, 2000). Moreover, identifying children in need of additional support prior to school entry is an issue of international importance.

Recent studies shown that,school readiness can be predicted by parent reported vocabulary (Duff et al. 2015; Morgan et al., 2015). However, in a relative weights analysis to assess the orthogonal contributions of parent report on the MacArthur-Bates Communicative Development Inventory (MCDI), and CCT scores, the CCT was the strongest predictor of a kindergarten readiness in the fourth year (Friend, Smolak, Liu, Poulin-Dubois, & Zesiger, 2018). Results from a subsequent study indicate that CCT vocabulary in the second year identified 85% of children at risk for language delay (Friend et al., 2019). Parallel findings obtained for French-speaking children in Switzerland and French-English bilingual children in Canada.

Our recent work includes updates to automated scoring and an upward extension of the ceiling from 24 to 36 months of age in the Danish adaptation. This facilitates assessment in preschool settings allowing scaling up to larger samples with both empirical and applied implications. Upward extensions of the CCT in other languages are in development. In this presentation, we illustrate the CCT assessment procedure and present psychometric data across languages (see Table 1). These findings highlight the effectiveness of the CCT as a vocabulary assessment tool and show the implications this has for the ability to predict the risk of a delay in language development.

Table 1. Psychometric Properties of the CCT across Languages and Samples

aFriend, M. & Keplinger, M. (2003, 2008). bFriend, M., Schmitt, S. A., & Simpson, A. M. (2012). cHendrickson, K., Mitsven, S., Poulin-Dubois, D, Zesiger, P., & Friend, M. (2015). dFriend, M. & Zesiger, P. (2011) eFriend & Zesiger (2012). fDeAnda, S., Arias-Trejo, Poulin-Dubois, D., & Zesiger, P. (2015). gFerjan Ramirez, N. & Kuhl, P. (2017). hIn preparation. iPoulin-Dubois, D., Bialystok, E., Blaye, A., Polonia, A., & Yott, J. (2013). jLegacy, J., Zesiger, P., Friend, M. & Poulin-Dubois, P. (2015).

255 10:45 am Q

Lexical Decision Task Performance and Executive and Linguistic Abilities in Adolescents with Autism Spectrum Disorder

Kalekirstos Alemu, Psychology (U)

Introduction: Autism Spectrum Disorders (ASD) are neurodevelopmental disorders characterized by socio-communicative impairments and restricted and repetitive patterns of behavior. Although no longer required for a diagnosis, language skills are frequently impaired in individuals with autism. People with ASD also commonly have deficits in executive function (EF), especially in novel situations requiring flexibility. The present study examined

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whether linguistic abilities and EF were associated with lexical decision task performance in adolescents with ASD and their typically developing (TD) peers.

Method: Thirty-seven ASD and 30 TD participants performed a lexical decision task. Groups were matched on age (12-21 years), gender, handedness, and non-verbal IQ. Participants were presented with standard (non-animal) words, animal words, and pseudowords and asked to press a response button with their index and middle finger for standard and animal words, respectively, while not responding to pseudowords. We conducted independent samples t-test to test for group differences in response time and accuracy, and partial correlations (controlling for age) to explore the relationship between task performance, linguistic abilities assessed with a standardized measure (CELF-5), and EF measured by a parent report (BRIEF-2).

Results: Accuracy was significantly higher in the TD than the ASD group, across all three conditions, while no difference in response times was detected. Language abilities (CELF-5 Total) and accuracy were positively correlated in both groups (all $rs>0.3$, $p<0.05$), with better language skills associated with greater accuracy. Lower set-shifting abilities as measured with the BRIEF-2 scale were associated with better accuracy for animal ($r=0.4$, $p<0.05$) and pseudowords ($r=0.4$, $p<0.05$) in the ASD group. No such correlations were found in the TD group.

Conclusions: The finding of lower lexical decision accuracy in adolescents with ASD is consistent with previous studies reporting atypical or impaired lexical processing even in high-functioning ASD. While both TD and ASD participants showed expected positive association between language abilities and task performance, a paradoxical pattern emerged for EF in the ASD group. Namely, greater impairments on the EF set-shifting skill were associated with better performance on the task conditions requiring inhibition and set-shifting, possibly reflecting compensatory mechanisms supporting better performance in the face of poorer EF.

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256 10:45 am R

The effects of iconicity in word and picture naming in American Sign Language: preliminary testing of stimuli in a control group of monolingual English Speakers

Bradley Cheng, Psychology (U)

Signed languages and spoken languages can have signifiers (words or signs) that overlap with what they mean. In English the word 'BOOM' is iconic (or onomatopoeic) in that it sounds like what it represents. Because American Sign Language (ASL) is a visual language, the overlap between signifier and meaning (known as iconicity) occurs more frequently. In prior work with iconic signs and picture naming, shorter naming times for iconic vs. non-iconic signs have been observed. One question addressed in a series of studies ongoing in the NeuroCognition Lab is: will reading an English word that elicits via translation an iconic ASL sign (read BIRD, sign BIRD) result in shorter naming times than an non-iconic sign. Is the facilitation observed in producing iconic signs tied to priming of the visio-spatial overlap inherent in the presentation of pictures compared to words? Or will the production of iconic signs also be facilitated by English words – i.e. even in the absence of a visio-spatial prime? One difficulty in picture naming studies is that there may be properties of the pictures that could drive observed effects, such as prototypicality (how close is the image to our prototype) or complexity of the image or even properties that have not yet been considered. These unanticipated properties are difficult to control. The present study focuses on a control group of monolingual English speakers naming words and pictures in English. Finding a null result in a group of monolingual English speakers would ensure that the effects, if observed in the deaf, would be due to iconicity and not other uncontrolled properties in the pictures or words. In a block design, our monolingual English-speaking participants first read aloud 88 English words then named 88 pictures of the same concepts. If null effects are found, these same materials will be presented to deaf participants to explore the facilitation effect of iconicity. However preliminary data indicate unexpected iconicity effects in picture naming, but not in word naming for our control group. These results indicate that additional consideration of the pictures may be necessary before continuing the study in deaf participants.

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257 10:45 am S

Audio-Visual Integration Skills and Language Abilities in Monolingual Adults

Michelle Villaraza, Speech, Language and Hearing Sciences (M)

The auditory and visual modalities play important roles in speech perception, as visual input from faces influences the auditory speech signal that we hear. The intersensory redundancy hypothesis (IRH) proposes that redundant auditory and visual input results in facilitated perception, which is necessary and foundational for word learning. Developmental Language Disorder (DLD) has been linked to fewer audio-visual integration type responses on speech sound tasks, though it is unclear whether audio-visual integration for non-speech sound perception is similarly affected. The purpose of this study is to investigate whether audio-visual integration for non-speech sound perception is reduced in adults with a self-identified history of language difficulties.

Thirty-two adults who self-identified as having language difficulties participated in the study. All participants completed a language background questionnaire and language assessments, a hearing screening, and a test of nonverbal reasoning. Participants were administered three audio-visual tasks using eye-tracking to measure auditory and visual perception and integration: 1) auditory and visual integration task where auditory targets were accompanied by visual targets, 2) auditory-only task, and 3) visual-only task. Tasks 1-3 were Go/No Go paradigms, where participants press a button when they hear and/or see two beeps of the same length (175ms - 175ms) and ignore trials where two beeps are of different lengths (175ms - 75ms). This tested auditory and visual processing and attention skills together (task 1) and separately (task 2-3).

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Auditory and visual processing data will be analyzed for average accuracy and speed of button presses across tasks 1-3. Eye fixation data will be analyzed by proportion of looks to target visual quadrants for trials with a visual component. We expect less accuracy and slower responses across tasks for individuals with lower language ability, than individuals with higher language ability. We expect that lower language ability will be associated with fewer looks to visual targets during auditory tasks, supporting that lower language abilities (including a history of DLD) may be associated with lower audio-visual integration of non-speech sounds. Findings will inform whether and how non-speech, audio-visual integration may be linked to language related skills in adults with and without language disorder.

258 10:45 am T

Explicit Repetition Priming in Treatment of Anomia

Rana Tabrizi, Speech, Language and Hearing Sciences (M)

Aphasia is a condition, typically resulting from injury to the left hemisphere of the brain (Helm-Estabrooks, Albert, & Nicholas, 2014), which is characterized by impaired language abilities. Individuals with aphasia can have difficulties with understanding and producing language. One commonly affected domain of language is accurate naming of objects or images, which is known as anomia. Prior research has suggested that naming can improve when pictures are preceded by masked primes, that is, words that are presented rapidly such that they are not consciously processed by the participant, but feasibility in a clinical setting has proven difficult (Silkes, 2015, 2018). Therefore, the present study explored the efficacy of visible word primes (i.e., explicit primes that do not use masking) as a treatment approach for naming in individuals with aphasia. The study involved one female participant with aphasia with anomic features, approximately 19 years post left-cerebrovascular accident (L-CVA). A single-subject design was carried out involving pre-testing, an experimental protocol of 12 treatment sessions, and post-testing. During baseline sessions (pre-testing), the participant was asked to name a series of pictures presented one at a time on a computer screen; results were used to choose items the participant was familiar with, but unable to name accurately. Treatment sessions involved repeatedly exposing the participant to pictures of those items on the screen, each preceded by an explicit word prime (the name of the item), then having the participant attempt to name the item. These trained items were randomized with untrained control items—pictures with no priming. Post-testing involved having the participant name all trained and untrained items from treatment sessions, in addition to naming baseline session items that she was not exposed to over the course of treatment. Within-subject analysis involved comparing mean naming accuracy before and after treatment, using Cohen's d to calculate effect sizes. A large effect (d=7.94) was observed for trained items, while no effect was observed for untrained items that were exposed and unexposed. While testing needs to be carried out with additional participants, outcomes suggest that explicit priming may be effective in improving naming in adults with aphasia.

Session B-12

Poster Health Nutrition & Clinical Sciences 2
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

259 10:45 am U

Head and Neck Cancer - Disease and Treatment Impact on Speech Physiology

Annie Miodovski, Speech, Language and Hearing Sciences (U)

According to the American Cancer Society, it is estimated that over 65,000 people are diagnosed with head and neck cancer each year. Cancer adversely affects the components of a patient's oral cavity that, in turn, also impacts a patient's quality of life. Data shows that a large number of head and neck cancer patients experience complications with speech and swallowing during and after treatment. Patients who present with speech problems feel isolated and voiceless, while those who experience motility disorders have difficulty swallowing due to reduced tongue strength and prolonged transit time (Rinkel). A study by Dr. Bas J. Heijnen noted that impairments involving saliva production, pain, and fatigue are also accompanied by social stigmas, and the inability to return to the workforce. These disorders are strongly associated with the patient's tumor site and method of treatment and radiation therapy. As damaging as the cancer may be, the treatments available are not as advantageous to the patient as one would hope. Treatment can affect vital components of the speech mechanism, such as the tongue, that are necessary for speech and swallow. This is why it is essential to study and understand speech physiology as well as how cancer affects these mechanisms. Through the utilization of such studies, SLPs can predict a client's response to a treatment and gain insight on oral movements that may help target specific articulation/motor characteristics for treatment. The methods put into practice by the SDSU Speech Physiology Lab involve the utilization of SMASH and MATLAB software to analyze kinematic data that help identify the movement characteristics of the tongue and jaw, which are involved in producing speech via electromagnetic articulograph. Articulograph and spectrograms give us information on the client's oral motor movements, their ability to articulate particular phrases at different loudness, rates and their speech intelligibility. This research involves analyzing data from 2 participants with head and neck cancer as well as healthy controls that will allow us to see exactly which oral mechanisms are being affected and help SLPs determine the best intervention for clients who continue to experience complications.

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260 10:45 am V

Do the Dietary Practices of African Americans Increase Their Rate of Colorectal Cancer?

Tony Zamro, Biology (U)

Background/Purpose: Colorectal cancer has the highest incidence rate among African Americans. Carcinogens found in high-temperature-cooked foods that are activated by colon enzymes can influence the risk of colorectal cancer. This narrative literature review examined whether the high risk of colorectal cancer in African Americans is associated with their dietary practices.

Methods: A narrative literature review was conducted on the dietary practices of African Americans and the relationship of diet and carcinogen activation to colorectal cancer risk. The databases that were searched were: CINAHL, PsycINFO, Medline/PubMed, Web of Science, and ERIC. The keywords were: colorectal cancer, African Americans, Blacks, Black Americans, diet, red meat, NAT (n-acetyltransferase), HAA (heterocyclic aromatic amines), HCA (heterocyclic amines) genetic mutations, and cooking methods.

Results/Findings: There was evidence of an association among the type of meat consumed, preparation of the meats, concentration of HAA/HCA, and risk of colorectal cancer in African Americans. One study showed that African Americans consumed more poultry, but not red meat than Whites and Hispanics. When cooked at a high temperature, poultry contains the most amount of HAA/HCA among the various types of meats. Africans Americans may be more likely to cook at higher temperatures in food preparation, which is associated with higher intake of HAA/HCA, but mixed findings for cooking methods were found.

Discussion: The dietary practices of African Americans may put them at increased risk of colorectal cancer due to high HAA intake. Increased awareness, modifications to meat intake, and different cooking methods may help reduce this risk. More studies should examine food preparation and diet of African Americans to study carcinogenic impact.

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261 10:45 am W

Using a process map to identify workflow and intervention points for colorectal cancer screening in community health centers

Carly DaCosta, Biology, Public Health/ Women's Studies (U)

Purpose: Few community health centers (CHCs) have consistently implemented and sustained evidence-based interventions (EBIs) to increase colorectal cancer (CRC) screening. Our study aimed to understand CRC screening processes in a San Diego County CHC and identify intervention points.

Methods: Guided by the contextually expanded RE-AIM framework (PRISM), secondary data were extracted from CHC databases along with new data requests to identify contextual factors influencing CRC screening processes. A CHC-based study coordinator recruited key clinic personnel (e.g., clinic's executive team, clinic managers, referral managers, quality improvement specialists, lab personnel, providers, and referral gastroenterologists) to participate in surveys and in-depth interviews. Adapted process maps, a tool for visualizing the CRC screening process, were developed with the CHC as a strategy to identify key CRC screening intervention points.

Results: Our partnered CHC has 4 clinic sites serving CRC screening age-eligible patients. Patients are primarily racial/ethnic minorities (77%) with an income status at or below the federal poverty line (98%). The CRC screening rate at the CHC remains low (59%), compared to the American Cancer Society target (80%). We found that the CRC screening process begins with patient screening reminders via mailed letters and provider recommendation at appointments. Despite receiving instructions for CRC screening kits, some kits are completed improperly. Another intervention point was found in the documentation process of colonoscopy results. Clinic personnel reported an inaccuracy in patient's electronic health records due to improper naming of documents.

Conclusion: Our results show the need for multi-component implementation strategies with potential intervention points for CRC screening kit distribution and completion, as well as the documentation for the CRC screening process. These include multi-component implementation strategies such as phone client reminders, reducing structural barriers (e.g. appointment scheduling, alternative screening sites, add clinic hours, transportation, language translation, and childcare) and provider feedback (i.e., describe provider performance and compare with a goal or standard).

This research was supported by NCI of NIH, award numbers: U54CA132384 & U54CA132379. The content is the responsibility of the authors and does not represent the official views of the National Institutes of Health.

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262 10:45 am X

Trends in Stage at Diagnosis for Lung Cancer in the US, 2009-2016

Paris Offor, Public Health (U)

In 2013, the U.S. Preventive Services Task Force began recommending lung cancer screening for current and past smokers with at least a 30 pack-years of smoking history. Evidence shows that with compliance, lung cancer screening may lower the number of lung cancer-related deaths. One way to determine if screening is effective is by a shift towards earlier stages of diagnosis in national statistics. We sought to investigate if such a stage shift has occurred since the implementation of the new screening guidelines overall and by race and/or geographical regions.

We used the National Cancer Institute Surveillance, Epidemiology, and End Results Cancer Registry. Incident lung cancer cases diagnosed from 2009-2016 were extracted and stratified using proportions by stage, year of diagnosis, race (White and Black), and geographical regions.

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320,116 lung cancers were diagnosed between 2009 and 2016. Among whites, the proportion diagnosed at stage 4 was 53.9% in 2009 and 48.4% in 2016 and the proportion diagnosed at stage 1 was 22.1% in 2009 and 28.1% in 2016. For blacks, the proportion diagnosed at stage 4 was 58.2% in 2009 and 54.7% in 2016 and the proportion diagnosed at stage 1 was 17.6% in 2009 and 21.9% in 2016. Overall, this reflects a decrease in Stage 4 lung cancer diagnosis (10.2% relative decrease for Whites and 6.0% relative decrease for Blacks) and an increase in Stage 1(27.1% increase for Whites and 24.4% increase for Blacks). These results varied by region. In the Northeast region, proportions of stage 4 decreased more among Whites (13.0% vs 7.2%). In the Southeast region, Blacks and Whites had smaller comparable reductions in proportions of stage 4 diagnosis (3.1% vs 3.0%).

Blacks are more likely to be diagnosed at a later stage overall and in all geographical regions in the United States. Since the new implementations of screening guidelines, late stage lung cancer diagnosis has been continuously decreasing for both race and all regions, but not uniformly by race and geography.

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263 10:45 am Y

Comparing age at cancer diagnosis between Hispanics and non-Hispanic Whites in the United States

Andrew Vu, Epidemiology (M)

Purpose: To examine ages at cancer diagnosis for United States (US) Hispanics compared with non-Hispanic whites (NHWs) after adjustment for population age structure. These differences in population age structures may play a role in confounding the age of cancer diagnosis among ethnicities.

Methods: We analyzed Surveillance, Epidemiology, and End Results (SEER) data for US Hispanics and NHWs from 18 US regions in 2015. Separately for 32 cancer sites, we calculated crude mean ages at diagnosis and population structure-adjusted mean ages at diagnosis using age- and sex-specific weights. For each cancer site, we examined differences between the crude and the adjusted mean ages at diagnosis using t-tests, by Hispanic ethnicity and sex. Using SEER*Stat, we also examined age-adjusted incidence rates for the three cancer sites with the largest positive/negative mean age differences by ethnicity and gender, as appropriate.

Results: ðCompared to NHW males, Hispanic males were younger at diagnosis of testicular cancer (mean age difference, ð= -4.74, 95% CI= -5.44, -4.04 years), and Kaposi sarcoma (ð = - 3.58, 95% CI= -6.34, -0.82, but older at diagnosis of gallbladder cancer (ð = 3.15, 95% CI= 1.81, 5.70) and Hodgkin's lymphoma (ð = 7.53, 95% CI= 5.72, 9.37), after adjustment for population age structure. Compared to NHW females, Hispanic females were younger at diagnosis of mesothelioma (ð= -3.72, 95% CI= -6.73, -0.72), and gallbladder cancer (ð= -3.0, 95% CI= -4.27, -1.74), but older at diagnosis of Hodgkin's lymphoma (ð = 7.03, 95% CI= 4.99, 9.07), and Kaposi sarcoma (ð = 11.3, 95% CI= 2.41, 20.19), after adjustment for population age structure. Notable changes of crude age of cancer diagnosis differences after adjustment include: male bones and joint cancer (-13.4 to -1.06), and female brain cancer (-10.1 to 3.1).

Conclusions: Hispanics appear to be experiencing a younger crude cancer diagnosis age than NHW; however, after adjustment, many of these cancer sites are shown to have an older age of cancer diagnosis. Adjustment for population structure may be important for various cancer sites when comparing ages at diagnosis between populations with different underlying age structures.

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264 10:45 am Z

Developing and Adapting Survivorship Care Plans for Rural Latina Breast Cancer Patients

Viviann Cesena, Social Work (M)

Background Facilitating an optimal transition to cancer survivorship is challenging for Latino cancer patients in rural regions due to personal, structural, and cultural barriers. The Survivorship Care Plan (SCP), a comprehensive treatment summary, could provide effective guidance; yet little is known about its implementation and cultural appropriateness for rural Latina breast cancer (BC) patients. Purpose The purpose of this study is to adapt and develop a breast cancer SCP intervention targeted to rural Latina BC patients. Methods The present study implemented formative research. Eight focus groups (n=41) and individual interviews (n=4) took place with stakeholders (i.e., patients, family, physicians, nurses, medical assistants, and social workers) to gain an in-depth understanding of the needs and preferences for BC SCP. Focus group participants were recruited from the Cancer Resource Center of the Desert (patients, family, and patient navigators) and the El Centro Regional Medical Center (Nurses, physicians, and medical assistants) in Imperial County, California. Results Formative focus group results address: 1) barriers in the implementation of SCP 2) preference for adapting BC SCP and 3) preference for SCP aid. All participants were receptive towards the implementation of the BC SCP. First, barriers for cancer survivorship care consisted of lack of knowledge about survivorship related issues, psychological distress, lack of self-efficacy (i.e., managing chronic illness, asking questions) and supportive resources (i.e., transportation). Second, participants preferred adapting SCP to survivor's language. Third, participants selected the animated video demonstrated as the best SCP aid. Implications Latina BC survivors residing in rural regions are faced with many barriers that affect proper cancer survivorship care. However, in order to facilitate the use of BC SCP for survivors: their language, literacy, and cultural norms must be taken into consideration in the development of the survivor's SCP. Conclusion This study addresses the gap in literature through the opinions of participants on how to better adapt and develop SCP among Latina BC survivors. Further research is recommended in order to continue the improvement of cancer survivorship among Latina BC survivors.

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265 10:45 am AA

The Spatial and Temporal Association between Breast and Colorectal Cancer Incidence and Poverty among California Teachers

Rachelle De Ocampo, Public Health Epidemiology (M)

Among women in the United States diagnosed with cancer, breast cancer is the second leading cause of death and colorectal cancer is the third leading cause of death. In addition, certain occupations, such as teaching may have a higher risk of breast cancer. This has led to the formation of the California Teacher Study (CTS) in 1995. The California Teachers Study (CTS) is an observational cohort study composed of 133,479 women. Collected information on their health and lifestyle help researchers better understand various health conditions and risk factors. CTS researchers have collected data on cancer types, diagnosis dates and geographical information such as census tract location. Multiple factors are taken into consideration in the study of cancer such as geospatial factors, race/ethnicity and socio-economic status. We aim to assess the spatial association between poverty rates and two types of cancer incidence 1) breast cancer and 2) colorectal cancer among California teachers. Using data from the California Teacher Study we identified women diagnosed with breast or colorectal cancer. We used participant geographic location data from the US Census Bureau, at the census tract level and spatial scan statistics to determine geographic clusters of breast and colorectal cancer. The results of this analysis will reveal areas of high or low rates of breast or colorectal cancer and any associations between these cancer incidences and poverty rates by census tract. By utilizing large-scale public data on census tract poverty rates in conjunction with private health records, we hope to identify geographic areas which might benefit from more targeted health interventions. The results of this study may show the usefulness of geospatial analysis to identify high-risk geographical areas and high-risk populations.

Session B-13

Poster Physical & Mathematical Sciences 4
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

266 10:45 am BB

Evolution of Spectral Distributions in Deep-Water Constant Vorticity Flows

Mackensie Murphy, Applied Mathematics (U)

The goal of this project is to verify the conditions in which modulational instability is suppressed in constant vorticity shear current water waves. In addition, we will be examining the impact of magnitude of vorticity on this modulational instability threshold. We will be comparing the statistical properties of the solutions using the Nonlinear Schrodinger Equation and the higher-order Vor-Dysthe Equation. These partial differential equations will be converted into ordinary differential equations using Fourier Transforms. Then we will use the Runge-Kutta Method with an integrating factor and a theoretically more robust method using a combination of linearly implicit multistep methods and compare their performance. Our results revealed that the threshold for modulational instability seems reasonable, but we need to further investigate the errors to fully verify the conditions. We also observed that larger magnitudes of vorticity result in a smaller threshold for modulational instability. Furthermore, for our specific conditions, the combination of linearly implicit multistep methods is less robust than the Runge-Kutta Method and actually requires a significantly smaller timestep to perform correctly.

267 10:45 am CC

Distinctive allometry relations and conserved properties in dsDNA viral lineages

Meg Robinson, Applied Mathematics (U)

Viruses are the most abundant biological entity on the planet with a total estimate of 1031–1032 viral particles, infecting organisms in all domains of life. The ancestry of viral genes is mostly unknown, contributing to challenges regarding the prevention of viral infections. However, the structure of viruses displays conserved properties. Viruses are composed of a protein shell known as the capsid which protects the infective viral genome. The capsid is built from a limited number of structural folds, but the physical properties of the capsid in various viral lineages remain largely unexplored. Here, we study the two main lineages of double-stranded DNA viruses: HK97-like and PRD1-like viruses. UCSF Chimera was used to measure internal and external radii, sphericity, volume, surface area, genome density, icosahedral capsid number, among additional properties. Statistical analysis was performed and revealed a strong correlation between physical properties in relation to one another (i.e capsid size and genome size was conserved across icosahedral capsid numbers). These conserved properties are distinct to each lineage. Further analysis was performed on the allometric relationships between these properties, with the results suggesting that there is a discrepancy in allometry laws for the lineage as a whole compared to variability in icosahedral capsid numbers within each lineage. This can be attributed to a different physical mechanism being used to accommodate the variation in the genome between the two groups. These findings confirm that viral capsids in viral lineages conserve their fundamental structural properties regardless of their viral host.

268 10:45 am DD

Finding Dense Lattice Packings in Prime Dimensions

Michael Angel, Mathematics (M)

This research looks for high density lattice sphere packings using a computer search with MAGMA and SAGE mathematical computation programs. Given a cyclic extension L/Q of degree p with p an odd unramified prime in L/Q, the search space is lattices constructed from submodules of the ring of integers of L.

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269 10:45 am EE

Land-cover Classification using Spectral Mixture Analysis and Random Forest

Ye Mu, Geography (M)

The study describes spatiotemporal variation in land cover in the central/Ouro Preto do Oeste (OPO) region of Rondônia, Brazil. A multistage process is used to map primary forest, secondary forest, pasture, pasture with >50% trees, urban, and water using Landsat scenes available in the Google Earth Engine datasets between May and August in 2009. Based on spectral mixture analysis (SMA) and random forest (RF) classifiers, the study aims to determine whether the SMA technique in combination with RF significantly improves the accuracy of classification in the Amazon tropical forests. The land cover product is compared with field farmers-reported data and imagery interpretation using high-resolution (5m) satellite imagery.

270 10:45 am FF

Modeling Fibroblast Growth Factor Expression in Embryonic Lungs

Geneva Porter, Applied Mathematics (M)

This research entails using mathematical modeling to understand how genetic expressions affect branching patterns in embryonic lungs. Specifically, I am investigating how the geometry of embryonic lungs affect the location of Fibroblast Growth Factor 10 (FGF10) expression and epithelial lung branching. I use a system of reaction-diffusion equations to model FGF10 expression at the lung surface and the resulting diffusion into the surrounding lung tissue. I have developed a computational model of the embryonic lungs by applying the surface finite element method to obtain numerical approximations of the reaction-diffusion equations via the C++ based program library deal.ii. The novelty of this research is the development of a new technique that involves the application of the surface finite element method to study the expression of key molecules in lung development. I will present preliminary results from numerical simulations that demonstrate the ability of the model to generate patterns. Results from this study can offer new insights into the mechanism of embryonic lung development, and the techniques used in this study could be extended to examine other branching organs such as the kidney and mammary glands. Particularly, I am excited about possible applications for treating Congenital Diaphragmatic Hernias (CDH), which causes hypoplastic lung development in the fetus.

271 10:45 am GG

Mathematical Models of the Transmission Dynamics of Black Band Disease in Coral Reefs

Jayme Rosenquist, Applied Mathematics (M)

Coral Reefs play a significant role in keeping the ocean healthy. Healthy Coral Reefs also create viable homes for small fish which serve an important part of the marine animal food chain. Black Band Disease (BBD) is one of the spreading coral reef diseases causing a huge loss of corals worldwide. However, mechanisms and transmission dynamics of BBD are still poorly understood to the scientific community. The environmental seawater temperature has been found to alter the microbiome composition of coral reefs, impacting the spread of BBD across many corals. In this study, we present a mathematical model to evaluate the effects of seawater temperature on the transmission dynamics of BBD. Using our model to fit the data from infected coral sites, we estimate the important parameters, including disease infection and coral death rate. We further implement our model to identify factors playing an important role in the progression of the disease and to evaluate potential ways of preventing the threats of BBD spread. Our results help advance the knowledge on the transmission dynamics of BBD and can be useful to develop strategies for the prevention of coral reefs.

Session B-14

Poster Behavioral & Social Sciences 7
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

272 10:45 am HH

Investigating Spatiotemporal Stages of Emotional Face Processing with anatomically-constrained MEG

Joseph Gorski, Psychology (U)

Emotional facial expressions are an essential dimension of social interactions. Existing EEG/MEG literature has focused on the structural face encoding which takes place at ~170ms in the fusiform gyrus. However, the neural characteristics of the later stages with relevance to processing of emotional expressions are poorly understood. This experiment was designed to analyze the neural activity in response to the images of human faces displaying emotional expressions. Sixteen young, healthy individuals were presented with 300 greyscale images of unfamiliar human faces in a randomized order. The images were presented every 3 sec and remained on the screen for 270ms. They were counterbalanced for gender and emotional valence which included sad, happy, and neutral expressions. Participants were asked to identify the emotional expression of each face by pressing one of three buttons. High-density

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whole-head magnetoencephalography (MEG) signals were recorded from each participant and combined with structural magnetic resonance imaging (MRI) scans obtained in separate scanning sessions. We employed an anatomically-constrained MEG (aMEG) approach which makes it possible to examine spatiotemporal stages of processing that is distributed across different brain areas. Group-averaged waveforms were generated to analyze differences in event-related fields (ERFs) within time intervals and cortical regions of interest (ROIs) with most notable activity.

Following a replication of the early face-sensitive response in the fusiform cortex at ~160ms, the subsequent activity encompassed the temporal and frontal cortices in an emotion-specific lateralized manner. Happy faces elicited greater activity between 400 and 800ms in the left lateral prefrontal and temporal cortices. Conversely, greater neural activity to sad compared to neutral faces was observed between 500 and 800ms in the right temporal lobe. These results are broadly supportive of the existing EEG literature suggesting a left-lateralized bias for positive and a right-lateralized bias for positive emotional expressions. Furthermore, these results are consistent with the Valence Hypothesis that was originally based on lesion evidence which proposes that positive and negative emotions are processed in a biased manner by the two hemispheres. The aMEG approach provides a temporally-precise insight into the distributed nature of emotional face processing.

273 10:45 am II

Accuracy of An Automated Decision Tree Tool for Detecting ARND

Emily Duprey, Psychology (U)

Purpose: Examine the relation between an automated decision tree tool for identifying youth affected by prenatal alcohol exposure (the eTree) and the Alcohol-Related Neurodevelopmental Disorder (ARND) behavioral checklist (Burd et al. 2008).

Methods: Data were collected from 117 subjects (ages 7-17y). Subjects were recruited from 2 sites: UCSD FASD Clinic (UCSD) and SDSU Center for Behavioral Teratology (CBT) and included children with and without histories of prenatal alcohol exposure. The eTree algorithm returns a classification of exposed/affected or not exposed/affected, based on data from 2 parent questionnaires and a physical exam. The ARND checklist comprises 35 questions about child behavior. As suggested by Burd et al., (2008) a cutoff score of >20 indicates the presence of ARND. eTree results (yes/no) were compared to results from the ARND behavioral checklist (yes/no). Overall accuracy (ACC), sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated. Misclassified cases were examined for systematic bias.

Results: Of the 117 subjects, 67 (57.26%) had confirmed histories of prenatal alcohol exposure, 35 (29.91%) had suspected exposure, 15 (12.82%) had no reported exposure. 46 (39.32%) surpassed the cutoff for ARND according to the checklist and 71 (60.68%) were identified by the eTree as exposed/affected. ACC was 55.56% (sensitivity = 46.67%, specificity = 85.19%), PPV was 91.30% and NPV was 32.39%. 42 (91.30%) of the subjects that surpassed the ARND cutoff were also identified by the tree as exposed, and 48 (67.61%) of the subjects that did not meet the ARND cutoff were not identified by the tree as exposed. Of these 48 subjects, 44 had suspected or known histories of prenatal alcohol exposure.

Conclusion: The eTree accurately identified subjects with ARND, supporting the validity of this tool. Furthermore, the eTree identified exposed subjects that were not identified by the ARND checklist suggesting that the eTree is a more sensitive measure. Additional research is needed to determine if adjusting the cutoff score for the ARND checklist increases agreement between the tools. Research supported by NIAAA grants U01 ASession A-14834, U24 ASession A-14811.

274 10:45 am JJ

The Relationship between Apolipoprotein E Alleles, Cognitive Performance, and BrainAGE Among People with and without Bipolar Disorder

Da Yeoun Moon, Psychology (U)

Bipolar disorder (BD) is a severe psychiatric illness marked by periods of depression and mania. Individuals with BD may experience accelerated aging, showing greater age-associated cognitive impairment (e.g., executive functioning) and brain abnormalities compared to age-matched peers. Although genes coding for Apolipoprotein E (APOE), a lipid-binding brain protein, have been linked to impaired cognition and brain size in healthy older adults, less is known about APOE's role in cognitive performance and brain health in BD. Brain age gap estimation (brainAGE) is a novel way of indexing brain health by subtracting one's chronological age from one's age as predicted by brain characteristics. Little is known about how this measure relates to cognition and APOE in BD. We hypothesized that participants with an APOE e4 allele and those with older brainAGE would show worse EF compared to those without e4 and those with younger brainAGE, particularly in the BD group. Stable, euthymic outpatients with BD (n = 36) and healthy comparison (HC; n = 71) individuals received structural MRI scans, EF testing (D-KEFS Color-word interference and Trail Making Test), and had their blood drawn. Blood samples were assayed for APOE genotype (rs429358/rs7412) by the Taqman allele specific assay method. BrainAGE was calculated based on an algorithm involving Freesurfer cortical and subcortical regional size measures developed on a large, healthy sample. With general linear models, we examined predictors of EF (composite of letter-number and color-word inhibition completion time scaled scores): main effects of group, APOE allele, groupXAPOE interaction (model 1) and group, brainAGE, and groupXbrainAGE (model 2), while controlling for age and gender. Model 1: there was a significant interaction between

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APOE and group (F(1,101) = 4.31, p = .04), such that in the BD group, APOE e4 carriers performed non-significantly worse compared to non-carriers on EF, whereas little difference was seen in the HC group. Model 2: there was a significant main effect of group on EF (F(1,94) = 5.76), p = .02). No other effects were significant. Our findings point to a possible differential role of APOE e4 allele on EF in BD compared to HC, which must be further explored.

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275 10:45 am KK

Moderate Ethanol and n-3 Diet Interactions on Lipid Profile and Liver Function in Mice

Luciano Voutour, Psychology (M).

Several studies have found a non-linear relationship between alcohol consumption and cardiovascular disease (CVD) risk, suggesting that low or moderate consumption of alcohol may provide cardioprotective effects, while excessive alcohol consumption increases the risk of CVD. Studies also suggest that increased dietary consumption of n-3 fatty acids may reduce CVD risk. The purpose of this study is to examine the effects of moderate ethanol consumption as a function of dietary n-6:n-3 fatty acid composition on markers associated with cardiovascular disease and liver dysfunction in mice. Twenty-three mice (12 male, 11 female) consumed an 18% ethanol solution or 26.9% maltose dextrin solution (non-ethanol isocaloric control) for 12 weeks. In each group, half of the mice were fed either a high n-6 (n-6:n-3 = 50:1) diet or a balanced n-3 (n-6:n-3 = 1:1) diet ad libitum. There were no differences in initial body weight between the two groups; however, the control group gained significantly more weight than the ethanol group (P = 0.020) associated with higher maltose dextrin fluid intake (P < 0.001). In the control group, the balanced n-3 diet resulted in significantly lower aspartate aminotransferase (AST) levels (P = 0.010) compared to the n-6 diet. In the ethanol group, the balanced n-3 diet resulted in lower levels of serum triglycerides (P = 0.086), total cholesterol (P= 0.096), and low-density lipoprotein (LDL) levels (P = 0.053) that were approaching significance. These findings indicate that a diet with a balanced n-6 to n-3 ratio may improve several lipid profile markers associated with CVD in mice who concurrently consume moderate amounts of alcohol.

Funded by NIH ASession A-23291

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276 10:45 am LL

The Stroop effect reveals deficits of cognitive control in individuals with AUD

Rebecca Carvalho, Psychology (M)

Cognitive control is the ability to rapidly regulate behaviors to adapt to changing contextual demands in a flexible manner. It relies on the capacity to suppress undesired behaviors while making appropriate decisions under the conditions that induce response conflict. It has been established that Alcohol Use Disorder (AUD) is associated with executive impairments whereby individuals with AUD exhibit deficient self-control which results in compulsive drinking. Even though our current knowledge on gender differences in cognitive control is rudimentary and inconsistent, extant evidence suggests that women with AUD show greater deficit than men expressed as vulnerability to accelerated progression of AUD.

This collaborative study aimed to investigate differences in cognitive control in a large group of abstinent individuals with a history of AUD (men=34,women=29) who were demographically matched with healthy control participants (CONT, men=32, women=29). Cognitive control is commonly probed with the Stroop color-word interference task which consists of color words displayed in different color fonts that match (CONG), or are incongruous with the word meaning (INCONG). In this task variant, participants are instructed to press a button corresponding to the font color if a word is written in color, or to respond to the meaning of the word if it is written in gray. Typically, INCONG stimuli evoke decreased accuracy and delayed response times compared to CONG, which is known as the Stroop effect. Participants were administered the Stroop task during a functional magnetic resonance imaging (fMRI) scan. Behavioral analysis confirmed that the task successfully elicited the Stroop effect in both groups (p<.01). Relative to control participants, individuals with AUD showed a greater Stroop effect in performance accuracy (p=.029), but response latency did not differ between the two groups. The Stroop effect correlated positively with alcohol intake (r= .21, p=.017) and duration of heavy drinking (r=.22, p= .013) indicating that a history of greater drinking severity is associated with lower cognitive inhibitionwhich may underlie inability to refrain from excessive drinking.No gender effects on performance measures were observed. Taken together, these results provide further evidence for the residual deficits of cognitive control associated with AUD.

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277 10:45 am MM

Altered Functional Connectivity During Cognitive Conflict in Men and Women with Alcohol Use Disorder

Sojung Youn, Psychology (M)

Alcohol use disorder (AUD) is marked by a compulsive desire to consume alcohol despite negative consequences. Executive functions are critical for implementing top-down control over behavior with the goal of optimizing decision outcomes. Executive impairments have been implicated in weakening the self-regulatory processes underlying excessive alcohol intake. Neuroimaging evidence shows that AUD is associated with attenuated activity in the brain regions subserving cognitive control. However, the evidence on the disruptions of the synchronous activity at the level of neurofunctional systems is lacking. Furthermore, research suggests that women may be more susceptible than men to the detrimental effects of alcohol but specific outcomes of long-term alcohol abuse as

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a function of sex remain poorly understood. This collaborative study was designed to examine the functional connectivity (FC) of networks activated during cognitive control in abstinent men and women with a history of AUD.

Functional magnetic resonance imaging (fMRI) scans were acquired from 120 participants comprising men (ALCM, n=31) and women (ALCFM, n=29) with a history of AUD, and demographically matched nonalcoholic control participants (CTLM, n=31; CTLFM, n=29). They performed a modified Stroop interference task that combines color naming and reading and engages cognitive control. Seed-to-voxel FC analysis focused on the task-elicited response conflict and was conducted with the CONN software with seeds placed in the regions critical for executive functions.

Relative to CTLs, the ALC group exhibited higher FC between the right inferior frontal cortex (rIFC) and visual and auditory sensory-related areas. ALC men exhibited stronger FC between the rIFC and the basal ganglia than CTLM, while ALC women showed greater connectivity between the rIFC and the temporal cortex than CTLFM . Additionally, the FC between the rIFC and the cingulate cortex was stronger in ALC women compared to ALC men. Taken together, the observed greater FC between the rIFC and other areas in abstinent individuals with a history of AUD suggests that network level changes persist after the cessation of regular intake and is indicative of compensatory engagement. The differing connectivity patterns of male and female ALC's indicate that biological sex mediates network alterations.

Session B-15

Poster Biological & Agricultural Sciences 3
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

278 10:45 am NN

Pathophysiology of Neurodegenerative Langerhans Cell Histiocytosis

Samantha Trescott, Biology/Cell and Molecular (U)

Langerhans Cell Histiocytosis (LCH) is a rare disorder characterized by an accumulation of abnormal histiocytes. It results in a broad range of clinical symptoms from single bone lesions to multisystem disease associated with high morbidity and mortality. Some patients develop a severe progressive treatment refractory neurodegenerative disease which is poorly understood. LCH is most often caused by a somatic B-Raf (BRAF) mutation in the MAPK/ERK pathway with the most common point mutation being V600E. Recent data in mice suggests that a BRAF(V600E) mutation in erythro-myeloid progenitors (EMP) leads to microglia with BRAF mosaicism which causes a progressive neurodegenerative disease similar to that seen in patients. Microglia, which are the primary innate immune effector cells of the central nervous system, play an integral role in maintaining normal homeostatic functioning in the brain. We postulate that LCH associated neurodegeneration is caused by the somatic BRAF mutation in EMPs leading to a subpopulation of microglia carrying the BRAF mutation. These microglia are abnormally activated. Through the use of patient-derived human-induced pluripotent stem cells (hiPSCs), an in vitro model can be generated to explore the hypothesis that the pathophysiology of neurodegeneration associated with LCH is in part due to microglial overactivation or dysregulation in the MAPK/ERK pathway. The hiPSC lines generated from patients with LCH with peripheral blood BRAF mosaicism will allow for the derivation of control cell lines and mutated BRAF(V600E) lines to provide an isogenic control from the same sample. These lines will be differentiated into microglia in vitro and used for a variety of assays involving immunofluorescence imaging, immunoblotting and phagocytic, cytokine, and cell migratory assays. We postulate that BRAF mutated microglia will be abnormally activated with increased markers of MAPK activation and cytokine release. By using the BRAF carrying microglia, we can observe how these cells and inflammatory activity contribute to neurodegenerative LCH. Further, this model will help to elucidate how the improper functionality of microglia can be applied to other neurodegenerative diseases such as Parkinson's and Alzheimer's Disease.

280 10:45 am PP

Knocking out genes downstream of Yamanka factors to elucidate necessity in dedifferentiation of hepatocytes

Jasmine Chavez, Cell and Molecular Biology (M)

Oct-4, Sox-2, Klf-4, and c-Myc are four genes that have been shown to control cellular pluripotency in combination. The four genes are known as Yamanaka's four factors (4F) and have been shown to induce pluripotent stem cell formation in differentiated cells such as fibroblasts. Previous studies by Ocampo et. al, have demonstrated that using a systemic Tet-On cassette for 4F in the aged Progeria mouse model allows for tissue rejuvenation and regeneration when doxycycline is used to transiently activate the expression of 4F. Our lab has also recently shown that transient expression of 4F in the liver leads to some dedifferentiation of hepatocytes. Although 4F are known to induce pluripotency and transient expression of 4F in vivo has lead to tissue dedifferentiation, the genes activated downstream of 4F are additional important targets for study. The specific role of all the downstream genes involved in the dedifferentiation of cells is important to understand the mechanism of action for dedifferentiation and identification of potential gene targets for rejuvenation. To test the necessity

of specific genes in the dedifferentiation process, we utilized clustered regularly interspaced palindromic repeats (CRISPR) to mediate knockouts of specific genes by building small guides targeting portions of the sequence of specific downstream genes such as Tet1, Tet2, Smarcc1, c-Jun, Esrrb, and more. The results will demonstrate by knocking out one gene at a time, which, if any, of the downstream genes alone may be necessary for 4F-induced dedifferentiation of cells.

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281 10:45 am QQ

Effect of LMX1A in the generation and differentiation of dopaminergic neurons from iPSCs

Willi Cheung, Cell and Molecular Biology (M)

The degeneration of dopaminergic neurons of the midbrain is one of the major hallmarks of Parkinson's disease (PD), the second most common neurodegenerative disease. iPSC-derived dopaminergic neurons have been generated to model PD. Prior studies have shown that a combination of the transcription factors Ascl1, Nurr1 (alone or together with Lmx1A) directly reprogrammed mouse fibroblasts to functional induced dopaminergic neurons. In our previous study, we detected expression of key dopaminergic neurons defining genes tyrosine hydroxylase (Th) and dopamine decarboxylase (Ddc) in induced neuronal cells generated with Ascl1 and Nurr1. However, dopamine transporter DAT could not be detected in any induced neuronal cell population. Thus, the study of transduction of Ascl1 and Nurr1 alone or in combination with Lmx1A is fundamental to understand whether Lmx1A is essential for neuronal maturation in the dopaminergic system.

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282 10:45 am RR

The effect of drugs that induce E2A activity on pancreatic cancer stemness

Denay Stevenson, Cell and Molecular Biology (M)

Pancreatic ductal adenocarcinoma (PDA) has a 5-year survival rate of only 9 percent, presenting the desperate need to better understand the molecular mechanisms involved in pancreatic cancer progression. Mutations in Kras, P53, P16, and SMAD are major drivers of PDA progression. Additionally, PDA is characterized by high levels of the stem cell driver MYC and dysregulation of the retinoblastoma (RB) tumor suppressor. Together, these aberrations promote tumorigenesis through uncontrolled proliferation and dedifferentiation. Previous research in our lab discovered that the bHLH transcription factor E2A gene is repressed in PDA progression and that restoration of E2A activity induced growth arrest through downregulation of MYC and upregulation of P21, which subsequently promoted RB activity. Simultaneously, this corresponded to a loss of stem cell-like characteristics and induced cellular differentiation. Thus, a screening platform to identify drugs that induce E2A activity was developed. The FDA-approved drugs Pitavastatin and Vorinostat were identified in the screen as inducers of E2A activity. Here, we are investigating the effectiveness of the two drugs, individually and in combination, to control tumorigenesis and the cancer stem cell population in PDA. We found in vitro that the drugs function in synergy to downregulate MYC expression and induce P21 expression, which restores RB activity, significantly depleting cell growth. Moreover, the drugs required E2A, or its homolog HEB for the activity. To determine whether the drug combination will halt PDA progression in vivo, we are conducting mouse xenograft studies. Tumor size will be measured and immunohistochemistry will be used to assess tumors for markers of cell cycle progression, stemness, and dedifferentiation. We expect that drugs promoting E2A activity in PDA will demonstrate an advantage in reducing the stem cell phenotype in PDA.

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283 10:45 am SS

RNA and protein composition of extracellular vesicles compared throughout different human tissues

Amber Morey, Cell and Molecular Biology (M)

Extracellular RNAs (exRNAs) have been found in all tested human biofluids, and there is increasing evidence that they can serve as mediators of intercellular communication, as well as diagnostic, prognostic, and theranostic biomarkers for a wide range of disease and physiological conditions. ExRNAs are associated with a variety of carriers subclasses (CSs), including extracellular vesicles (EVs), ribonucleoprotein complexes (RNPs), and lipoproteins (LPP), many of which are as-yet unknown or poorly characterized. This research will focus on development of reagents for identification and separation of known and suspected CSs using appropriate cell culture models and healthy human plasma and serum samples. This work will include screening of available antibodies against markers for known general CSs (e.g. tetraspanins, AGO proteins, apolipoproteins) and a variety of cell type-specific markers to identify antibodies that perform well for Western Blot and IMS, and dissemination of results for both successful and unsuccessful antibodies. If successful, this project will result in development of a rigorous workflow for separation of exRNA CSs that reproducibly and rapidly produces fractions that are highly enriched for desired CSs with minimal contamination by other CSs in a cost-effective manner on clinically feasible volumes of input material, and yields sufficient material for downstream molecular analysis.

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Session B-16

Poster Behavioral & Social Sciences 8
Friday, February 28, 2020, 10:45 am
Location: Montezuma Hall

284 10:45 am TT

Associations between Temperature Variables and Heat-Related Deaths in the Contiguous United States

Jessica Embury, Geography/Geographic Information Science (U)

Hyperthermia caused by exposure to high temperatures results in hundreds of deaths annually in the United States. Individual susceptibility to heat-related death or illness is determined by both environmental and socioeconomic factors. Community based interventions, such as the provision of air-conditioned spaces, can prevent heat-related deaths in at-risk populations. This study examined the relationship between heat-related deaths reported by county and two temperature variables: extreme maximum temperature and percentage of days above 90°F. Additionally, this study identified outlier counties as targets for future demographic analysis and assessment of need for heat-related social programming.

Data from 1999-2016 for the study area of the contiguous United States was collected from the Centers for Disease Control and Prevention (CDC) and the National Oceanic and Atmospheric Administration (NOAA). Temperature values at the county level were determined through the aggregation of data from stations within each county. The occurrence of heat-related death was expressed using crude death rates. Python scripting was used to automate the collection and preparation of data for both visual and statistical analysis. Data visualization was completed in ArcGIS Pro and R scripting was used to analyze variable relationships with both simple linear correlation and geographically weighted regression techniques.

The results of this study revealed that percentage of days above 90°F is more closely related to crude death rate than the extreme maximum temperature. This finding is supported by both the linear correlation and geographically weighted regression analyses. The study identified several possible outlier counties with unexpectedly high crude death rates, such as Onondaga County, NY and La Paz County, AZ. These findings provide guidance for further analysis of heat-related deaths and the eventual study of the effects of established social programs.

285 10:45 am UU

Vegetation regrowth in a post-wildfire riparian environment using field-based observations and citizen science

Madeline Hapgood, Geography (U)

Wildfires can bring new opportunities for vegetation, providing a nitrogen rich environment for plants. The fire severity can impact the physical and chemical structure of soil and water storage, which are key factors in vegetation regrowth. Opportunistic plant species, usually invasive or non-native species, may thrive after fire, taking nutrients and light needed by native plants. Invasive vegetation such as Arundo Donax are also highly flammable and can increase the fire fuel loads. Understanding vegetation processes and feedbacks after fire is essential for predicting and managing post-fire recovery. The goal of this project was to monitor and analyze the transformation of an urban riparian zone after it had been damaged by a fire. A riparian area is the land that is located near a river or stream and is important for maintaining a healthy waterway. Monitoring locations were selected along a transect in the burned riparian zone. Locations of ash and decaying vegetation were noted as key features that might influence regrowth. Frequent (biweekly) vegetation surveys provided an opportunity to note resprout patterns and canopy cover. Citizen science was also employed to augment field observations. The public was encouraged to help monitor the site by sending digital photos, contributing to a continuous database for monitoring changes in vegetation. Through frequent vegetation monitoring, observations of the types and patterns of vegetation that flourish after an event such as a fire can take place. While fires can significantly alter a community, education and outreach activities can help to bring the community together and increase our understanding of post-fire processes. The community may want to understand the beauty the fire can hold, is this site the future for native plant species to flourish in the wake of decaying flora?

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286 10:45 am VV

Detecting Risky Driving from Recorded Driving Data

Eduardo Cordova, Geographic Information Science (M)

Risky driving (RD) is a widespread complicated issue and has lead to many vehicular accidents and deaths over the years. We devised a method to detect and aid in studying this behavior, which required a multi-dimensional approach that accounts for the spatial-temporal and physical attributes of RD. This study utilized driving data from the Safety Pilot Model Deployment (SPMD) dataset for Ann Arbor, Michigan, consisting of approximately two billion driving records. The SPMD was collected over two months from 3000 volunteers. We developed and propose the Risky Driving Index (RDI) as a means of classifying the presence and severity of risky driving given a large volume of driving data. The index is designed to automatically and systematically detect RD, score the trajectory's severity, and isolate the flagged records. The RDI functions by examining a vehicle's speed, turning, lane changing, braking, and acceleration across vehicle trajectories; the more severe the action, and the more actions deemed to be severe, the higher the RDI score. These RDI-ranked trajectories condense several dimensions and billions of measurements into scores that can be analyzed for relationships between their geospatial and temporal components, as well as data not associated with the SPMD; road vector, and socio-demographic data. Using K-means cluster analysis with these RDI-ranked trajectories, we isolate road segments and associated attributes that contribute to risky driving with the goal of finding ways to reduce these factors.

287 10:45 am WW

Nongovernmental Organizations in Mexico: Impacts on Food Policy

Paola Diaz de Regules, Public Administration/ Latin American Studies (M)

The purpose of the preliminary research was to identify the role of nongovernmental organizations (NGOs) in Mexico's food policy. Research methods consisted of an analysis of food policies in Mexico since the 1960 and seven preliminary interviews to NGOs and government administrators in rural and urban Mexico. Through these interviews key themes, actors, and relevant changes in food policy were identified. The exploratory research resulted in increased understanding of the consequences of food policy across Mexico and knowledge about new legislation regarding food labeling. Benefits from this research are increased cooperation and inclusion of nongovernmental organizations, constituents, and the Mexican government when creating food policy.

288 10:45 am XX

Indigenous Social Movement in Nayarit

Samuel Orndorff, Geography (M)

The goal of this research is to better understand how Indigenous social movements have resisted displacement, environmental damage, and cultural destruction that would have been caused by the Las Cruces Hydroelectric Dam Mega-Project in Nayarit, Mexico. In order to shed led on this struggle against a top-down economic development project, I analyze the pan-Indigenous, international legal frameworks that underpin the resistance movement as well as the practices of Nayeri and mestizo Mexican activists. My theoretical framework is informed by decolonizing scholars who challenge the oppression of Native, Indigenous, and First Nations peoples. Marxian political economy, which I intersect with social movement theorizing, forges connections between the structural-historical injustices and the everyday realities of actors facing and challenging oppression. Through this investigation I hope to advance understandings of Indigenous resistance from within Indigenous framings and practices. In particular, I focus on how Indigenous people used the right to free prior informed consent (FPIC) legal framework, including the way this shaped participation and discourse. This research primarily involved conducting in-depth qualitative interviews, but also participant observation and museum archival research. I show how Indigenous practices/behaviors enabled resistance by focusing on the ways actors organized, mobilized, launched an injunction, and brought to bear the indefinite retirement of the hydropower plan. In producing a case study, I hope to provide a model that can be used to understand socio-ecological struggles elsewhere, particularly those involving Indigenous people and the commodification the environment. Ultimately, this research reveals that multiple modes of action have been taken to challenge oppression, and that the movement against the dam is one part of a larger struggle for sovereignty occurring in Nayarit and globally. I hypothesize that FPIC is radically reshaping the stance Indigenous peoples take to defend their territories from capitalist incursion.

SRS

Abstracts of Presentations

Session C

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Session C-1

Oral Humanities, History, Literature, Philosophy 3
Friday, February 28, 2020, 1:00 pm
Location: Pride Suite

289 1:00 pm

Creation of a Narrative: The Cultural Ostracization of Monastic Figures in Renaissance and Early Modern Europe

Christopher Balingit, History (U)

This study aims to fill a gap within the historiography of monastic institutions during the Italian Renaissance and Early Modern Period (Circa 1450-1700 CE) by demonstrating how the practice of forced monachization came to be normalized in Italian society. During this period, many elite Italian families used the monastic institution as a means of disposing of unwanted children, a phenomenon historians Jutta Sperling (2000) and Anne Jacobson Schutte (2011) among others have examined in depth. The cultural narrative that grew up around nuns and monks served to normalize elite families' widespread abuse of Italian monastic institutions. For this study I have closely examined seminal European literary sources from thinkers such as Desiderius Erasmus, Giovanni Boccaccio, Geoffrey Chaucer, and Alfonso de Valdes as well as artistic portrayals of monastic figures to demonstrate how a cultural narrative forms. I have used standard historical procedures in the analysis and interpretation of these sources drawing inspiration and guidance from the methods outlined in John Tosh's The Pursuit of History (2015). The sources examined provide ample evidence of a cultural narrative surrounding monks and nuns that portrays them as sexual deviants, untrustworthy, and hypocritical which served to ostracize them within the wider society. Monastic voices came to be silenced through cultural portrayals surrounding them. Through the examination and analysis of this narrative, a greater understanding of how cultural messaging normalizes mistreatment, discrimination, and sentiments of distrust becomes clear. This study demonstrates how cultural narratives form and the impact they can have on beliefs and practices of the wider society. This phenomenon exists to this day in political campaigns which make use of narratives as a shorthand or generalization of a problem even when they misrepresent the truth.

290 1:15 pm

History of El Asalto a las Tierras in the Mexicali Valley of Baja California Continued

Rigoberto Gerardo, Social Science/History (U)

Documents collected in Mexico's National Archives (AGN) help illustrate the depth of the commitment of President Lazaro Cardenas to the colonization and industrialization of Baja California Norte in the 1930's. This barren territory on the geographical fringes of Mexico had great strategic importance as its territory encompasses the Colorado River Delta. As the U.S. Bureau of Reclamation began building Hoover Dam and the All-American Canal to eliminate the region's sweeping flooding issues and, equally significant, to take unilateral control over this binational river's headwaters, President Cardenas understood that Mexico had to take a preemptive role in Mexicali's agricultural development and in maintaining Mexico's rights to Colorado River headwaters. My research helps understand the struggles endured by the marginalized poor peasants of the Mexicali Valley of Baja California Norte in their quest to fully develop an agriculture economy in the arid lands of the Mexicali Valley. It further shows how President Cardenas continued to personally support the agrarian movement in Baja California three years after "El Asalto a las Tierras," a pivotal event in 1937, when Mexican campesinos invaded and took control of the American-owned lands of the Colorado River Land Company (CRLC). These AGN documents display President Cardenas' personal outreach to different financial institutions to support agriculture projects in Baja California Norte and to feed this starving workforce struggling to turn these arid lands profitable. Research methods include curating and translating from Spanish to English primary documents and records recently found in the AGN. These documents give us a window into understanding the history and struggles of the campesinos of Baja California, as well as Mexico's efforts to fortify it's right to the vital resources of the Colorado River.

291 1:30 pm

Yesterday's Brew: Beer and Society in San Diego, 1860 - 1920

Alec Whitson, History (M)

In recent years, San Diego has become nationally renowned for its thriving "craft beer" scene, with around 150 different breweries spread across the county. Beer, however, has been a part of the lives of San Diegans since long before the craft boom. From the 1860's, when boosters and businessmen began to promote and develop the city, into the early 20th century, San Diego developed a taste for beer as it grew (and shrank) through cycles of boom and bust. During this time, the manufacture, sale, and consumption of beer was tied inextricably with the fortunes of the city, earning a uniquely valued and equally contested position in the minds and taste buds of the city's residents.

This paper serves to contribute to the small but growing body of historical works on beer and brewing in American history. To date, much of those works have tended to focus on the history of the brewing industry or, in other words, the stories of notable historical brewers, breweries and their economic contributions. Few, meanwhile, have addressed beer's value to the urban consumer, or how its consumption has been perceived during different historical periods.

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This paper explores these gaps in the context of a crucial era of San Diego history, from the beginning of the city's development under American governance to the onset of nationwide Prohibition in January 1920. Using local archival sources such as written manuscripts, print advertisements, organizational and business records, this paper will attempt to position beer as both a highly valued and uniquely contested product within the greater context of San Diego history. Furthermore, the study of beer's manufacture, sale and consumption will be positioned as a useful means of studying the lives of historical San Diegans of a variety of social, cultural or economic backgrounds.

292 1:45 pm

From the Campus to the Community: The Struggle for Gay and Lesbian Rights in 1970s San Diego

John Gove, History (M)

LGBTQ+ historical scholarship is a relatively recent field, and most of what has been written follows a common narrative arc: though early homophile gay rights groups such as the Daughters of Bilitis and the Mattachine Society formed and were active on the west coast as early as the 1950s, it was not until the June 1969 uprising at the Stonewall Inn, on Christopher Street in New York City, that the concept of gay liberation truly took shape. With the subsequent founding, again in New York, of the Gay Liberation Front (and soon thereafter the Gay Activists Alliance), the east coast is often seen as the place of genesis for contemporary gay rights activism—an "out" and unabashed social movement that would eventually spread around the world and come to be known almost universally as "Pride."

This paper adds to the growing body of scholarship that complicates the traditional historical narrative of gay liberation in the late 1960s and 1970s. An in-depth examination of primary source documents and oral histories reveals that gay rights activism in San Diego was focused on and inspired by local and regional issues, rather than national events. While gay rights activists in San Diego were undoubtedly allied with and supportive of groups on the east coast, it was their desire to serve and support the gay community in their own city that led to such local activism as the creation of the San Diego Gay Liberation Front at San Diego State, the founding of The Gay Center for Social Services, and the evolution of San Diego Pride.

This examination of campus and community gay rights activism in 1970s San Diego reveals not only the legal and cultural challenges that the movement faced, it also illustrates both the overt and subtle resistances that activists employed in overcoming these challenges. By connecting San Diego's early gay-rights struggle to later local movements, this paper adds to the historical record of social activism that is still in progress today.

293 2:00 pm

Exploring Approaches to Examining Government Managed Healthcare in Mexico City

Jorge Juarez, Communication (M)

The Médico en tu Casa/Salud en Tu Vida (i.e. Doctor in Your Home/Health in Your Life) health programs bring free at-home-health-care services to homes of high-risk population residents of Mexico City. These home visits consist of a multidisciplinary medical team that provides consultations, treatment, and medications at no cost for the uninsured who lack the ability to attend clinics on their own. In this preliminary research project, the engagement with key stake holders, and observations, suggest a high feasibility for a project highlighting voices of residents who have been indirectly affected by the services offered by the program in conjunction with a few people who work directly for it. This project will also significantly contribute to the health communication discourse by offering an analysis of local, often marginalized, perceptions of Médico en tu Casa/Salud en Tu Vida that are not included in program evaluations. This not only in hopes to highlight the importance of including these voices in evaluations, but in hopes to widen adoption of a similar approach on a global scale.

My two-month-long experience was informed through the observation of the processes, and procedures, of the decision-making amongst physicians and administration who implement the program. After long waits, back and forth with university and government staff, and consistent efforts to meet and learn more from key stake holders of this health program, I successfully established close relationships and contact with them. First I met Dr. Reza, a professor in the School of Medicine of the National Autonomous University of Mexico (UNAM) and the volunteer/training coordinator for medical students to work directly with this program. Second I met Dr. Leyva, the coordinator of the home-care medical brigades of all Mexico City's municipal clinics and expert of the program's goals. Third I met Dr. Gallardo, the State's Public Health Coordinator for Home Care who's worked closely with the program since its early launch.

In all, after observing, taking copious notes, gathering information, and making meaningful strong connections, I have the tools to successfully work on a research plan on how to best execute this thesis idea in the near future.

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

Session C-2

Oral Interdisciplinary 7
Friday, February 28, 2020, 1:00 pm
Location: Park Boulevard

294 1:00 pm

Using Transmission Electron Microscopy to investigate the effect of pulsed 450 nm blue light on methicillin-resistant Staphylococcus aureus

Chynna Bowman, Biology (U)

In pioneering experiments, we demonstrated that blue 405 nm and 470 nm wavelengths can eradicate two strains of the notoriously deadly methicillin-resistant Staphylococcus aureus (MRSA), Community associated (CA-MRSA) and Hospital associated (HA-MRSA). In ongoing experiments, we utilize pulsed 450 nm blue light, which was shown to be superior to continuous wave, to inactivate USA-300, a CA-MRSA found predominantly in the United States. A common mechanism of blue light bacterial suppression has implicated the absorption of blue light by photoacceptor molecules including porphyrins, NADH and flavins, which then triggers the production of reactive oxygen species that eventually kills bacteria and other microbes. Our team has shown that blue light disrupts the membrane potential and changes the DNA signature of MRSA, which would lead us to believe that there also, could be some architectural damage. This study therefore investigates, such structural changes by using TEM. Briefly, MRSA planktonic cultures were irradiated with 3 mW/cm2 irradiance and 2.5 J/cm2 radiant exposure three times at 15-minutes intervals and then incubated at 37°C for 24 hours. Irradiated colonies and control non-irradiated colonies were further processed using TEM. Our results indicate that blue light has the potential to cause architectural/structural damage to MRSA, with observed deterioration of the cellular membrane and disruption of cellular content and metabolism. This data provides valuable information towards the development of blue light technologies for MRSA suppression.

295 1:15 pm

Inhibition of RET via Pralsetinib in an in vitro Model of Neuroblastoma

Jessica Gutierrez, Biology (U)

Neuroblastoma is the most common extracranial solid tumor of childhood. Despite aggressive treatment, outcomes in patients with high-risk disease remains poor and new therapeutics are needed to address their needs. Rearranged during Transfection (RET) is a tyrosine kinase that is a known oncogenic driver of multiple human tumors. RET is expressed on neural crest derived cells, including neuroblastoma cells, and has been shown to play a role in neuroblastoma proliferation and survival as well. Recent studies have shown RET inhibition to be a promising new therapeutic target in neuroblastoma. Pralsetinib (BLU-667) is a selective RET inhibitor with a higher potency and selectivity for RET than the current multikinase inhibitors that have been previously tested. We hypothesize that this increased potency and selectivity will result in greater efficacy against neuroblastoma in preclinical models with fewer off target effects. Thus, to investigate this we evaluated pralsetinib at different concentrations against a panel of established human neuroblastoma cell lines to assess its effects on neuroblastoma cell proliferation, differentiation, and viability. We found that inhibition of RET resulted in a significant decrease in cell proliferation and viability in vitro. Further, given the increased selectivity of pralsetinib to RET, we hope to use western blot protein analysis to establish the specific downstream pathways through which RET inhibition leads to decreased neuroblastoma cell survival, potentially revealing further therapeutic targets.

This research was supported by NCI of NIH: U54CA132384 & U54CA132379. The content is the responsibility of the authors and does not represent the official views of the National Institutes of Health.

296 1:30 pm

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

Jeffrey Jones, Biology (U)

Rationale: Cardiac development is characterized during the embryonic and neonatal stages by hyperplastic or proliferative growth of both atrial (ACMs) and ventricular cardiomyocytes (VCMs). While VCMs comprise the overwhelming majority of the cardiac mass in the adult heart and provide the contractile force for pulmonary and systemic circulation, they are uniquely unfit for such a crucial role due to their limited regenerative capacity in adulthood. Instead, VCMs respond to pathological insults such as a myocardial infarction, by cellular hypertrophy or growing in size. Coordinately, VCMs exhibit a genetic reprogramming event in adulthood, namely by downregulating the expression of High Mobility Group Box 1 (Hmgb1). However, while it is known that many of the same genes that are downregulated in the adult VCMs remain expressed in the adult ACMs, neither the proliferative capacity of, nor the expression levels of HMGB1 in adult ACMs are known.

Objective / Methods: We postulate that ACMs have a greater proliferative capacity than VCMs, and that proliferation is coordinate with Hmgb1 expression. ACMs and VCMs will be isolated and cultured from neonatal and adult mice. Subsequently, proliferation will be monitored over time via cell counting and expression of Hmgb1 and cell cycling markers will be determined via qRT-PCR, ICF and immunoblotting.

Results: In culture, neonatal VCMs displayed a blunted proliferation rate compared to ACMs. This rate of proliferation was further decreased in VCMs transfected with siHmgb1. siHmgb1 transfected ACMs exhibited decreased expression of the proliferative marker, Ki-67. Hmgb1 transcript levels were maintained at high levels in ACMs from tissue extracts across development (murine ages postnatal days 1, 7, 14, 21, 10-weeks, and 52-weeks), while expression was lost in VCMs by 10-weeks of age.

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Conclusions / Future Direction: Our results demonstrate a correlation between Hmgb1 expression and cardiomyocyte proliferation. Future experiments involve the culture of ACMs in order to measure the rate of proliferation, as well as knocking down Hmgb1 using siRNA in order to measure rates of proliferation in ACMs and VCMs.

297 1:45 pm

Human iPSC-derived senescent microglia as a screening platform for Alzheimer's disease therapeutics

Carolina Cano Macip, Cellular and Molecular Biology (U)

Research on the biology of aging strives to understand the causes of increased disease vulnerability with age. Senescent cells are abnormal cells that accumulate with age. They promote inflammation as part of their senescence-associated secretory phenotype (SASP). We have shown that inflammation associated with SASP depends on a mitochondria-to-nucleus retrograde signaling pathway. Senescence of glial cells in the brain has been associated with inflammation in Alzheimer's Disease (AD). However, the mechanism and cell type(s) involved are incompletely understood. Here we show progress on models of microglial senescence, including assays for markers of senescence and inflammation using human induced pluripotent stem cell (iPSC) approaches in vitro and animal models in vivo. We are developing these cell lines as a novel model to screen for drugs that block senescence-associated inflammation in microglia, including drugs which are already clinically available. This work can identify novel therapeutic targets for treatment of AD and novel mechanisms of senescence that underlie age-associated disease.

298 2:00 pm

Discovering Bacteriophages in the Human Gut

Melissa Giluso, Bioinformatics/Medical Informatics (M)

Viruses make up the most abundant biological entities in the biosphere. Classified within this group are bacteriophages, viral particles that infect bacteria. Bacteriophages existing in the human gut have gone largely undetected due to high levels of variability and limited knowledge of their specific bacterial hosts. Using metagenomic sampling techniques and computational tools for downstream analysis, it is now possible for DNA sequences to be isolated and identified as a novel phage strain. This was proven in the 2014 discovery of crAssphage, a highly abundant bacteriophage present in the gut of about half of all people. Since then, the amount of publicly available sequencing data has grown exponentially, and there are now over 4,000 human fecal metagenomes needing to be scanned for potential phage sequences. Using some of the current leading bioinformatics tools, we have developed a pipeline for this type of analysis that begins by extracting DNA sequencing data from NCBI's Sequence Read Archive (SRA) and produces a collection of DNA sequences that likely belong to the same genome. Through comparison of these collections of sequences to a phage gene database, novel phage genomes can be identified and eventually reconstructed for further research. These methods are promising for identification of biological entities within the human body, which can improve overall knowledge of human health.

299 2:15 pm

The Efficacy of VAX014 in the B16F10 Mouse Model: A Novel Oncolytic Immunotherapy for Melanoma

Katherine Reil, Cell and Molecular Biology (M)

The B16F10 mouse melanoma is a unique preclinical model resembling many human tumors that are highly aggressive, poorly immunogenic, and have high metastatic potential. Therefore, this model is clinically relevant and ideal for testing potential immunotherapies. Here, a clinical stage oncolytic immunotherapy developed by Vaxiion Therapeutics, called VAX014, is being tested as a locally administered therapy for B16F10. This therapy is a novel E. coli derivative, known as recombinant bacterial minicells (rBMCs), that target and deliver therapeutic molecules directly to tumor cells. VAX014 rBMCs incorporate invasin, a rBMC surface protein that targets integrins expressed on tumor cells, and perfringolysin O, an oncolytic bacterial toxin that facilitates tumor cell membrane lysis and death.

In vitro studies demonstrate rapid VAX014-mediated oncolysis of B16F10, which set the stage for in vivo anti-tumor efficacy studies against intradermal B16F10 in immune-competent mice. All mice treated intra-tumorally 1x/week with VAX014 responded either completely (58%, n=22, $p<0.0001$) or partially (42%, n=16, $p<0.0001$) with an overall enhanced survival compared to placebo ($p<0.0001$). When survivors were re-challenged with B16F10 on the opposite flank, >60% (n=32, $p<0.0001$) had reduced tumor growth, suggesting generation of anti-tumor adaptive immunity in response to therapy. Depletion of CD8+ cells prior to treatment resulted in a total loss of VAX014 efficacy (n=11, $p<0.0001$), suggesting cytotoxic T cells play a critical role in VAX014-mediated tumor clearance. Flow cytometry was then utilized to identify potential differences in immune cell populations within the tumor microenvironment (TM) between complete (responding tumors) and partial responders (rebounding tumors) vs. placebo-treated controls. Consistent with depletion study results, responding tumors had a significant increase in immune cells, particularly CD8+ cells, compared to rebounding tumors ($p<0.05$). Immunohistochemistry is now being used to determine the location of CD8+ cells within the TM while VAX014 complete responders are being evaluated for long-term anti-tumor durability.

To date, VAX014 stimulates CD8+ T cell mediated anti-tumor immunity in this poorly immunogenic model of melanoma, inducing complete tumor regression in the majority of mice. These data encourage future studies on the investigation of VAX014 as a locally delivered immunotherapy for melanoma patients.

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Session C-3

Oral Behavioral & Social Sciences 9
Friday, February 28, 2020, 1:00 pm
Location: Tehuanco

300 1:00 pm

"I wish I had more time, I felt a little rushed": Miscommunication Inhibiting Success in Students' Academic Plan

Nicole Deis, Health Communication (U)

San Diego State University (SDSU) undergraduate students' number one goal while attending college is to graduate on track within four years with the rest of their classmates. In order for students to achieve such success, most students will reach out to an academic advisor on campus to map out their four years at SDSU. It is vital for students to have a positive communication style while interacting with an academic advisor. Previous scholars have studied the communication style between students and advisors and have found conclusions that lead us to our studies. Which style of communication inhibits students from seeing an advisor and feeling secure with their academic path? A major factor that influences productive communication and planning is the students coming in prepared with questions. Another factor is the student's willingness to communicate with front desk staff. Students being prepared and building an open line of communication will result in a positive communication outcome between the student and the academic office as a whole. Overall, it will result in the student graduating within four years.

301 1:15 pm

National Identity in Israel and its Relation to Inequality and Conflict

Brenden Hawk, Environmental Engineering (U)

This qualitative research investigates the social inequalities present in Israeli society that contribute to the Israeli/Palestinian conflict through the lens of national identity. This paper begins by probing the historical origins and formation of national identities and emphasizes the use of pre-existing religious symbolism. These findings are then analyzed within the context of Israeli history to determine the role of national identity in the formation of the Israeli state and its present-day form. The link between national identity and current inequalities between Israeli social groups is explored specifically through the lens of contrasting political, social and health outcomes for members of the ethnic and religious Arab minority. The relation of these social inequalities to conflict and conflict resolution is dissected to shed more light on potential causes and aggravators to conflict in the region; potential solutions to the regional conflict or areas requiring further study are also discussed. The diverse ethnic demographics of Israel are presented within this paper, as well as the disaggregation of views held by Israeli Jews regarding national identity.

This paper was supported by a wide body of research ranging from published research from the last several years, primary historical sources, reports from non-profits within Israel and reporting from reputable news sources.

In conclusion, I found that the lack of an inclusive national identity and the existence of an exclusionary national identity in Israel contributes to horizontal inequalities and ethnoreligious conflict in the Israel/Palestine region. The issue of national identity in Israel has served to suppress political and social participation by various social groups but most notably Arab Israelis, and the Israeli national identity has created deep horizontal inequality between members of social groups.

302 1:30 pm

Organizational communication: Jersey Mike's Subs

Asia Smith, Philosophy (U)

This study explored relationship formation and satisfaction within Jersey Mike's Subs, an East coast developed sandwich shop that encompasses hundreds of locations nationwide. The phenomenon of subjective work policies has been hypothesized to positively influence work relationships, satisfaction, and retention that form close friendships and romantic relationships within Jersey Mike's Subs. To legitimize these communication outcomes between workers, the work policies, duality of structure, and daily benefits were analyzed as well. I have turned to organizational internal and external factors forming these results using the concept of "meaningful work" (Chesney et al [2008]). 15 hours a week for one month has been dedicated to analyzing and conducting organizational research on 14 employees from diverse backgrounds within the Otay Ranch, CA location. My method is focused on qualitative research: field notes and interviews. Three interviews were conducted on different employee positions, gender, and backgrounds. Using Anderson & Martin's (1995) interpersonal needs gratification theory as a lens through worker communication, this study examined forced communication, the duality of structure, and independency shape job satisfaction resulting in meaningful relationships. Work relationships are positively influenced by freedom, "forced" communication, the duality of structure, and the "blank slate" [tabula rasa] equality-phenomenon that our uniforms entail, forming retention and satisfaction.

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303 1:45 pm

Recognizing, Respecting, and Reaffirming Indigenous Lands: Exploring San Diego State University's Newly Established Land Acknowledge Statement

Lane Yazzie, Interdisciplinary Studies (U)

Native Americans make up less than one percent of the population at San Diego State University. Some Native students consider themselves "statistically insignificant" and some often feel invisible on campus; narratives like this are common amongst Indigenous students at SDSU. When we reflect historically on why Native Americans feel these sentiments, we have to first understand colonization. Spanish missionaries ferociously tried to colonize and decimate the California Indian populations, especially through the extensive federally funded acts of genocide and violence forced onto all Indigenous peoples.

Through collective efforts among Indigenous community members and allies at SDSU, the newly established Kumeyaay land acknowledgment statement was formally adopted on September 3rd, 2019. This was passed through a University Senate resolution, written by Michael Connolly Miskwish (Kumeyaay), which would institutionalize and introduce a short and long land acknowledgement template for marketing materials and campus events, i.e. freshmen orientation and graduation. This land acknowledgement statement also serves in hopefully reconciling the relationship between SDSU and the Indigenous communities on-and-off campus.

The purpose of a land acknowledgement is a formal statement that recognizes and respects Indigenous peoples as traditional stewards of a given geographic area and the enduring relationship that exists between Indigenous Peoples and their ancestral territories.

With this research, I would like to examine and highlight the array of reactions and feelings towards SDSU's newly established land acknowledgement statement. The methods I will use to analyze this project are individual and focus group interviews with the Indigenous communities of SDSU (faculty, staff, students, alumni, and community members).

I hope to understand how this land acknowledgment statement impacts its Indigenous population. As well as answering questions like: What role do land acknowledgment statement's play with Indigenous student success and engagement? Why are land acknowledgment statements important? What does reconciliation with Indigenous people look like? A brief literature review can showcase the lack of discourse around this topic, so documenting the effects of this land acknowledgement has important implications for establishing future land acknowledgements and other reconciliation efforts at other institutions across the continent.

304 2:00 pm

Women Facing Homelessness and Vulnerability: An Assessment at a Large Public Library in San Diego

Janny Li, Social Work (M)

Background: San Diego, ranked as having the fourth most homeless residents in the U.S., is facing a homelessness crisis. Women in particular are preyed upon in major urban areas, facing multiple vulnerabilities: mental health, violence, and sexual exploitation. Methods: In-depth interviews and four focus groups were conducted with 49 cisgender males (n= 25) and females (n= 24) experiencing homelessness at a large public library in San Diego, California. Participants also completed brief surveys in this mixed methods study. Data was coded and analyzed using a thematic analytical approach. Results: Homeless women had fewer access to shelters, including a lack of: locations serving the north county, women-only accommodations, available overnight dormitories, and satisfactory livable conditions within the shelters. Nearly 70% of the women in our study were mothers fighting for custody of their children or traveling with children. More than half of the women struggled with depression, approximately half described hopelessness, and nearly all felt despair from isolation and loneliness. More than half of the women in the study witnessed or experienced violence against women, including verbal harassment and cases of sexual exploitation. Conclusion: Without safe lodging and social support, women facing homelessness are extremely vulnerable to unwanted contact, perpetration, and sexual assault. An absence of adequate shelters throughout the county and a lack of supportive mental health services leave women susceptible to greater safety risks compared to men.

305 2:15 pm

Framing Coast Guard Press Releases: Examining the PR Practitioner - Journalist Relationship and Multimedia Applications

Robert Simpson, Mass Communications (M)

Coast Guard public relations practitioners and journalists rely on established and mutually beneficial relationship with each other. They each have assertive goals: public relations practitioners seek to have their organizational messages published, and journalists seek out information and story leads for publication. Coast Guard communicators must understand media routines and the influences that impact a reporter's daily life. Previous published research has shown that timeliness is the most important key element that impacts media routines, and Coast Guard communicators must meet that demand to remain news relevant. Converging media markets also demand more photos, video and audio in stories, which give readers an immersive experience.

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

Guided by the Hierarchy of Influences, this study will employ a multi-method approach with in-depth interviews of journalists, and a content analysis of press releases and news items. This is designed to examine current Coast Guard public affairs practitioner and journalist relationships, as well as multimedia placement in news publication. This study aims to address current Coast Guard policy and common practices within their public affairs program. By understanding how reporter relationships relates to resulting media coverage, Coast Guard public relations practitioners can then increase timely, and targeted, multimedia press releases that may increase news publication potential.

Session C-4

Oral Engineering & Computer Sciences 6
Friday, February 28, 2020, 1:00 pm
Location: Aztlan

306 1:00 pm

Los Penasquitos Black Mountain

Raghad Hashim, Civil Engineering (U)

Los Penasquitos 'Black Mountain' storm drain assessment and maintenance Los Penasquitos trapezoidal channel is located near a popular trail and parking lot in northeastern side of San Diego. The channel is earthen and has experienced significant vegetation growth and sediment accumulation, which has impacted its flood conveyance ability. However, its maintenance is neglected due to budget limitations. Having the blockage in the channel affects the channel flow and functionality. According to our site visits, we identified three major areas were affected the most as shown in our presentation. Since its majorly a residential area with a minor open space, we assessed a high runoff coefficient. By using the Manning's equation along with the data from site visits, we determined the flow rate with 2 to 100-year return period, and if the channel will overflow. The blockage in the trapezoidal channel varies from 28% up to 35% blockage as shown in our presentation. Lastly, we proposed some sustainability-base measures to control the flooding and performed cost estimates.

307 1:15 pm

Design, Microfabrication, and Characterization of Bismuth and Glassy Carbon Based Sensor for Heavy-Metal in Drinking Water

Ryan Butler, Bioengineering (M)

In the past several decades, the US has experienced a rising concern over toxic pollution from heavy metal sources. For example, the pollution based natural disaster of Flint, Michigan garnered an abundance of media attention for its devastating impact on the lives of those in the local community. Although this negative press was rightly deserved, there are many places in America with much higher recorded heavy metal poisoning rates – three thousand to be exact. A big concern of much of this pollution comes in the form of water toxicity. Often, heavy metals find their way into water supplies for local communities which results in the indirect poisoning of citizens. Therefore, there is great need for a commercially available and portable device which would provide an easy method to test the level of poisonous elements in community water supplies.

Herein, the creation of a novel microfluidic device for the measurement of trace heavy metal ions is described. The work presented within focuses on these ions due to their health hazards and low concentration limits lending to an interesting challenge in detection.

The first effort in this project revolved around determining the form factor of a MEMS device which would act as an environmental sensor for minute concentrations of lead. Much background research into similar devices was performed before starting to conceptualize the preliminary design. Taking the equipment of the San Diego State University Clean Room facility into consideration, a rough model was presented and refined over several weeks. A final design then followed with a basic 3D model and fabrication process presented.

After much time testing and redesigning, results were generated for the measurements of trace heavy metal ions in solutions of water. Additional results were then obtained by altering various parameters within the experiment such as the analyte concentration. They were then compared to other experimental and commercial devices to determine the efficacy and practicality of the device. Finally, a study was performed to determine future work and technological extensions of the tool presented within.

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308 1:30 pm

Rainwater Harvesting in Southern California

Cheyenne Graves, Water Resources Engineering (M)

Southern California is a semi arid region prone to drought and water shortages, this region and arid regions are in need of new technology to provide sustainable water sources to the area. Rain water harvesting (RWH) has proven to be a sustainable infrastructure for supplying water and managing stormwater, but has yet to be adopted for arid and semi arid regions.

In these regions many property owners are under the false impression that there is not enough water to make RWH a feasible implementation to the infrastructure of the region. Urban planners have also not yet adopted plans for implementing RWH into urban areas due to a lack of RWH research in arid to semi arid regions.

Despite the impression that there is not enough water, San Diego County has been listed by FEMA as having one of the highest frequencies of flooding in the country. San Diego County receives a large amount of water during the wet season, the temporal distribution of the supply though is at the opposite side of the year when the water is most needed. Implementing RWH also includes flood control ability, during the wet season a massive amount of urban pollutants are discharged into local water bodies negatively impacting them.

Additional research is needed to explore the sustainability benefits of RWH in these discussed climates. Stored water cannot be static for months waiting for the dry season, therefore innovative designs will allow for captured rainwater to be used long after the rainfall has occurred. One technique may be capturing rainwater and then diverting it to water treatment reservoirs. This would bring valuable water supply benefits to face drought challenges. This study will analyze different RWH scenarios to discover the most environmentally sustainable scheme of urban RWH in arid and semi arid regions, the life cycle assessment (LCA) method will be used to evaluate these scenarios. The scenarios to be analyzed include: No RWH, RWH for on site use (irrigation, toilet flushing, other uses that do not require treatment), RWH for off site use (conveying captured rainfall as a water supply to reservoirs).

309 1:45 pm

Urban Fire Effects on Hydrologic and Soil Mercury Processes in a San Diego Creek

Quinn Alkin, Civil Engineering/Environmental Engineering (M)

Urban areas in California have an increased risk of future fire disturbances that are likely to impact ecosystem services due to both climate variation and anthropogenic activity. Hydrologic characteristics such as infiltration and soil moisture content are important antecedent conditions for rainfall-runoff processes that can influence the transport and storage of heavy metals like mercury (Hg). Inorganic mercury can be converted into methylmercury (THg) in terrestrial environments, which can result in transportation to coastal waterways through runoff and erosion. This study investigates the complex interactions of post-fire rainfall-runoff processes and total mercury (THg) and MeHg transport in an urban stream ecosystem in San Diego, California. In June 2018, a 38-acre fire burned a portion of the riparian zone in Alvarado Creek near San Diego State University. Three transects (two unburned and one burned) were monitored monthly to investigate the differences in soil moisture and infiltration process for a year after the fire. Multiple soil samples across all three sites were obtained to represent pre- and post-fire conditions for THg and MeHg content. Both wet and dry weather soil moisture content and infiltration rates varied considerably by location along each transect and were influenced by factors such as soil type and proximity to the stream bed. The burned transect exhibited lower soil moisture and infiltration values than the unburned transects. THg concentrations ranged from 10.625 ng/g to 182.383 ng/g with a median of 54.115 ng/g, and MeHg concentrations ranged from .026 ng/g to 1.584 ng/g with a median of 0.268 ng/g. THg and MeHg concentrations increased across all three sites after the first post-fire storm, and the unburned samples had the largest increase at 44.34% for THg and 64.71% for MeHg. Hg stable isotope analysis indicates urban runoff as the dominant source at all transects, and a slight enrichment of photodegradation isotopes at the DC site. This research demonstrates the differences of hydrologic properties and terrestrial Hg contamination among burned and unburned transects in a disturbed semi-arid urban stream channel. The results from this study provide new insights into rainfall-runoff processes and the transport of contaminants after fire in urban areas.

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310 2:00 pm

Using Floating-Gate MOS as a Non-Volatile Analog Memory for Energy-Efficient Adaptive Thresholding in ECG Sensors

Cihan Gungor, Electrical and Computer Engineering (D)

We present a floating-gate metal-oxide-semiconductor (FGMOS) device in a 65 nm standard CMOS technology as a non-volatile analog memory element for energy-efficient adaptive thresholding in an electrocardiogram (ECG) sensor. We present the write and erase characteristics of the FGMOS obtained through measurements on fabricated pMOS-type FG elements. An adaptive thresholding circuitry that generates, stores, and dynamically updates a threshold value on a FGMOS element to identify the R-waves in an ECG recording is demonstrated. The proposed circuitry uses the outputs from a Pan-Tompkins-algorithm-based ECG processor that accentuates the R-waves of a 50 s ECG recording from the MIT-BIH arrhythmia database. Circuit simulations of the proposed adaptive thresholding circuitry and the measured characteristics of the analog memory element demonstrate the similarity between the adaptive thresholds from the proposed circuitry and the digital implementation of the original Pan-Tompkins algorithm. The proposed circuitry consumes 19 nW.

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311 2:15 pm

SVM-based Channel Estimation and Data Detection for Massive MIMO Systems with One-Bit ADCs

Van Ly Nguyen, Computational Science (D)

Massive Multiple-Input-Multiple-Output (MIMO) has been emerged as a key solution for improving the spectral efficiency of wireless communications systems. However, the use of tens to hundreds of antennas at the base station of massive MIMO systems poses a number of technical challenges such as system cost and power consumption. Recently, low-resolution Analog-to-Digital Converters (ADCs) have been considered as a practical solution to address these problems. Nevertheless, the severe nonlinearity of low-resolution ADCs causes significant distortions in the received signals and makes the channel estimation and data detection tasks much more challenging. In our study, we show how Support Vector Machine (SVM), a well-known supervisedlearning technique in machine learning, can be exploited to provide efficient and robust channel estimation and data detection in massive MIMO systems with one-bit ADCs. The performance of the proposed data detection method is very close to that of Maximum-Likelihood (ML) data detection with much lower complexity. Finally, we propose an SVM-based joint Channel Estimation and Data Detection (CE-DD) method, which makes use of both the to-be-decoded data vectors and the pilot data vectors to improve the estimation and detection accuracy. Numerical results confirms the efficiency in computation and robustness in performance by the proposed methods.

529 2:30 pm

Novel Terahertz Spectroscopy In-situ Dynamic Mechanical Loading for Polymer Characterization

Nha Uyen Huynh, Mechanical Engineering (D)

Terahertz (THz) spectroscopy has been gaining scientific and industrial attentions with an intermittent focus on polymers. For the latter, a keen effort has been directed towards measuring the intermolecular vibrational modes during the polymerization process through the measurements of the indices of refraction as well as transmission, reflection, and absorption. The propagation of THz pulses though the polymer continuum can yield intrinsic information about the mechanics and physics of these processes. However, the investigation of the mechanical properties using terahertz wave concurrent with dynamic mechanical loading has not been yet reported. Since most polymers are transparent to terahertz waves, it provides the unexploited capability to intimately characterize the spectroscopic response associated with the intermolecular motions resulting from time-varying mechanical loading such as variance in axiality, strain-rates, and duration. The goal of this research is to develop a novel experimental setup, where a polymer sample is loaded at different strain rates and different temperatures while being observed using terahertz time-domain spectroscopy. Specifically, ultrathin, standalone polyurea films are fabricated using spin coating and are then dynamically stretched or compressed to gain a fundamental insight into the mechanics of polymers during different loading scenario. To control the strain rate and degree of strain, the mechanical loading results from the application of an electric field in a configuration similar to the concept of dielectric elastomer actuators, which was motivated based on the hyper-viscoelastic properties of polyurea. The temperature of the sample is closely controlled using a cryostat, which is integrated with the terahertz time-domain spectroscopy (THz-TDS) and mechanical loading setups. Fundamentally, the reported property-map captures the different modalities of the mechanical and temperature loading the material system is subjected to. With a deeper mechanics insights, new material or material systems can launch advanced evolutions in monolithic or multi-layers polymer composites.

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Session C-5

Oral Interdisciplinary 8
Friday, February 28, 2020, 1:00 pm
Location: Metztli

312 1:00 pm

Portrayal of Migrants in the Media

Franklin Robles, Criminal Justice (U)

The purpose of this research project is to analyze the image of migrants portrayed by the media. Research will be conducted from a criminal justice perspective. The project seeks to answer the questions, how are migrants portrayed in the media, and are they portrayed fairly and without bias. Research will be conducted by gathering current news articles and analyzing its contents. Using content analysis, we are going to analyze similarities and differences by type of media (in the U.S. and national) as well as similarities and differences of that portrayal, based on gender and nationality of the migrant.

313 1:15 pm

Corruption at the US-Mexico Border: Qualitative Analysis of Official Documents

Eduardo Villa, Criminal justice (U)

Within the immigration branch of the U.S. Homeland Security the agency tasked with guarding the boarders is U.S. Customs and Border Protection (CBP). CBP comprises two large operational units, the Office of Field Operations (OFO) and United States Border Patrol (USBP). The first unit that a lot of people tend to have contact with are the officers in blue called CBP Customs officers. Customs officers are tasked with customs operations at port of entries. USBP agents are tasked with patrolling the border between official entry points and both units are tasked with protecting America's border. Disclosed cases and federal reports suggest widespread corruption in CBP. In the past 12 years 177 customs officers and border patrol agents were arrested, mainly for facilitating smuggling drugs and illegal immigrants.

This research is based on an inductive analysis of these exposed cases. Thank to investigative journalists who have obtained records through multiple Freedom of Information Act requests different types of documents, related to those arrests, are available. Each document offers important pieces of the story how border corruption actually happens. Supported by Qualitative Data Analysis software (MaxQDA) I am coding texts and identifying typical patterns and major themes across the cases.

In our investigative research we already found different patterns of corrupt activity in the two main units. The preliminary findings suggest customs officers and border patrol agents had somewhat different roles in border corruption. Customs officers, based on earlier arrangements with criminals, let the drug smugglers drive through the border while not properly checking the vehicle or without performing any inspection at all. While border patrol officers also engaged in similar activities they had specific roles by advising the smugglers which route they should take in order to avoid interdiction by USBP or provided information about the locations of sensors. In some occasions, border patrol agents even actively participated in corruption by helping load vehicles with drugs or smuggling the drugs in their own car. These two latter behaviors were not found among customs officers.

314 1:30 pm

Spending Habits Revealed Through Prosody

Tanya Ortiz, Communication (U)

We send messages to all the people around us through our movements and sounds. This study will be focused on vocalics and how a specific pitch voice leads to emotional spending in a candy store at a touristic place in San Diego during a weekend. The study analyzes the vocalic reactions of people towards entering a Mexican candy store and how their pitch affects the way they buy and how much they get. The study will be conducted at a candy store located in a tourist place in San Diego, California, through participant observation. Throughout the research, I have discovered a series of links between high pitch and the amount of money they paid along with the rate and loudness. After collecting this information, my understanding of how the pitch reflects the money spending tendencies of people at a candy store.

315 1:45 pm

Court Cases, Plagiarism, and the Ability to Decipher Music Examples

Andrew Michel, Music-Global Composition (M)

When a musician creates a new work, very often they will gain inspiration from the pre-existing works of others (Ardebili, 2015). This inspiration can take many forms, such as gaining knowledge from other musicians, or learning new skills from music scores. From the earliest days of radio, musicians have honed their skills by imitating recorded music (Green, 2002). This tradition continues to this day in all forms of popular music, such as hip-hop artists who sample previously recorded R&B records (Brown, Mitchell, Schuster, 2019), or jazz musicians who transcribe previously recorded solos (Goldsby, 2011). Inspiration has been essential to the development of popular music throughout the 20th and 21st centuries.

Along with inspiration may come litigation, and many musicians who find ideas from other artists also find themselves facing plagiarism accusations. As artists such as Robin Thicke and Pharrell Williams face copyright lawsuits, the definitions of inspiration and plagiarism become more indistinct (Leo, 2016). Juries comprised of average lay listeners make decisions in court cases, and musicologists are brought into the courtroom to serve as expert witnesses for both sides (Balganesh, 2016). These verdicts can implement creative ideas, finances, and future music compositions.

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

The purpose of this research is 1) to determine whether a person's level of musicianship (or lack thereof) affects how accurately they can discern two similar pieces of music, and 2) to determine whether the ability to recognize these differences has an effect on juries' points of view in court cases. Musicians and non-musicians were given twelve tracks of audio examples to familiarize themselves with through online files. Each track consisted of two similar, yet different pieces of music. Approximately one week was given to them to familiarize themselves with the tracks. Afterward, a test was given to the participants. The test consisted of twelve questions corresponding to the twelve tracks. Only one of the two examples was presented for each question. Participants were then asked to identify which of the two audio examples they were listening to.

316 2:00 pm

The Problem of Information Technology

Dustin Gray, Philosophy (M)

Modern technological devices have undoubtedly become more than a collection of trivial gizmos and gadgets we give and receive as Christmas or birthday presents. Remote control cars, toy robots, and iPods are seemingly no longer of interest. What we seem to desire more than anything are devices that stand to open up whole worlds of entertainment, interaction with others and most importantly, information. Information devices like smartphones, tablets, and laptop computers seem to be at the top of everyone's list. Though the device itself may be of interest, what is truly desirable is what it does.

Nearly every aspect of our lives is automated. Think of the way you navigate from place to place. The manner in which your utility bills are calculated and delivered. How you get your paycheck. The way you spend your money. The methods by which you purchase goods and services. The way you date. Your driving record, criminal background, credit score, and educational history. These and countless other facets of existence in an advanced technological society are absolutely grounded in and dependent upon machines, computers and the information superhighway that connects them all. There is an undeniable dependence upon information technology to live the way we do.

What I find most compelling about all of this is that we tend to think of information technology as being neutral. It is nothing more than a set of tools we use to assist us in our daily lives. It tells us how to get from one destination to the next. It provides new ways to communicate with others. It allows us to complete tasks more efficiently. But that which tells, provides, and allows also requires our interaction. It regulates the ways in which we complete tasks. It demands our constant care and interest. This exchange had between people and information technology occurs in much the same way as would between two persons. So I will argue that labeling modern technology as neutral is a mistake. The argument I will make is that it is most certainly autonomous and in so being, has the inherent ability to control.

Session C-6

Oral Behavioral & Social Sciences 10
Friday, February 28, 2020, 1:00 pm
Location: Templo Mayor

317 1:00 pm

How Student Workers at SDSU Manage their Professional Fronts when Lacking Audience Segregation

Alina Aguirre, Criminal Justice (U)

The research I am proposing for the SRS conference centers on microsociology, or the study of human interaction. In his book, "The Presentation of Self in Everyday Life," microsociologist Erving Goffman explores how people act in groups. He introduces the theory of expected presentations, which is when a person fills a certain role in a group because they are expected to, especially in professional settings (16). Playing to expected presentations often hinges on the ability of a person to only show certain aspects of their personality in order to maintain others' assumptions. Goffman also explains the idea of audience segregation, which is when the distinct groups a person interacts with will remain separate, and thus can act differently, or present different "fronts," for each group (31). However, what happens when people with expected fronts are not able to segregate their audiences?

I answered this question using participant observation to examine a social context where people would have a hard time segregating their audiences. I observed behavior at the Zura Hall dorm lobby of San Diego State University, where the front desk employs students to check the IDs of incoming residents and give general help. In this setting, I believe the student workers were unable to maintain the institutionalized service front usually expected of employees because they were among their peers as well as customers, and therefore lacked a clear separation of personal and professional audiences. I found that when faced with an unknown person they need to service, workers will transform into the expected neutral and pleasant helper, however with people they already know, the workers cannot stay in "service mode" and must relax in speech and body. Thus when professionals are unable to segregate their audience, they segregate their personality instead to match the group they are addressing at the time.

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318 1:15 pm

The Impact of Specific Dimensions of Gender Sexuality Alliance Participation on Academic Outcomes Among LGBTQ+ High School Students

Talia Kieu, Public Health (U)

Background and purpose: Gender Sexuality Alliances (GSAs) are in-school programs designed to provide a supportive space for LGBTQ+ youth and allies through three components: providing opportunities for socializing and support, advocacy efforts, and connections to LGBTQ+ resources. Previous studies have shown that GSA participation improves academic outcomes, such as grade point averages and truancy rates, for LGBTQ+ youth, though it is unclear what specific dimensions of a GSA are driving these improved academic outcomes. This study aims to understand if and how GSAs benefit students in two parts: 1) By observing differences in academic outcomes between LGBTQ+ students who are involved in GSAs and LGBTQ+ students who are not involved in GSAs 2) By understanding what unique components of the GSA (socializing and support, advocacy efforts, and education on LGBTQ+ resources) are responsible for differences in academic outcomes.

Methods: We analyzed data drawn from the 2016-2018 Massachusetts GSA Network Survey dataset, observing 580 students total across 38 high schools in Massachusetts. At each high school, data was collected from students participating in a GSA, as well as students from a classroom sample who were non-GSA participants. Of these 580 students from the GSA and classroom sample, 470 students self-identified as LGBTQ+ (Mage = 15.48; 71.7% White), with two-thirds of these students participating in a GSA. Academic outcomes were measured using self-reported grade point averages (GPA) and number of truancies in a month. The central functions GSAs (socializing and support, advocacy, and education) were measured by a 0-4 Likert scale (0= not at all to 4 = a lot).

Results: Preliminary univariate descriptive analysis results show that 18.9% of LGBTQ+ GSA participants report having all A's, while 14.1% of LGBTQ+ non-GSA participants report having all A's. We observed no discernible differences in truancy rates between LGBTQ+ GSA and non-GSA participants.

Conclusion: Future directions for this project include running regression analyses to better understand academic disparities and to identify the impact of individual GSA components on academic outcomes.

319 1:30 pm

The Associations between Sexual Assault, Sexual Exploitation and Greek Affiliation

Christian Cacho, Social Work (M)

Introduction: Across college campuses, there has been a rise in the prevalence of sexual assault and sexual violence strongly correlated with Greek organizational affiliation on campus. Within the last 7 years, there has been a 20% increase in sexual assault and reported rapes (Jackson, 2018). 1 in 5 women and 1 in 6 men will be assaulted while in college (Krebs, Lindquist, Warner, Fisher Martin, 2007). There are also reported differences based on the type of Greek affiliation (fraternity vs. sorority membership). Greek affiliation has shown an increase in sexual assault or violence among fraternity men and an increase in victimization in sorority women. In addition, masculine norms continue to encourage the belief that men are more highly respected for having sex with multiple women and can be especially dangerous when this culture is fostered among a fraternal group of men. This research fills a gap in knowledge about the prevalence of not only sexual assault, but sexual exploitation (e.g., human trafficking) that Greek-affiliated organizations may knowingly or unknowingly be engaging in. It is hypothesized that Greek affiliation vs. non-Greek affiliation will be associated with higher levels of sexual assault and exploitation.

Methods: The study is conducted on the San Diego State University's campus and received Institutional Review Board approval. Data are quantitative, with support from qualitative interviews. Quantitative data (n=100) are collected through an on-line survey to current SDSU students (over age 18). Qualitative data (n=15) are collected through in-depth personal interviews with SDSU students, community members and campus experts. At least 20 Greek affiliated students are targeted via recruitment flyers placed in strategic locations on campus and via snowball sampling as a basis of comparison with non-Greek affiliated students. Data analysis consists of logistic regression predicting a higher association between Greek affiliated vs. non-Greek affiliated students and sexual assault and sexual exploitation.

Results: Preliminary data from experts/survivors of human trafficking indicates an association between Greek affiliation and sexual exploitation. Conclusion: This research attempts to lay the foundation for informing targeted sexual assault prevention within Greek organizations on college campuses.

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320 1:45 pm

Parent-Therapist, Youth-Therapist, Parent-Youth & Parent-Youth-Therapist Agreement on Externalizing & Internalizing Treatment Goals Related to Treatment Engagement in Latinx Families

Devynne Diaz, Psychology (M)

Therapist-client cognitive consensus (agreement) on treatment goals has been identified as a key element of culturally-competent care. Research has supported this relationship in Asian American adult populations, but more research is needed in Latinx populations as well as with adolescent samples. In adolescent samples, youths, parents and therapists may be considered stakeholders in treatment. Multi-stakeholder agreement on the presence of externalizing problems has been higher than internalizing problems, suggesting the importance of researching certain problem types related to engagement in treatment. This longitudinal study included parent, youth, and therapist data on treatment goals and later therapist-assessed treatment engagement for a Latinx sample of 199 outpatient mental health service-using youth (aged 12–17 at Time 1 interview; 40% female). It was hypothesized that parent-therapist agreement, youth-therapist agreement, parent-youth agreement, and parent-youth-therapist agreement on both internalizing and externalizing problem treatment goals would be associated with better Time 2 engagement in treatment (approximately 2 months after Time 1). Contrary to hypotheses, neither parent-therapist agreement on internalizing and externalizing treatment goals, nor parent-youth-therapist agreement on internalizing and externalizing treatment goals were associated with better parent or youth engagement in treatment. Although youth-therapist agreement on externalizing treatment goals was not associated with better youth engagement, youth-therapist agreement on internalizing treatment goals significantly predicted better youth engagement at Time 2 (B = 4.06, p = 0.013). Parent-youth agreement on externalizing treatment and internalizing goals were not positively associated with engagement. Results convey the importance of youth-therapist agreement on internalizing treatment goals as it pertains to youth engagement in treatment. Due to the inner expression and less visible nature of internalizing problems, agreement on internalizing treatment goals may indicate the youth's higher level of trust in the therapeutic relationship, thus, leading to higher treatment engagement. Differences in findings between parent and youth engagement may be examined further by considering how treatment goal agreement by problem type may relate to different aspects of treatment engagement.

321 2:00 pm

Pathways to Student Leadership Within High School Gender Sexuality Alliances

Fitri Wijaya, Public Health (M)

Purpose: There are limited studies exploring leadership development within LGBTQ+ high school students. The purpose of this study is to explore the individual-level and contextual correlates of leadership development in high school Gender and Sexuality Alliance (GSA). Within GSAs, youth are given these opportunities to build their leadership capacities, developing autonomy and agency which in turn provide youth an active role in mitigating the negative impacts of oppressive systems and structures to improve their socio-emotional wellbeing. The results of this study will help inform future GSA program development and advisory training to increase leadership among members. Methods: The present study used the 2016-2018 Massachusetts GSA Network Survey dataset drawn from a two-wave (fall and spring) study of 580 high school students (M = 15.59 years, SD = 1.39 years) in 38 GSAs across Massachusetts (range of 4 to 34 students per GSA; M = 15 students, SD = 6.62). Surveys included questions on demographic factors and about GSA involvement, activities, and engagement. For preliminary analysis, univariate descriptive statistics were calculated. Results: Preliminary univariate descriptive analyses indicate that among 361 youth in 38 GSAs (range of 4 to 34 students per GSA; M= 15 students, SD= 6.62), 82 (22.7%) youth indicated that they held a GSA leadership position and 275 (76.1%) youth indicated that they did not. Among the 82 youth who did not hold a GSA leadership position, 37.7% indicated that they took on at least some leadership role in activities and events in their GSA within the past year. Multivariable models will examine how experiential, identity-based, and contextual factors are associated with holding a leadership position and level of overall leadership involvement. Conclusion: Based on the preliminary results, GSA participants take on leadership roles despite not having a formal leadership title (president, secretary, etc), meaning, GSAs provide a variety of leadership roles for students beyond traditional positions. Future directions after these preliminary analyses are to perform a bivariate analysis and multilevel logistic regression to analyze the association among experiential, identity-based, and contextual factors that impact leadership.

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322 2:15 pm

HIV Stigma in HIV-positive people in Rural Uganda: a psychometric evaluation of HIV Stigma Mechanisms Scale (HIV-SMS)

Alexandra Almeida, Interdisciplinar Research in Substance Use (D)

Background: In Uganda, it is estimated that, in 2018, only 84% of the people living with HIV (PLHIV) were aware of their status, from which 87% were in HIV treatment. From these, 88% achieved viral suppression.

In Uganda and worldwide, the literature regards HIV-stigma as a critical barrier to HIV testing and treatment. Scales to measure its impact on people have been used since 1988. Still, it was just in 2009 that a theoretical framework to encompass and distinguish infected and non-infected people was developed. The results also suggest different implications for health outcomes.

This study aims to evaluate the psychometric properties of the HIV-SMS in HIV+ in rural Uganda.

Methods : The PATH (Providing Access To HIV Care)/Ekkubo Study, a cluster-randomized controlled trial designed to compare the efficacy on enhanced linkage to HIV care intervention versus standard-of-care, is being performed from 2015 to November/2019. This study interviewed more than 31,000 people (HIV-positive and negative) from Rural Uganda asking about their demographics, health, and stigma due of their HIV-status (HIV-SMS questions).

The analyses of the psychometric properties of the HIV-SMS assessed: (i) face and content validity, (ii) reliability, (iii) construct validity (factor analysis and item response theory), (iv) convergent validity (CES-D10 scale), and (v) concurrent validity (HIV-related health outcomes).

Results: The sample comprises 760 participants self-declared as HIV+. Our findings pointed to a more specific Stigma Structure than the original model, where the Anticipated Stigma (AI) should decouple into two sub-constructs: AI-family members, and AI-Health workers. All sub-scales suggested by the 4-factor model have low correlation (p=0.3-0.4), reinforcing the independent nature of the mechanisms. The reliability of the (new) 4-factor model of HIV-Stigma amongst PLHIV was high (alpha=0.92-0.96). The correlations of each HIV-Stigma mechanism and depression (CES-D10) supported convergent validity (p=0.22-0.46). Unexpectedly, not all the hypothesized associations between the HIV-Stigma mechanisms and health outcomes were observed.

Conclusion: The HIV-SMS efficiently measured HIV-Stigma amongst PLHIV in Uganda. The face, content, and convergent validity, as well as the reliability, indicated a proper measurement of HIV-Stigma. The specific relationship between HIV-Stigma mechanisms and health outcomes is challenging to prove using self-declared information.

Session C-7

Oral Visual or Performing Arts 1

Friday, February 28, 2020, 1:00 pm

Location: Visionary Suite

323 1:00 pm

Zilphia Horton: Connecting Church Life, Labor Organizing, and the Civil Rights Movement through Music

Willow Lark, Music (U)

The 1930s and 1940s brought about a resurgence of left-wing musical protest songs, coinciding with the heightened labor union struggles of the Great Depression. The contributions of Zilphia Horton to the field of ethnomusicology in collecting and teaching folk songs has gone largely unacknowledged outside of regionally specific circles in the Appalachian region and southern United States. Rarely is Horton's ethnomusicological philosophy investigated and analyzed despite her work bearing the same potency as the Lomax brothers in collecting and archiving folk songs. Likewise few scholars have engaged with her work and archives from a uniquely musical perspective. Though an underrepresented figures in American musical and political life, Zilphia Horton, through her pedagogy and ethnomusicological work, had a critical role in the connection between church music, labor music, and political life. The lineage of songs connected to Horton, such as "We Shall Overcome" and "We Shall Not Be Moved," can be traced back to music and poetry of nineteenth century American church music, and through indexical layering took on new meaning as these songs became anthems of the labor movement, and later in the 1960s the anthems of the Civil Rights movement. In the case of these two songs, these indices change depending on political movements but also in different regional contexts. Through my analysis of the ways in which "We Shall Overcome" and "We Shall Not Be Moved" were performed throughout history, the lyrical modifications to these songs between different regional contexts and political movements, and tracing the songs' lineage and usage as anthems in both the labor and civil rights movements, I discuss the importance of church musical life and Christian thought in determining how protest songs were disseminated and sung among working and oppressed classes in the United States.

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324 1:15 pm

The Effect of Materials on the Western Concert Flute Tone

Anna Sharp, Flute Performance (M)

A student flute can be fairly inexpensive and range upwards of $1,000, while new professional flutes typically start at $2,000 and can go upwards of $80,000 (flutes4sale.com, 2019). James Galway, a globally renowned flutist, has a commissioned flute made by Nagahara that starts at $25,320 (Flute Center of New York, 2019). Jasmine Choi, another very highly accomplished player, is a Straubinger Flute Artist (Straubinger Maker of Flutes, 2019). These flutes starts at $10,995 (Flutistry, 2019). Emmanuel Pahud, an incredibly famous Swiss flutist, plays on a pinless all 14 carat Haynes gold flute that costs $28,000 for the lowest model (Pahud, 2019). When looking to buy a flute, the flutist has several options to choose from, such as silver, gold, platinum, and a mix of metals (Flute Center of New York, 2019). There are many options at very different price points dependent on the metal, craftsmanship, and brand (Flute Center of New York, 2019).

The purpose of this study is to determine if both flautists and non-flutists can distinguish between different types and qualities of flutes based on a recording of the F Major Scale by a graduate student in flute performance on three different flute headjoints. The survey was sent out to students studying music through the Student Services Coordinator and it was advertised on facebook and instagram. The results of this survey do not indicate that there is a far superior headjoint. The highest ranking headjoint was ranked first by six respondents out of the total 20 people who completed the survey. The second most commonly ranked as first headjoint was ranked first five times. Although the highest ranked headjoint was chosen as the first place six times, one of the headjoints was chosen as last place ten times. The results imply within this sample group that there is no strong preference of a flute headjoint.

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325 1:30 pm

Parallels in the lives Rachmaninoff and Tchaikovsky through their mental illness and symphonies The Bells and Pathetique

Nick Newman, Choral Conducting (M)

Pyotr Illych Tchaikovsky and Sergei Rachmaninoff are two pillars in the history of Russian composers. According to League of American Orchestras, Tchaikovsky and Rachmaninoff ranked 3rd and 10th respectively in most performed composers in The United States for the 2010-2011 season. Though they were born 33 years apart, there are multifarious examples that link the two composers throughout their life. Rachmaninoff and Tchaikovsky shared a mutual admiration, even with Tchaikovsky taking his own life while Rachmaninoff was still only 20 years old. Both composers had made their presence to the musical world known at a young age. While their music has profoundly impacted generations, their lives were both filled with troubles outside of their music. The purpose of this research is to examine the parallels between Sergei Rachmaninoff and Pyotr Tchaikovsky through their works The Bells and Symphony no. 6 (commonly referred to as his Pathetique Symphony) as it relates to their lifelong battles with mental illness. This research will focus on the final movement of The Bells (a work that Rachmaninoff composed at a desk once used by Tchaikovsky himself) and Tchaikovsky's Pathetique concerning their disregard for the normal symphonic structure, and what that compositional technique might reveal about their inner struggles. Aside from score analysis, this research looks into the personal lives of each composer, specifically their longtime struggles with mental illness. The study shows that they both had long and short termed influences that led to their lifelong depression.

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326 1:45 pm

Memorizing Piano Music for Performance: A Qualitative Analysis of the Most Effective Techniques

Nancy Coto, Piano Performance (M)

Since the latter part of the nineteenth century, pianists have memorized their pieces in preparation for performance and then performed without their scores. Clara Schumann and Franz Liszt shocked audiences by performing entire piano recitals without their music in front of them. The precedent was set and from the mid-nineteenth century to present day, modern performance practice dictates that music should be memorized (Mishra, 2010). This qualitative study focused on investigating the most effective strategies for memorizing music in preparation for performance. Two professional pianists were interviewed to ascertain the following information: their approach to memorizing music and if this approach varied depending on the genre or period of music; the plan each pianist had in place in case of a memory slip; the differences in playing with the score versus playing from memory; the necessity to memorize the score in collaborative playing in a chamber music setting; and, the ways in which their experience in memorization has influenced the way they teach their students. The results showed that both pianists interviewed preferred to use an analytical approach by in-depth study of the score to secure their memory for performance and as part of their plan in case of a memory slip during performance. Furthermore, they maintained that this theoretical approach is an effective strategy that they teach to their own piano students. These findings can be used in support of favoring intellectual memory through score analysis as an important component in music memory retrieval in piano performance.

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327 2:00 pm

Building the Pipeline: A Proposed Curriculum for a Graduate Certificate in Musical Theatre Education and Direction

Devon Hunt, Musical Theatre (M)

We are living in a new golden age of Broadway. Musical theatre, always a uniquely American art form, has continued to grow in popularity since the early 1990s and the arrival of Disney in Times Square. Broadway shows like Hamilton and Dear Evan Hansen and television productions like Hairspray Live and Jesus Christ Superstar Live in Concert have served to heighten the visibility of musical theatre in popular culture. This increased popularity has naturally driven an increase of interest among students in studying musical theatre at the postsecondary level, both among those who intend to pursue careers in the performing arts and those interested in other fields but seeking a more diverse education. However, as college programs enjoy the benefits of the increased visibility and interest in musical theatre, secondary schools continue to struggle against the ever-looming specter of budget cuts and reallocations away from arts programs. In addition, few secondary teachers have specialized musical theatre training beyond a BA or BFA in musical theatre, if that. While many graduate degree programs exist and a number are tailored towards training artist-educators, there is a lack of musical theatre education available at the graduate certificate level. Print and electronic resources available through the SDSU library were researched to determine the skills necessary for the successful secondary musical theatre educator. Comparative analysis was performed using various graduate degree programs at the MFA, MM, and MA level with respect to credit load, program focus, and curriculum. Graduate certificate programs community music and theatre education were examined to provide context of the scope and credit range of programs at that level. Ultimately, a curriculum is proposed for a graduate certificate in musical theatre direction and education, specifically designed to fulfill the California requirement of at least 10 graduate semester hours to obtain a teaching credential in theatre.

Session C-8

Oral Engineering & Computer Sciences 7

Friday, February 28, 2020, 1:00 pm

Location: Legacy Suite

328 1:00 pm

Investigating Stress-Induced Domain Switching in Piezoelectric Materials

Steven Malley, Mechanical Engineering (U)

The performance of piezoelectric materials hinges on the alignment of internal domains resulting in non-zero net polarization. This class of materials is prevalent in actuation applications with nanoscale precision and in sensors in relating mechanical and electric energies. Moreover, and due to the intrinsic coupling between electrical and mechanical response, piezoelectric materials are also used in energy harvesting. However, the application of mechanical stress induces domain switching mechanisms, leading to suboptimal performance, and in some cases complete loss of polarization (termed depoling). Once the material is depoled, it has no electromechanical coupling; hence deemed unusable. The purpose of this experiment is to investigate the mechanisms and stress-threshold leading to domain switching in absence and presence of electric field. Off-the-shelf lead zirconate titanate (PZT) circular disks will be used for this study, where they are usually preferentially polarized in the out of plane direction. Before mechanical or electrical loading, the domains will be observed and mapped using Electron Backscatter Detection (EBSD) on a Scanning Electron Microscope (SEM). The pre-loading domain map will include the average grain size and polarization direction for each of the observed domains. The PZT disks will then be subjected to concurrent electromechanical loading at different levels of electric field and different levels of uniaxial compressive stresses. Thereafter, a post-loading map will be created using the same approach as before. It is expected that the concurrent application of electric field and mechanical stress will degrade the piezoelectric behavior within certain limits.

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329 1:15 pm

Electron and Hole Mobility in Graphene and Glassy Carbon-Based Transistors

Trevor Hunt, Bioengineering (M)

Transistors have many uses for electrical systems including acting as a gate switch and enhancing signals. However most transistors are not compatible with biological systems due to the metallic materials they are made up of. For these instances, organic transistors made with carbon based materials are used. For my research I have been working on a similar carbon based FET (field effect transistor) using Glassy Carbon (GC) and Graphene (GR). With these two materials I hope to fabricate a transistor that will be compatible in biological systems as well as have high thermal and electrical properties as compared to conventional FET transistors. This type of transistor could be used to enhance electrochemical signals in vivo to act as a highly sensitive biosensor.

To test the properties of these combined materials, the electron mobility and resistivity was experimentally determined using the Hall Effect method along with Hall Bar type devices. Three devices were tested for the electron mobility; one fabricated with Graphene on top of Glassy Carbon and the other two were made with just a single layer of Glassy Carbon or Graphene respectively as experimental controls.

The transistors are characterized by determining the Transconductance, this is an electrical characteristic of transistors relating an output current with a given source voltage through the device. In order to determine the Transconductance of the transistor devices, numerous designs will be fabricated to test different sizes and design types. This will also be done with different material types (GR/GC, GC, and GR) similar to the mobility testing to have comparable results.

Preliminary results from the Hall Experiments showed that the Graphene had the highest mobility and Glassy Carbon the lowest. The combination device (GR/GC) had a measured mobility between the two controls. These results show that the stacked material (GR/GC) has properties that lie between the two, which is typical of compound materials.

330 1:30 pm

Fracture Behavior of Concentric Multiferroic Composite Cylinders

Ryan Stampfli, Mechanical Engineering (M)

In the area of voltage-controlled magnetism, strain-mediated multiferroic composites have been an area of recently increased research interest due to their measurable response at room temperature, contrasting with their intrinsic magnetoelectric counterparts. Magnetoelectric composites carry the prospects of further device miniaturization, energy efficiency, and low power consumption, which in contrast to traditional electromagnetic devices. In the latter, magnetism is constrained by electric current posing a fundamental barrier to device miniaturization, as the electric resistance is inversely proportional to the cross-sectional area; hence diminished strength of induced magnetic fields with higher power consumption. On the other hand, multiphase magnetoelectric composites exhibit coupling coefficients an order of magnitude larger than their single-phase counterparts by way of strain mediation between magnetic and electric energies. Concentric ring structures are of a particular interest for multiferroic composites as they exhibit greater magnetoelectric couplings compared to similarly sized stacked laminated structures as the cylindrical shape gives rise to inherit anisotropies of the geometry and the materials. To achieve their maximum magnetoelectric coupling potential, these structures are typically operated at or near their resonant frequencies. In this study, a multiferroic composite cylinder consisting of lead zirconate titanate (PZT) piezoelectric ceramic concentrically bonded to Terfenol-D magnetostrictive alloy was investigated. An interface crack was introduced and allowed to propagate and degrade the strain mediation between the piezoelectric and magnetostrictive phases. The composite structure was subjected to an A/C electric field (200 Vpp) at near-resonant frequency (32.5 kHz) concurrently applied with a magnetic field corresponding to magnetic saturation (500 Oe), and the composite tested to failure. The crack propagation behavior is reported along with its effect on the overall magnetoelectric performance of multiferroic composite ring structures.

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331 1:45 pm

Deformation nanomechanics and dislocation quantification at the atomic scale in nanocrystalline pure-metal magnesium

Md. Shahrier Hasan, Engineering Science/Mechanical and Aerospace (D)

Classical molecular dynamics (MD) simulation method is employed to study the uniaxial tensile deformation of nanocrystalline magnesium (Mg) of varying grain size levels. The mean grain size of the sample is varied from 6 nm to 45 nm, with each sample containing more than 43 million atoms in the modeling system. The deformation nanomechanics reveals two distinct deformation mechanisms. For larger grain size samples, conventional dislocation dominated deformation is observed while, in smaller grain-sized samples, grain boundary-based mechanisms such as grain boundary sliding, grain boundary rotation are observed. The grain hardening to softening occurs at around 10 nm, making it the strongest grain. Dislocation density quantification shows that the dislocation density in the sample drastically reduces with decreasing grain size. Elastic modulus of nanocrystalline Mg remains comparable to that of the coarse-grained bulk polycrystalline above 20 nm and shows a rapid reduction below that grain size. The present work reveals the nanomechanics of nanocrystalline Mg, facilitating the design and development of Mg-based nanostructured alloys with superior mechanical properties.

332 2:00 pm

Electrical-mechanical-magnetic properties of Terfenol-D particulate embedded in PVDF-TrFE matrix composites

Scott Newacheck, Mechanical Engineering (D)

The interest of multiferroic magnetoelectric composites has been proliferating due to their growing domain of potential applications. To meet the needs of future applications, such as soft robotics or wearable devices, researchers have investigated the magnetoelectric coupling in complaint multiferroic composites, typically consisting of transition-metal magnetic particles embedded in an electroactive polymer matrix. The magnetoelectric coupling of all of the complaint composites investigated thus far have vastly underperformed in comparison to their mechanically-hard counterparts, which is attributed to the low magnetic properties, such as magnetostriction, used in the magnetic-phase of the composite. However, it has been analytically hypothesized that replacing the transition-metal particles with 'giant' magnetostrictive materials, such as Terfenol-D, can yield giant magnetoelectric coupling on par with mechanically-hard multiferroic composites. This standing hypothesis has been realized due to the scientific challenges with fabricating the composite relating to the large size of the Terfenol-D particles resulting in electrical breakdown and percolation of the polymer matrix. This presentation will discuss one method to synthesize these Terfenol-D/PVDF-TrFE composites, which were shown to become polarized by direct contact electrodes. The experimental protocol and results are then discussed to elucidate the ferroelectric and ferromagnetic properties of this novel composite. First, magnetic force microscopy indicates that the Terfenol-D magnetic particles retained its magnetic properties and are well dispersed. Second, the mechanical properties are investigated by a dynamic mechanical analyzer to understand the effect of the magnetic particles on the mechanical stiffness of the composite. Third, the magnetic properties are quantified using a Vibrating Sample Magnetometer (VSM) to characterize the magnetic properties of the composite including the emanating magnetic flux (B) and the piezomagnetic properties. Finally, the magnetoelectric coupling is reported. In all, this presentation will briefly discuss the synthesis of these magnetoelectric composites and then shift focus onto the magnetic characterization, such as the magnetization, piezomagnetic, and magnetoelectric properties.

333 2:15 pm

Preliminary Characterization of Glassy carbon and Graphene based Metamaterial

Surabhi Nimbalkar, Bioengineering (D)

Graphene is the gold-standard for electrical conductivity along with its high mechanical strength and excellent thermal conductivity. On the other hand, GC has exceptional chemical inertness, good electrical properties, high electrochemically stability (gold-standard for electrochemistry), purely capacitive charge injection, and fast surface electrokinetics coupled with lithography patternability. Therefore, to leverage the unique strength of these 'gold-standard' materials in electrode technology, we introduce a new material system that brings the best qualities of these materials in a single format joined through strong covalent bonds. In this preliminary study, we investigate fabrication methodology, transfer on flexible substrate, bonding between the two allotropes of carbon through FTIR (Fourier transform Infrared) spectroscopy, surface morphology through SEM (Scanning electron microscopy) and topography by AFM (atomic force microscopy), and application of metamaterial based microelectrodes for neural signal recording i.e. electrocorticography (ECoG).

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Session C-9

Poster Behavioral & Social Sciences 11
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

335 12:30 pm A

Comparing trust in sources of cancer health information between Hispanics and Non-Hispanic Whites in the San Diego County

Harvey Vu, Nursing (U)

Purpose: Receipt and processing of health information by individuals from different racial/ethnic groups is influenced by the degree of trust they have in the source. The purpose of this study was to assess levels of trust in receiving cancer health information and assess differences in these levels between Hispanics and Non-Hispanic Whites (NHW) in San Diego County, a large US-Mexico border county.

Methods: We mailed Spanish and English surveys to a random sample of 4,000 households and an additional 1,000 households in ZIP codes along the US-Mexico border in San Diego County. Surveys included a variety of questions aimed at assessing cancer-related knowledge, attitudes, and behaviors, along with sociodemographic constructs. Among the cancer-related questions were a series of items asking about the level of trust in receiving cancer information from different sources.

Results: Of the 720 surveys returned, 151 (21%) respondents identified as Hispanics and 446 (61.9%) identified as NHW. Differences in responses between Hispanics and NHWs were assessed using chi-square tests. Significantly more NHW reported trusting their doctors “a lot” (75.7%) compared to Hispanic (62%; p=.001). Hispanics were more likely than NHW to report “a lot” of trust in insurance companies (6.6% vs 1.6%; p=0.002) and in pharmaceutical companies (6.5% vs 2.8%; p=.041). Although not significant, a higher proportion of Hispanics responded that they trusted religious organizations and leaders “a lot” (4.4% in Hispanics vs 1.6% in NHW; p=.058). There were no significant differences between Hispanics and NHWs in reporting trust in charitable organizations, family or friends, government agencies, or health organizations.

Conclusion: Differences in trust were shown between Hispanics and NHWs. These feelings of trust by Hispanics and NHW should be taken into account when communicating health information to these populations. Fostering trust between these populations and their health information sources is critical to reducing health disparities in cancer screening, diagnosis, treatment, and survivorship.

336 12:30 pm B

What Matters During EOL Care Planning? - From the Perspective of Rural Latino Cancer Patients

Evan Acosta, Public Health (U)

Background/Purpose: Advance care planning (ACP) involves making end-of-life (EOL) decisions by communicating one’s EOL treatment wishes with loved ones and physicians and documenting them in an Advance Directive (AD) for patients who face chronic-to-fatal diagnoses such as cancer. Study aims to explore the perspectives of EOL care planning among the rural Latino population suffering from cancer diagnoses since little is known how this population views current ACP practices in order to identify what elements of the process is important to them.

Design/Sampling Method: Study conducted through a qualitative approach. Thirty cancer patients participating in AD intervention program from a rural non-profit cancer organization in Imperial County, CA were invited for in-depth interviews about their experience and opinions about ACP. Interviews were conducted by a trained staff member of rural cancer-community facility. Interviewer used semi-structured interview guide to explore cancer patients’ perspectives and experiences with ACP during sessions. All interviews were audio-recorded, transcribed, translated from Spanish to English. Final transcripts analyzed using thematic analysis method to generate data.

Results: 80% of subjects (n=24) were female. Average age of subjects was 59.8 years old. More than half (n=16) were diagnosed with breast cancer. 20% of participants completed or almost completed an AD. Majority of subjects reported having EOL discussion with their physicians and/or with loved ones. Qualitative themes most concerning or desired by subjects include: funeral planning, being a burden to loved ones, being free of physical and psychological pain during EOL, and the wish for loved ones to accept their death and move on.

Conclusion/Implication: Majority of participants shared a desire to reduce the burden and impact of their EOL care and deaths on loved ones. Participants also expressed a preference toward care that focuses on making patients more comfortable over prolonging life. Current ACP practices inadequately address these desires and wishes. Current ACP practices can be improved by making processes more family inclusive and a part of standard care where physicians discuss EOL options with patients. These changes may potentially encourage more rural Latino cancer patients to actively participate in ACP process thereby improving the quality of their EOL.

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337 12:30 pm C

Investigating the influence "powerful others" have on colorectal cancer screening among Latinxs

Miriam Maldonado, Public Health (U)

Background:Data show lower rates of colorectal cancer(CRC) screening among Latinxs compared to other ethnic/racial groups. Lack of education as well as cultural beliefs and myths have been associated with low CRC screening in Latinxs.The goal of this study was to investigate the influence that "powerful others" (e.g., will of God, luck/chance, and health professionals) have on CRC screening among Latinxs who have not been screened for CRC.

Methods:Participants were recruited in waiting rooms from a federally qualified health center (FQHC) near the Mexico-US border. Individual interviews (n=9 men; n=11 women) were conducted in Spanish with participants age 50+ years who had not had CRC or completed CRC screening (colonoscopy) in the past. Interviews were audio-recorded, transcribed, and coded by research staff in Spanish. Data were analyzed using a rapid qualitative approach guided by an adapted Health Belief Model (HBM) including individual perceptions, modifying factors, and likelihood of action. The "powerful others" construct (i.e., belief that other individuals or external factors determine one's health) was analyzed closely. Transcripts were coded independently, reconciled by two members, and a matrix was created to consolidate quotes that fit into the adapted HBM.

Results:Mean age of participants was 63.35 (SD=9.30) years, and 70% achieved elementary school or less education. A primary theme influencing CRC screening was fatalism (e.g., believing events are predetermined). Participants placed a significant responsibility on "powerful others" when determining their health status. Key quotes from participants included "God wants that for us," "I will die sooner if I know I have cancer, " and "doctors go above and beyond when you have money, but not when you're poor." These quotes provide us with insights on culture and beliefs of participants.

Conclusion:The construct of "powerful others" can influence likelihood of CRC screening among Latinxs. Understanding how such beliefs impact decision-making around CRC and the amount of responsibility individuals are willing to place on "powerful others" in determining their health can inform the development of prevention programs. Educational workshops targeting common misconceptions about CRC would help address low CRC screening rates evident in Latinxs.

This research was supported by NCI: U54CA132384, U54CA132379

338 12:30 pm D

Identifying Chemicals of Emerging Concern in San Francisco Bay Sediment Using a Non-targeted Approach

MaryAnn Zakaria, Public Health/ Environmental Health (M)

Sediment is a major Bay matrix which can serve as a sink for contamination through both natural and anthropogenic processes. Further, sediment can harbor both polar and non-polar contaminants that can be transferred to the food web through benthic organisms. Chemicals of emerging concern (CECs), which are also known as contaminants of emerging concern, are chemicals that have the ability to negatively affect humans and aquatic life. There are a variety of pathways for these chemicals to end up in the bay, including wastewater treatment, urban and industrial runoff, and illicit dumping. This research focuses on San Francisco Bay (SF Bay) and emerging contaminants. Seven margin and three ambient samples in the upper South Bay were collected. In the lower South Bay, three ambient, five lower margin, and three southern slough margin samples were collected. Sediment samples were prepared using QuEChERS method and analyzed by comprehensive two-dimensional gas chromatography coupled to time-of-flight mass spectrometry (GCxGC/TOF-MS). In this study, a chemical was determined to be a true contaminant by the following criterion; the compound was found in at least fifty percent of the sample and not detected in the blank samples. Compounds identified by these criteria, were then analyzed by their mass spectra for a true fail. Targeted chemical sampling of ambient Bay sediment has been performed for quite some time in SF Bay. However, only recently has margin site analysis (near the shoreline) begun. Since many of the methods to identify contaminants have been through a targeted approach, where contaminants are known, using a non-targeted approach to identify those chemicals in the sediment would help identify unknown chemicals to the Bay. The tremendous volume of new chemicals and their byproducts pose many challenges to monitoring and managing CEC's. The goal of this study is to determine if sediment in the margin areas will contain unique emerging contaminants that are not found among ambient sediment in San Francisco Bay, and to identify and prioritize contaminants of emerging concern in SF Bay.

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339 12:30 pm E

An Examination of Parental Services Efficacy in Child Mental Health Treatment

Ruth Nunez, Child Development /Mental health (M)

This study aims to examine the associations between parental services efficacy to participate in mental health treatment for their child with disruptive behavior problems and both their actual participation and their child's treatment outcomes. Parental services efficacy refers to how confident a parent is in their ability to effectively promote their child's success in treatment. Parents' engagement in their child's treatment is also considered an important part of treatment effectiveness. Many studies have examined the impact of parental service efficacy in children's medical treatment but not on mental health treatment outcomes. More studies are needed to understand the potential role of parental services efficacy in child mental health treatment. There were 19 therapists and 18 parent-child dyads that participated in the study from five publicly funded community mental health clinics. Participants were from a pilot intervention study that examined the use of a parent participation toolkit. Parents reported on their services efficacy at baseline and follow-up. The engagement outcomes included therapist report of attendance and parent engagement at follow-up as well as an observational measure of parents' engagement behaviors in sessions. Children's treatment outcomes were examined at baseline and follow-up, including parents' reported perceptions of treatment effectiveness and frequency of disruptive behaviors. Regression models were used to control for study condition and ethnicity. Results indicated that parent services efficacy is not positively associated with engagement or treatment outcomes. One effect size was small but close to meaningful with an effect size of (f^2=0.027). For most predictors effect size was almost nonexistent, which indicated a low likelihood of associations. Given the pilot nature of this study, future research may still be warranted to understand the potential role of parent services efficacy in parents' treatment engagement and children's treatment outcomes.

340 12:30 pm F

Colorectal Cancer Trends and Screening Modalities Among Californians in 2018

Marisa Torres-Ruiz, Public Health, Health Behavior (D)

Background: Although colorectal cancer (CRC) is a preventable disease it is the fourth most common type of cancer in the U.S. In 2017, over 48,000 adults died from CRC due to lack of screening or late-stage diagnoses. The U.S. Preventive Services Task Force (USPSTF) recommends stool-based (e.g. guaiac-based fecal occult blood tests (gFOBT)) or direct visualization (e.g. colonoscopy) screening for CRC in adults ages 50-75. Monitoring CRC screening trends can identify subpopulations in most need of strategies to promote CRC screening.

Aim: To examine trends of CRC screening and testing modalities of Californians ages 50-75 in 2018.

Methods: Cross-sectional data was evaluated from the 2018 Behavioral Risk Factor Surveillance System (BRFSS) on Californian adults between the ages of 50-75. BRFSS data were collected through telephone-based surveys on health-related behaviors, health conditions, and preventive services and is supported by the Centers for Disease Control and Prevention. The data examined (n=400,000) include prevalence of CRC screening rates and testing modalities for adults in the reporting year (2018) and past five and ten years.

Results: Overall, 71.6% (CI:69.6-73.5, n=3117) of BRFSS respondents met the USPSTF recommendations for screening and 22.1% (CI: 20.3-23.9, n=947) received a blood stool test in the past year. Latinos had the lowest completion rates of blood stool tests (18.1%, CI; 15.4-20.9, n=217) in comparison to all racial/ethnic groups. Further, 1.9% (CI: 1.2-2.6, n=60) of adults received a home gFOBT within the past three years. Nearly 62% (CI:59.4-63.6, n=2630) of adults received a colonoscopy in the past ten years and 4.5% (CI:3.3-5.6, n=112) received a sigmoidoscopy in the past five years. Latinos also had the lowest completion rates of colonoscopies (46.6%, CI:42.8-50.3, n=523) and sigmoidoscopies (3.2%, CI:1.7-4.6, n=27).

Conclusions: The FOBT was the most underutilized screening modality among respondents and Latinos were the lowest racial/ethnic group to receive a stool-based or visual test to screen for CRC. Future studies should examine the individual, social, organizational, and community level determinants that influence low CRC screening rates evident in Latinos. Culturally sensitive multilevel interventions targeting different levels of the social ecological framework should be considered to increase screening rates among this population.

Session C-10

Poster Behavioral & Social Sciences 12
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

341 12:30 pm G

Nicotine effects on activation in the Isula, Primary Taste Cortex

Jessica Hennies, Psychology (U)

Objective: Nicotine, an addictive substance, has been reported to negatively impact taste perception and increase taste thresholds. A study utilizing electrogustometry thresholds found that smokers exhibited significantly lower taste sensitivity relative to non-smokers; taste sensitivity decreased as nicotine dependence increased. Acute effects of smoking cessation studies show former smokers increase in taste sensitivity shortly following cessation. The potential of nicotine to alter taste sensitivity and taste perception may influence dietary

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choices, ultimately impacting overall health and adiposity levels. Here we investigated fMRI activations in nicotine users and nonusers while they rated the taste of a bitter taste (caffeine), a sweet taste (sucrose), and a sweet taste with bitter after taste (saccharin) during the physiological states of hunger and satiety.

Participants and Methods:

There were 24 participants (16 males; 8 females), with a mean age of 45 (21 to 72 yrs). Eight males served as controls and 8 males were nicotine users based on survey responses. We matched on age, gender, and BMI. Nicotine users were instructed to not use nicotine products within 2 hours of the fMRI session. FMRI data were collected using a 3T General Electric Signa Excite short-bore scanner. Subjects participated in two separate sessions to investigate brain responses of nicotine users and non users to the stimuli during two different physiological states: hunger and satiety.

Results: FMRI data were analyzed with Analysis of Functional Neuroimaging (AFNI) software. In the physiological state of hunger, smokers demonstrated significantly less functional activation in the insula, the primary taste cortex.

Conclusion: Differential activation in the insula cortex in nicotine users and controls may be useful in understanding mechanisms that contribute to changes in taste sensitivity measured psychophysically. This may have implications in ingestion for nicotine users and non users.

Supported by NIH grant # R01AG004085-26 and R01AG062006-01 to CM.

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342 12:30 pm H

Can Stress Change Sensory Perception?

Carly Flynn, Psychology (U)

Salty foods have been labeled as a type of “comfort food” due to a common problem of overeating as a way to decompress. Eating foods high in sodium chloride have been seen to activate the brain’s reward system, often times leading individuals to “snack” without actually being hungry. Prior research has studied the effects of stress on individuals’ sensory perceptions, specifically the link between stress and overeating. The association between the perception of sucrose pleasantness has been researched at in the past, showing that higher levels of stress lead to heightened sucrose pleasantness ratings. The current study, however, investigated the association between stress and overeating through a new perspective, focusing on sodium chloride rather than sucrose. The current study aimed to discover whether stress affects the perceptions of sodium chloride pleasantness in college students. It was hypothesized that participants under the stress condition will rate the pleasantness of sodium chloride higher than participants in the non-stress condition. It was also predicted that pleasantness ratings would remain constant for participants in the control group. Forty-seven young adult college students were participants in the study. To induce stress on the experimental group, the experimenter stepped outside of the testing room to take a fake phone call from the professor, insisting urgency to finish up testing in a timely manner. The fake phone call taken in the control group did not insist timing urgency. Participants levels of stress were measured quantitatively on the State Trait Anxiety Inventory Questionnaire. The results indicated a significant main effect of stress manipulation on the pre and post pleasantness ratings ($p < .05$). There was a trend toward an interaction though in this sample size it was not statistically significant. Further research, perhaps with a larger sample size, is warranted to advance the understanding of the connection between stress and perceptions of sodium chloride pleasantness.

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343 12:30 pm I

Effects of Anxiety on Neural Cognition through Attentional-Control Theory

Abigail Albertazzi, Psychology (U)

Objective: Anxiety disorders are the most common mental health disease in the United States; affecting 22.3% of individuals ages 18-29 (National Comorbidity Study Replication NCS-R, 2017). The attentional control theory (ACT) (Eysenck et al. 2007) states that anxiety impairs processing efficiency because it reduces attentional control. According to the ACT anxiety reduces the ability to efficiently switch between the top-down and bottom-up processes by increasing the influence of the stimulus driven attentional system, as well as impairs inhibition functions (Eysenck, 2007). The present study investigates how anxiety affects cognitive performance in college students.

Participants and Methods: 26 female college students (age range 18-21, Mage= 18.76) participated in the study. Participants were administered the State-Trait Anxiety Inventory (STAI) and split into low anxiety (MSTAI= 61.42) and high anxiety (MSTAI =86.93) groups. For the procedure, participants were given three cognitive tasks: Brief California Odor Learning Test (COLT), D-KEFS Color-Word Interference III (Stroop), and the Trail Making Test (TMT).

Results: A multivariate ANOVA showed anxiety had a significant effect on cognitive performance in the study [$F (1, 24) = 3.921$, $p = .022$]. When looking at the between-subjects analyses of the three cognitive tests, participants did not significantly differ on their performances for the Stroop or COLT; but there was a significant difference between low anxiety and high anxiety groups for the TMT-B [$F(1, 24) =9.242$, $p= .006$].

Conclusions: The results of the presented study suggest that students reporting high anxiety demonstrated significantly worse performance, compared to low-anxiety reported students, on tasks requiring inhibition and shifting between top-down and bottom-up processing. These findings are congruent with the proposed cognitive impairments of anxiety by the attentional control theory; in that, anxiety was seen to impair inhibition and shifting within the three cognitive tasks.

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344 12:30 pm J

Odor and Taste Thresholds: Is Anxiety a Factor?

Kayla Gorenstein, Psychology (U)

Stress is a worldwide phenomenon that affects different aspects of individuals' lives, and consistently affects the lives of college students. Previous research has shown how stress can lead to varying levels of response to perceived odors in hunger and satiety. Olfactory impairments have been found to reflect mild cognitive impairment and early onset of Alzheimer's, while altered taste perception has been linked to obesity. This study aimed to investigate the effects of stress and time urgency on the ability of a young adult population to detect odors and tastes using threshold tests. The current study predicted that individuals will show poorer odor and taste threshold when under time urgency conditions. It was further hypothesized that thresholds will remain constant in the control group. Participants were 47 young adult university students. Stress was operationally defined using the State Trait Anxiety Inventory. The time urgency manipulation involved the experimenter taking a phone call from the professor presumably running the study and communicating a sense of time urgency for completing the testing in the experimental group and no sense of time urgency in the control group. Odor threshold and taste threshold tests utilized forced choice psychophysical methods described in Murphy et al., 1990, Neurobiology of Aging. There was a significant difference between individuals' pre and post taste threshold level ($p < .05$) in the control group. Individuals with low trait anxiety tended to have greater improvements between their baseline threshold tests and induced stress threshold tests, and better thresholds in general, while individuals with high trait anxiety tended to have smaller improvements between their baseline threshold and thresholds under time urgency, and poorer thresholds in general. Findings demonstrate that stress overall affects odor and taste thresholds, such that individuals with low trait anxiety have greater thresholds and improvement, while individuals with high anxiety have poorer thresholds and improvement. This study concludes that although there was no significant main effect of manipulating time urgency, trait anxiety level does influence taste threshold measurements, and further research is warranted to understand the implications for chemosensory function in health and disease. Supported by NIH grant # AG062006-01.

345 12:30 pm K

Comparing recognition task performance for odor and visual stimuli

Chantal Dietzen, Psychology (M)

Alzheimer's disease (AD) is a neurodegenerative disease that affects memory and cognition and currently affects 50 million people worldwide. Although AD currently has no cure, early detection and the ability discriminate between the different types of dementias will be important as interventions and treatments become available. Recent studies have highlighted the role of olfactory impairment in AD and suggest that the pathology of the disease begins very early in areas of the brain associated with olfaction. Neuropsychological test batteries are comprehensive tests used to assess different cognitive domains and allow for the opportunity to differentiate AD from Mild Cognitive Impairment and other dementias. Recognition tasks, for example, can be used to assess episodic recognition memory. Although many neuropsychological batteries do include recognition tasks to assess memory, visual stimuli are the most commonly used. This study aimed to examine recognition task performance when participants were given odor stimuli versus visual stimuli. Considering the pathology of the disease, it was hypothesized that participants would perform better during a recognition task when visual stimuli were presented than when order stimuli were presented. Recognition tasks were administered to elderly participants (n = 34) recruited from the Alzheimer's Disease Research Center at the University of California, San Diego using visual and odor stimuli, as part of a comprehensive neuropsychological test. A paired samples t-test compared recognition task performance for visual and odor stimuli. Results indicated that participants correctly recognized significantly more visual stimuli than odor stimuli ($t(1, 33) = -3.419$, $p = .002$). These findings support the results of previous studies that also examined differences in recognition memory tasks using visual and odor stimuli. This evidence, in combination with the similar findings of previous studies, supports that idea that odor memory tasks may be particularly vulnerable to early decline and offer further insight on memory impairment.

346 12:30 pm L

Impaired Lexicosemantic Performance and ffects of Implicit Semantic Categories in Adolescents with ASD

Apeksha Sridhar, Psychology (M)

Introduction: Autism spectrum disorder (ASD) is often associated with delayed language development. Despite evidence of lexicosemantic deficits, little is known about implicit semantic processing in ASD. We tested adolescents with and without ASD during a lexicosemantic decision condition that – unbeknown to participants – included 'hidden' semantic categories (action, mental, visual).

Methods: Accuracy and response time (RT) were recorded from 39 adolescents with ASD (mean age 14.7 years) and 29 typically developing peers (TD; mean age 14.7 years) during a lexical decision task, which involved differentiating between frequent standard words (including 3 hidden categories [action, mental, visual]), animal words, and pseudowords. Diagnostic groups did not differ on gender, age, handedness, or non-verbal IQ. Lexical performance was analyzed for each hidden category by conducting independent samples t-tests between ASD and TD

groups. Partial correlations (controlling for age, non-verbal IQ) were conducted between behavioral responses and scores on a standardized measure of language skills (Clinical Evaluation of Language Fundamentals, Fifth-Edition; CELF-5) and a parent-report measure of executive functioning (Behavior Rating Inventory of Executive Function, Second-Edition; BRIEF-2).

Results: Participants with ASD showed significantly lower accuracy for each semantic category, but comparable RTs, compared to TD participants. Language skills (CELF-5 Total) were associated with accuracy for all word categories in TD participants (all rs>0.5, ps <0.01), but were strongly associated only with the visual category in ASD participants (r>0.5, p<0.01). The BRIEF-2 Cognitive Regulation Index was positively correlated with RTs to mental (r=0.4, p<0.05) and visual (r=0.4, p<0.05) words in the ASD group, but not in the TD group.

Conclusion: Our finding of lower accuracy across all word categories in the ASD group compared to the TD group is consistent with previous studies, suggesting that lexicosemantic processing is affected even in high-functioning autism. Atypically weak association between overall language skills and accuracy for action and mental words may suggest differential processing compared to visual words. Lastly, association of RTs for mental and visual words with cognitive regulation may suggest a high demand for executive function.

Session C-11

Poster Health Nutrition & Clinical Sciences 3
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

347 12:30 pm M

The Association Between Acoustic Reflex Thresholds and DPOAEs in Young Adults

Athena Doss, Speech, Language and Hearing Sciences (U)

Middle ear muscles contract in response to high intensity sounds to restrict the amount of acoustic energy that reaches the cochlea. Acoustic reflexes are used to measure this protective mechanism within the auditory system whereas distortion product otoacoustic emissions (DPOAEs) allow for the sub-clinical assessment of the cochlea. The purpose of this study was to evaluate the association between acoustic reflex thresholds(ARTs) and DPOAEs in young adults with normal hearing to determine whether lower (i.e., better) ARTs were more protective of decreases within the cochlea after music exposure.

Twenty-six young adults, 18 women and 8 men, with normal hearing participated. Otoscopy and tympanometry were completed as well as 1 kHz ipsilateral ARTs. DPOAE data were obtained using f2 frequencies of 1-6 kHz using stimulus tones (L1 ,L2 = 55,40 dB SPL, f2 /f1 =1.22; f2 > f1) swept in frequency at 8 sec/octave. DPOAEs were measured before and after participants listened to one hour of music through earphones. A probe microphone was used to measure the preferred listening level of music within the ear canal averaged over one hour.

Across all f2 frequencies, those with higher ipsilateral ARTs had more of a decrease in DPOAEs after one hour of music. In one regression model, ART alone was a significant predictor of change in DPOAEs after music, accounting for approximately 6% of the variability. When preferred listening level was included in the regression model, ARTs were still significant predictors of change in DPOAEs.

In this sample of young adults with normal hearing and measurable ARTs, those with higher ARTs had more of a decrease in DPOAEs after listening to one hour of music through earphones. After accounting for preferred listening level during one hour, ARTs were significant predictors of changes in DPOAEs. These preliminary data demonstrate how the strength of the ART contributes to maintaining cochlear integrity during noise exposure. These data further suggest the importance of obtaining ART data to determine whether or not young adults may be vulnerable to this type of recreational noise exposure.

348 12:30 pm N

Role of Toll-like receptor 4 in joint remodeling, sprouting, and allodynia in the K/BxN serum transfer model of arthritis

Andrea Gonzalez Cardenas, Biology (U)

Role of Toll-like receptor 4 in joint remodeling, sprouting, and allodynia in the K/BxN serum transfer model of arthritis

Background: Rheumatoid arthritis (RA) is a chronic autoimmune disorder characterized by joint inflammation, cartilage destruction, and chronic pain. Sex is an important biological variable in the development and treatment of RA. Here, we examined the arthritic phenotype in a remitting murine model of arthritis in male and female mice. These experiments aimed to characterize the TLR4 involvement in the murine K/BxN serum transfer model of arthritis in:1) tactile allodynia and inflammation 2) Ankle and joint remodeling and 3) Sympathetic and afferent sprouting in the Dorsal Root Ganglia (DRG).

Methods: Male and female wild type (WT) C57BL/6 mice were purchased from Harlan (Indianapolis, IN). KRN T cell receptor transgenic mice were a gift from Drs. D. Mathis and C. Benoist (Harvard Medical School, Boston, MA and Institut de Génétique et de Biologie Moléculaire et Cellulaire, Strasbourg, France). These mice were maintained on a C57Bl/6 background (K/B). Arthritic mice were obtained by crossing K/B with NOD/Lt (N) animals (K/BxN). Groups of adult K/BxN

transgenic mice were bled, the sera pooled, and transferred to recipient mice by intraperitoneal (IP) injection (100 µl on days 0 and 2). Mechanical withdrawal thresholds (TA), arthritis scores, and weights were assessed in on days 0-6, 9, 12, 15, 18, 21, 24, and 28. At 13 wk of age, legs and DRG were harvested for assessment of bone density.

Results: Our results show that K/BxN tactile allodynia resolve concurrently with inflammation in WT and Tlr4-/- female mice, but not in WT male mice. TLR4 deficiency had no effect on baseline thresholds, but significantly attenuated the late phase allodynia and modestly reduced inflammation in males and females. Wild type mice had increased staining for nociceptive primary afferents (CGRP), afferent sprouting (GAP-43), and sympathetic sprouting (Tyrosine hydroxylase) in the ankles. Bone density of K/BxN mice is significantly lower than that of WT mice after the paw swelling resolves, as measured by microCT. These results suggest important sex differences in the development of an inflammation initiated neuropathic phenotype.

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349 12:30 pm O

Tobacco, Marijuana, and E-cigarette Effects on the Composition of the Oral Microbiome

Mambu Nsuangani, Microbiology/ Clinical Laboratory Science (U)

With the growing popularity of the use of e-cigarettes, tobacco, and cannabis, there has been an increase in the number of questions among the population, regarding the effects that these products pose to their health. To date, the effects on the oral bacteria from vaping and marijuana products are not well documented, and a study has yet to determine whether they pose a similar risk to the human body as tobacco products. Oral bacterial imbalance is associated with oral diseases such as periodontitis, dental caries, and potentially with systemic diseases such as coronary heart disease, pneumonia, and rheumatoid arthritis; thus oral bacterial imbalance can ultimately lead to cancer of the head and neck. We aim to study the oral microbiome of tobacco, marijuana, and/or e-cigarette users, and nonsmokers to determine whether there are differences present, and if those differences suggest a susceptibility to negatively affect health and increase chances of cancer. Methods: We plan to survey and collect samples from up to 200 subjects so that at least 50 subjects who are users and 50 subjects who are not users of tobacco, marijuana, and e-cigarette products are surveyed. The survey will ask questions regarding participants use or non-use of tobacco, marijuana, and e-cigarette products. This study will also involve obtaining a sample from participant's mouth with a cotton swab. This sample will be tested via a variety of simple or advanced techniques to determine the bacterial make up of their mouth. Results: Sample and data collection will begin in late January 2020. Conclusion: Preliminary results will be available once sample and data collection has begun.

350 12:30 pm P

Pure-tones and Self-Report Alcohol Use in Young Adults

Rebecca Vieira, Speech Language and Hearing Sciences (U)

Objectives: The effects of alcohol on the auditory system in young adults are not well understood. Alcohol use is likely to occur in a noisy environment and as a result can be a risk factor for hearing. The purpose of this study was to evaluate the association between self-reported alcohol use, personal music system use, and pure tone thresholds in young adults.

Design: Fifty-five undergraduate students, 42 women and 13 men (mean age= 21.7 years: SD= 3.3 years) participated in the study. A survey was administered to obtain basic participant characteristics and self-reported alcohol and personal music (PM) system use. Otoscopy and tympanometry were completed to ensure normal outer and middle ear function. Pure-tone thresholds were obtained in octave band steps from 0.25 through 8 kHz, including interoctave frequencies 3 and 6 kHz. Three pure-tone averages (PTA) were calculated per ear. Low-frequency PTA (LFPTA) consisted of 0.25, 5, 1, 2 kHz thresholds, mid-frequency PTA (MFPTA) consisted of 0.5, 1, 2, 4 kHz thresholds, and high-frequency PTA (HFPTA) consisted of 3, 4, 6, 8 kHz thresholds. Self-reported alcohol use was defined as drinks per month (DPM), categorized as No, Light (≤8.5 drinks), and Heavy (>8.5 drinks).

Self-reported PM system use with earphones was defined based on a survey question. Can Hear was comprised of participants who reported they could easily hear people or have a little trouble hearing people when using a PM system with earphones. Cannot Hear included combined responses of: have a lot of trouble hearing people and cannot hear people while using a PM system with earphones.

Results: For all three PTA measures, participants were within normal limits for both ears, although the means for both LFPTA and MFPTA were slightly higher compared to the mean HFPTA. Twenty-five participants reported No DPM, 15 reported Light DPM and 15 reported Heavy DPM. Forty-three participants reported Can Hear and 12 reported Cannot Hear while using their PM system with earphones. For all analyses, DPM was not significantly associated with any PTA outcome. This association remained not statistically significant after adjusting for self-reported PM system use. However for LFPTA only, women had statistically significant LFPTA compared to men after adjusting for age and self-reported PM system use (estimate = -5.1, 95% confidence interval = -9.7 to -0.4 dB). Women had lower mean MFPTA and HFPTA compared to the means for men, but these differences were not statistically significant.

Conclusions: Over 50% of participants reported Light or Heavy DPM. DPM was not associated with any differences in LFPTA, MFPTA, and HFPTA, even after adjusting for self-reported PM system use. Women had significantly lower LFPTA compared to men. Although DPM was not associated with decreases in PTAs in this sample of young adults, alcohol use likely occurs in a noisy background environment. Therefore, more research is needed to determine how loud those environments are and

how much alcohol was OR has been consumed, and how those combined risk factors possibly affect hearing.

Learning outcomes: Describe the association between pure-tones and self-reported number of drinks per month. Describe pure-tone differences between men and women who reported drinks per month.

351 12:30 pm Q

The effect of Green Tea Extract (GTE) on fat oxidation and glycemic responses during and after arm exercise

Tayelor Roberson, Interdisciplinary Studies (U)

Background: Arm exercise is a potential alternative mode for people who cannot undertake standard leg exercise, such as those with injures or disabilities. Green tea can increase fat oxidation during leg exercise. It can also lower post-leg-exercise glycemic responses. Whether these effects are also possible for arm exercise is currently unknown. Purpose: To investigate the effect of green tea extract consumption on fat oxidation and glycemic response during and after moderate arm exercise.

Methods: Four men and three women between the ages of eighteen to forty-five years participated in the experiment. Each participant was asked to perform an incremental VO2peak performance test to establish their exercise intensity for further trials. We used the cross-over double-blind design and randomize the order of trials. Participants consumed 20mg of caffeine plus 400mg of green tea (Camellia sinensis) extract (GTE) or 420mg of placebo (plant based protein powder) or seated control without supplementation. Testing consisted of a 20-minute arm crank exercise at 50% VO2peak and during this period we collected respiratory gas measure to calculate carbohydrate and fat oxidation. Subsequently, participants underwent a standard 2 hour oral glucose tolerance test (OGTT) during which plasma glucose was assessed every 10 min and glucose area under the curve (AUC) was derived. Results:The percentage of fat oxidation during exercise for GTE, 44(10%), and for the placebo (PLA), 44(11)%, were almost identical (p=.831). Similarly, absolute fat oxidation during exercise was also very close: GTE = 1.48(0.86)g/min vs. PLA = 1.49(0.76), p = .853. The change from baseline to peak glucose during OGTT was 77(51) vs. 60(32) vs. 60(29), for seated control, GTE and PLA, respectively which did not differ significantly among trials (p = .415). Incremental AUC (iAUC) during the OGTT was 4991(2984) vs. 5287(3343) vs. 5417(2984), for seated control, GTE and PLA, respectively with again no significantly among trials (p = .871)

Conclusion: Overall the ingestion of green tea extract did not significantly alter whole body' fat oxidation during or after arm crank exercise compared to placebo. While peak blood glucose excursion relative to baseline was reduced in both exercise conditions compared to seated control this reduction did not reach significance and was not enough to reduce overall postprandial glucose response.

352 12:30 pm R

Extraction of antioxidants from pistachio seeds using different solvents

Zheyuan Liu, Foods and Nutrition (U)

Pistachio is a good source of nutrients and antioxidants. Many studies have investigated the antioxidant activities of pistachio using various solvents. However, no justification has been provided for choosing these solvents. The study aimed to test the efficiency of different solvents in extracting antioxidants from pistachios.

Pistachio seeds stored in the presence and absence of endocarps were shelled if necessary and finely ground using a coffee grinder, then analyzed. Full fat pistachio seed flours were extracted in 10 volumes of water, 30% methanol, 70% methanol, absolute methanol, absolute ethanol, 70% acetone, acidified acetone (acetone:water:acetic acid = 70:29.5:0.5), and 80% acetone by continuous vortex mixing at 1000 rpm for 1 h. The extracts were centrifuged at 16,100 g, 4 °C for 10 min. Supernatants were collected and residues were subjected to extraction and centrifugation again. Supernatants from both extractions were pooled for determination of Trolox equivalent antioxidant capacity (TEAC). One-way ANOVA and Tukey's post-hoc test were used for statistical analysis (a = 0.05).

Pistachio seeds in shells had significantly ($P < 0.05$) lower fat (41.4%) and higher carbohydrate content (31.6%) as compared to pistachio seeds with shells removed (53.8% fat and 19.0% carbohydrate). No significant differences in moisture, protein, and ash contents were detected. TEAC of the extracts varied considerably (1.49-19.7 μmol Trolox equivalent/g) in different solvents and exhibited a U-shaped curve under different solvent polarities. The highest TEAC were detected in samples extracted by 70% acetone, acidified acetone, and 80% acetone with a relative polarity (RP) range of 0.48-0.55 followed by those extracted by water (RP = 1) and 30% methanol (RP = 0.93). The lowest TEAC was observed in absolute ethanol (RP = 0.65), absolute methanol (RP = 0.76), and 70% methanol (RP = 0.83) extracts. In-shell pistachio seeds were less prone to oxidation during storage and their acetone extracts exhibited significantly higher ($P < 0.05$) TEAC than shelled pistachio seeds.

Different solvents varied in their capabilities in extracting antioxidants from pistachios. Absolute ethanol and 70% acetone were the least and most efficient solvent, respectively.

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

Session C-12

Poster Engineering & Computer Sciences 8
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

353 12:30 pm S

Dynamic Nice Value Assignment

Michael Fox, Computer Engineering (U)

In the Linux operating system, a Nice value is a number related to the priority of a process in the user space. A process with a Nice value of -20 has the highest priority to execute, and a process with a Nice value of +19 has the lowest. Our project aimed to create an algorithm that could run single or multiple processes and modify them during runtime in order to achieve different execution goals. We were able to find clear relationships between the Nice value of two processes and its resulting execution time. Along with that, we created an algorithm that takes two processes with randomly assigned Nice values and dynamically adjusts the values at runtime so the processes use an equal amount of the CPU. We then expanded on this algorithm to create an interactive program that allows the user to directly control the CPU usage percentage of a user selected C program.

354 12:30 pm T

Multi-Processed VS Multi-threaded Socket Communication

Ramiz Hanan, Computer Engineering (U)

This presentation is focused on building and analyzing a communication system using network sockets through the Transmission Control Protocol. It explores the performance of such networks in four different configurations: data transfer between process to process, thread to thread, multiple processes to multiple processes, and multiple threads to multiple threads, from server to client, respectively. The goal is to determine the best configuration by measuring the total time it takes to a client to create a request and receive a response from a given server. For proof of concept we chose to send numbers (8 bit integers) as a starting point. Other data types can be sent as well. We needed to touch on multiple topics discussed in the Embedded OS course including threading, forking, thread synchronization, avoiding race conditions, and utilizing pipes for process to process communication. Also, the software was designed to run locally with the option to run the server remotely on a different device. We ran each configuration hundreds of times in order to collect diverse data and then compiled the findings by plotting each one's standard deviation and comparing average delay times. We programmed these configurations in C using the built in sockets library. Our results showed that the single thread to single thread configuration was much faster than the single process to single process. It also showed that the multi-processed configuration was faster than the multi-threaded configuration.

355 12:30 pm U

Implementation of Machine Learning Algorithm with Cryptosystems

Cesar Sanchez, Mathematics Single Subject Teaching Credential (U)

This presentation discusses the implementation of a machine learning algorithm on a cryptography system. We use the synchronization of two feed-forward neural networks to generalize secret keys that can be used in key-exchange and encryption-decryption in a public-key crypto-system. In this demonstration, we study a simplified model, in which we build a two-layered perceptron for both the sender and the recipient. Each perceptron contains an output layer with 1 unit, a hidden layer with K units, and an input layer with K*N units. The secret information is initialized as synaptic weights for the sender and the recipient, respectively. The exchange of information is equivalent to the process of synchronizing the synaptic weights of two neural networks. This process can be accomplished by exchanging and learning the mutual outputs of these two perceptrons with the Hebbian learning rule and given common inputs, which are illustrated carefully in this presentation.

356 12:30 pm V

Minimization of Utility Pole Failure Through Julia Optimization

Michael Violante, Civil Engineering Water Resources (M)

In rural areas across the U.S., there are utility poles and other critical infrastructure that are vulnerable to flooding and wind damage. The first goal of this multidisciplinary research is to assess the probability of utility pole failure through conventional hydrological and wind load calculations. Once the probability of failure is known for flood control, the most cost-efficient surface water and subterranean pipe network configuration can be created that will allow for flood waters to be redirected from vulnerable infrastructure via establishment of an optimization problem utilizing the Julia programming language. Similarly, for extreme wind scenarios, the optimal distance and positioning of transmission lines will be determined to avoid utility pole failure. Inside of Julia, the JuMP and GLPK optimizer packages will be used to solve a global minimum equation given several variables and constraints. The initial watershed is located in Whittier, NC and will be the site where the framework of this research is tested for both the flood control and wind scenarios.

All watersheds are delineated using spatial analyst tools in ArcGIS 10.6.1 and USGS Streamstats software. A 3-m resolution Digital Elevation Model (DEM) of the Great Smoky Mountains National Park and surrounding areas in North Carolina area was also used during the terrain preprocessing and delineation phases.

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

Session C-13

Poster Physical & Mathematical Sciences 5
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

357 12:30 pm W

Nuclear Scattering Modeling with Machine Learning

Steven Bradley, Physics (U)

I am working from the hypothesis that we can create a computational model using machine learning methods to predict nuclear scattering data. Scattering data can be used to shed light onto the properties of the interaction between neutrons and protons that, at this point, is not known with absolute certainty. There are currently many gaps in experimental scattering data and it is these gaps that I am striving to fill with a predictive unbiased model. This model can then be used to eliminate the need to measure new data experimentally which can be a financial burden on those conducting the experiment. This particular model has been generated by creating a random forest using existing experimental data to determine the relation between the experimental variables.

A random forest is a decision tree that asks a series of binary questions regarding the input to make a set of reliable predictions. This is done by training the tree with a known set of inputs and outputs so that the tree can "learn" the correct questions to ask. After testing with other known data to ensure functionality, we can use that model to make predictions at any value of laboratory frame energy and scattering angle for a particular measurement. The goal of this research is to create a predictive model for nuclear scattering data. Preliminary results have had an accuracy between 87-99%, with variation coming from the random decision on what data is used in training which creates a slightly different tree each time.

I plan to compare my model with other existing models to determine its validity. The advantage of my model is that it creates pseudo-experimental data that is not based on the physical assumptions other models must make.

At this point in my research, I have been focusing on neutron-proton SGT and SGTT data to act as a proof of concept as they do not depend on the scattering angle. However, it currently fails in regions where there is little existing data for it to train with. Going forward it might be necessary to fill in those gaps with other data generated from other models.

358 12:30 pm X

Analyzing the interaction between FGF10 and SHH proteins in early lung development through mathematical and computational models

Jasmine Camacho, Applied Mathematics (U)

The epithelium and mesenchyme lung tissues play a key role in lung development. Lung development occurs through repetitive branching of the epithelium tissue. Key molecular genes, including fibroblast growth factor 10 (FGF10), are transported through the mesenchyme (outer) tissue to the epithelium (inner) tissue of the lungs. FGF10 activates several intracellular signaling cascades, resulting in lung growth and branching. On the other hand, decreased expression of FGF10 is associated with reduced lung branching and growth. Furthermore, the sonic hedgehog (SHH) protein is created by the SHH gene that allows the protein to function as the chemical signal that is pivotal to embryonic development. Interaction between FGF10 in the mesenchyme tissue and sonic hedgehog (SHH) in the epithelium tissue is vital for the regulation of the branching and lengthening phases of the lungs. Overexpression of FGF10 in the mesenchyme leads to decreased expression of sonic hedgehog (SHH) in the epithelium which therefore, impacts the embryonic development. In this study, we will be analyzing the lung branching morphogenesis through the use of mathematical models, programmed in MATLAB and stability analysis. In addition, we build a system of differential equations, particularly reaction-diffusion equations, to study the interaction between SHH and FGF10 during branching phases. We analyze the system of equations to determine conditions that enable lung growth and branching. By understanding the interactions between the two proteins, we can analyze the patterns found in under developed lungs as opposed to well developed lungs. We show that oscillatory dynamics in the differential equations describe lung growth and branching via interactions between FGF10 and SHH. In particular, a higher concentration of FGF10 triggers a fast growth of lung branching, which shows an increased amount of oscillations. On the other hand, a higher concentration of SHH causes slow growth in the branching phases and thus, our model shows less oscillations. In the future, we will build on this model to study different treatment options for underdeveloped lungs.

359 12:30 pm Y

Machine Learning to Improve Theoretical Nuclear Binding Energies

Matthew Crowley, Physics (U)

This project is designed to test the possibility of systematically improving theoretical predictions for nuclear binding energies using supervised machine learning. Creating a procedure that can predict binding energies as accurately and precisely as possible has important applications in other areas of research. Having accurate binding energy predictions will better inform

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experiments investigating the properties of neutron and proton-rich nuclei. The predictions could be used as a more reliable input for simulations of astrophysical processes such as nucleosynthesis in neutron star merger events.

To make these improvements we are using a supervised machine learning algorithm called a random forest regressor. We produce training and testing data sets by randomly splitting all the nuclei that have both experimental and theoretical values for the binding energies. The random forest regressor is made by fitting a training data set of features to its corresponding training data set of targets. In one case we use proton and deformation as features to predict the difference between theoretical and experimental binding energies as the targets. We then use a testing data set of features and targets, which the random forest has not been exposed to before, to assess whether the random forest can make successful predictions. By trying different combinations of features, training/testing ratios and number of trees we can find a random forest that shows the optimal balance between bias and variance.

Our results show that we can make measurable improvements to theoretical models with machine learning. The random forests are optimized when the number of protons and the deformation are used as features. Not only does the machine learning component reduce the error of theoretical models but they also reduce the variability between predictions from different models in areas where no experimental data is yet available. These new and improved predictions of neutron-rich nuclei can have a significant impact in reducing the uncertainty in simulations for the creation of heavy elements in different astrophysical scenarios.

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360 12:30 pm Z

Numerical Semigroups: Analysis of Element Factorizations

Jose Parra, Single Subject Teaching Credential (U)

A numerical semigroup is a set of non-negative integers that is closed under addition. Closure under addition means that the sum of any 2 elements from the numerical semigroup is also located in the numerical semigroup. We represent a numerical semigroup by writing it at <6,9,20>, where we call 6,9, and 20 the generators of that numerical semigroup. 6, 9, and 20 are called generators because every element in the numerical semigroup can be represented as the sum of the generators. The research focuses on defining characteristics of numerical semigroups through the analysis of its factorizations and lengths of all factorizations. The factorization of an element are the different ways that an element can be written as a sum of the generators. While the length of a factorization counts how many elements are needed to generate said element. Through the analysis of numerical semigroups with three generators, we developed a function that allows us to determine how many elements display certain lengths which in turn gives us insight into the behavior of its factorizations and lengths.

361 12:30 pm AA

Modeling the effects of environmental temperature on the avian influenza epidemics among migratory birds of North America

Sophia Vargas, Statistics (U)

Every known human influenza virus originates from birds. Avian influenza virus primarily persists in wild aquatic birds and can be fatal when its genetically shifted strain transmits to humans. Understanding the spread of avian influenza among aquatic birds is crucial when considering human susceptibility. Migratory pattern among birds and environmental temperature have a significant impact on virus transmission and persistence over time. In this study, we use mathematical models to estimate the avian influenza prevalence among aquatic birds. In particular, we focused on three locations, namely, Alberta – Canada, Monterey – California, and Jalisco – Mexico, and five different strains, in order to evaluate how the different environmental temperatures impact the persistence of these strains. Our results show that the influenza prevalence peaks during the winter, as the weather tends to be colder during these months, and slows during the heat of the summer. The variation of the prevalence is particularly wide in the locations such as Alberta, where the environmental temperature has a large fluctuation. However, the variation of the prevalence may also depend on the type of strain. Finally, we use our model to evaluate how the migration of the birds from North to South during Fall migration and South to North during Spring migration through these different environments affects the influenza prevalence among these North American migratory birds. Results from our study can be useful for the preparedness of potential influenza pandemics.

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362 12:30 pm BB

Ball-collision Decoding Analysis: Linear Codes in McEliece Cryptography

Kyle Yates, Applied Mathematics (U)

Modern data encryption relies on computationally difficult problems. A message that is encrypted and sent through an electronic communication channel can only be understood by the intended receiver, who knows private information that is needed to decrypt the message. If a third party intercepts an encrypted message during transmission, they will not know the private information needed to decrypt the message, nor will they have the computational means to solve the problem without the private information.

In the next few decades, quantum computing is anticipated to become operational on large scales. The new computing power will compromise many cryptosystems. Systems such as RSA, the most commonly used public-key encryption system, would no longer be secure. The McEliece cryptosystem is resistant to attacks even with the development of quantum computers. McEliece cryptography tasks an adversary with decoding a seemingly random error correcting linear code, a difficult problem

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in the topic of algebraic coding theory. Decoding algorithms for this are known, but none are efficient enough to break McEliece. In 2011, Daniel J. Bernstein, Tanja Lange, and Christiane Peters published "Smaller decoding exponents: ball-collision decoding", showing a speedup from previous decoding algorithms.

This project works to implement and research capacities of ball-collision decoding on error correcting linear codes for purposes in McEliece cryptography. We implement the ball-collision decoding algorithm using Magma Computational Algebra, and then analyze algorithm performance, algorithm complexity, and security parameters. Our results find error correcting capabilities of ball-collision decoding that nearly come within lower error correcting bounds for sizable binary linear codes. Though these codes are too small for practical application in cryptography, our analysis yields observations of viable security parameters of codes in McEliece encryption schemes. Most notably, we find non-standard dimension ratios and desirable error distributions to maintain security in these codes.

Session C-14

Poster Behavioral & Social Sciences 13
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

363 12:30 pm CC

Navigating Care for HIV/AIDS at the US-Mexico Border in Mexicali

Dario Reyes-Gastelum, Psychology (U)

The relationship between scientific and other explanatory systems is a central question for cognitive psychology. A common assumption is that scientific knowledge eventually replaces intuitive or folk beliefs (e.g., Piaget, 1954). A growing body of evidence, however, shows that this is not the case (Legare et al., 2012). The co-existence of seemingly incompatible beliefs is particularly common when individuals are confronted with a life-threatening illness such as HIV/AIDS that resists an easy explanation or cure. Cognitive psychologists studying such questions, however, tend to overlook structural factors including access to healthcare that can influence both behaviors and beliefs. In the present study, we examine how both cultural and structural factors shape the causal beliefs and treatment choices of people diagnosed with HIV/AIDS residing near the US-Mexico border in Mexicali, Mexico. This context, where many migrants who may be at higher risk for contracting HIV temporarily reside, provides an ideal location to examine the factors affecting healthcare beliefs and practices related to this important health issue. We conducted in-depth interviews with 20 individuals diagnosed as HIV+ recruited from a clinic in Mexicali. Our protocol included open-ended questions about participants' conception of HIV including what it is, its mechanisms of transmission and potential treatments, and more focused questions regarding their experiences with their illness and with healthcare. In a more structured section, we asked participants to endorse different potential causes of HIV and their beliefs about the efficacy of different possible treatments using a 5-point Likert-type scale, including biomedical/natural, sociorelational, and supernatural probes. We also collected data on demographic factors including education, language, migration and work history. Our analysis revealed that participants endorsed biomedical and sociorelational causes and treatments to an equal extent. Participants also endorsed supernatural beliefs, but to a lesser extent. Interpersonal factors such as social support and stigma affected the treatments participants sought. This was in addition to the effects of structural factors such as poverty and cultural factors such as explanatory beliefs. This work has implications for the design of cancer education and treatment programs targeting this and similar populations.

364 12:30 pm DD

To Intervene or Not Intervene: Bystander Intervention in Potential Sexual Assault as a Function of Perpetrator and Victim Gender and Perpetrator Relationship to Bystander

Rachel Hamilton, Psychology (U)

Campus sexual assault is a pervasive problem across the country. Current research indicates that the most effective method of preventing sexual assault is Bystander Intervention programs. The present study examined the effects of Perpetrator and Victim Gender (Male/Female or Female/Male) and Perpetrator relationship to Bystander (Friend or Stranger) on Bystander Intervention likelihood. A sample of 80 college students from age 18 to 34 on the San Diego State University campus were randomly assigned one of four vignettes describing a bystander's perspective of a scenario that occurred before a sexual assault took place. Participants were instructed to rate how likely they were to intervene. Results showed a significant main effect for Perpetrator and Victim Gender such that individuals were more likely to intervene in the Male Perpetrator/Female Victim condition than the Female Perpetrator/Male Victim. There was no significant main effect for Perpetrator relationship to Bystander at the B=.05 level, and no significant interaction was found. Further research may assess how to increase intervention likelihood for male victims of female assailants in current Bystander Intervention programs.

365 12:30 pm EE

Enhancing Providers' Delivery of Feedback About an Autism Spectrum Disorder Diagnostic Evaluation

Kaitlin Chau, Psychology (U)

Hypothesis: With the growing population of individuals with Autism Spectrum Disorder (ASD), the process of serving children with ASD and working with their families is critical, starting at the time they are diagnosed and recommended

for services. In particular, the manner in which the diagnosis is delivered by clinicians may impact caregivers' subsequent access to and utilization of recommended services for their child. The SPIRIT toolkit described in this study is an effort to bridge the gap in research concerning appropriate trainings for clinicians who deliver feedback about an ASD diagnosis to increase caregivers' initiation of recommended services. Objectives: To assess (1) providers' perceptions of acceptability, appropriateness, usefulness, and utilization using mixed-method data; and (2) whether toolkit perceptions differed by provider characteristics. Methods: These data are taken from two SPIRIT toolkit trainings at the San Diego Regional Center for the Developmentally Disabled, comprised of 80 attendees total, including 1) psychologists who provide diagnostic evaluations; 2) service coordinators (SCs) who meet with families following a diagnostic evaluation; and 3) managers. A mixed-methods feedback survey was sent out 1-2 months after the training; close-ended responses were analyzed descriptively using SPSS and open-ended responses were coded using an open-coding process. Bivariate correlations and independent t-tests were conducted to compare toolkit perceptions by provider characteristics. Results: Considering objective 1, quantitative and qualitative results indicated that the toolkit was considered acceptable, appropriate, useful, and utilizable. Considering objective 2, quantitative results indicate that provider age had a varied range of significance in its correlations and that psychologists reported significantly higher perceptions of toolkit appropriateness than SCs. Conclusions: These mixed-method data indicate a toolkit designed to improve and individualize providers' communication to families following an ASD diagnostic evaluation is acceptable, appropriate, and useful across provider types. The high rate of appropriateness from psychologists aligns with how the toolkit was originally designed for them. Our findings suggest a need for further development of more intensive trainings and to make these trainings more widely applicable for all professionals who are involved in the process of the ASD diagnoses and services.

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366 12:30 pm FF

Patient Activation in Latino/Hispanic Populations with Cardiometabolic Conditions

Alexis Osuna, Psychology (U)

Introduction: Hispanics are at disproportionate risk for developing chronic health problems and often experience difficulties when it comes to actively advocating for their own health. Patient activation, or possessing the skills, knowledge, and motivation to participate in one's healthcare, is crucial to successful management of chronic conditions. The current study aimed to examine whether number of chronic cardiovascular-metabolic ('cardiometabolic') conditions is associated with level of patient activation among Hispanic adults with multiple chronic conditions. We hypothesized that individuals with more chronic conditions will be less activated than those with fewer chronic conditions.

Methods: Preliminary analyses were conducted with 487 participants. All participants were of Hispanic origin, inpatient at Scripps Mercy Chula Vista Hospital, at least 18 years of age, had two or more chronic cardiometabolic conditions, at least one behavioral health concern, and access to a telephone. Medical records were reviewed to obtain number of chronic cardiometabolic conditions and patient activation was measured via the Patient Activation Measure (PAM-13, scores range from 13-52 with higher scores indicating more patient activation). A Pearson correlation was conducted to examine the relationship between continuous number of chronic conditions and patient activation. To further examine this relationship, a t-test was used to compare patients with 2 chronic conditions to those with ≥3.

Results: The mean number of chronic cardiometabolic conditions patients had was 3.4 (SD=1.4, range 2-8) and mean patient activation score was 40.7 (SD=4.9). Results revealed that there was no significant association between the number of chronic conditions and patient activation in continuous (r=.04; p=0.4) or categorical analyses (t=-.7; p=.5). Those with 2 chronic conditions (N=168) and those with ≥3 (N=319) had very similar levels of patient activation (M=40.5 and M=40.8, respectively).

Discussion: The current study did not identify the number of chronic cardiometabolic conditions related to patient activation. The study was limited by the lack of inclusion of other demographic and health factors in analyses as covariates, which may have masked the hypothesized relationship. Being active in one's healthcare may improve health outcomes, thus it is important to assess other potential risk factors for low patient activation among Hispanics.

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367 12:30 pm GG

The Relationship Between Fatalism and Patient Activation among Hospitalized, Hispanic Adults with Cardiometabolic Conditions and Behavioral Health Concerns

Mariana Marin-Estrada, Psychology (U)

Background: Chronic cardiometabolic health conditions are highly prevalent in the United States. Hispanic/Latinos (hereafter "Hispanics") of lower socioeconomic status are at high risk for these conditions. Cultural factors majorly impact the development and progression of cardiometabolic conditions. A prominent cultural belief among Hispanics is fatalism, or the idea that events are predetermined by fate. The extent to which fatalism relates to how activated patients manage their health, which has important implications for disease management, is unknown.

Hypothesis: The current study aims to test the hypothesis that greater fatalism (i.e., stronger fatalistic beliefs) is associated with less patient activation.

Methods: To investigate this, preliminary data from the Mi Puente study were used. Mi Puente is an on-going trial of a

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behavioral intervention aimed at reducing hospitalizations and improving physical symptoms and quality of life among patients hospitalized at a San Diego County safety net hospital. Inclusion criteria include Hispanic ethnicity, two or more chronic cardiometabolic conditions (e.g., diabetes), and one or more behavioral health concerns (e.g., chronic stress). Participants in the current analysis (N=488; 45.5% female) completed surveys that assessed fatalism (using the Fatalism Scale; range 0-10 with higher scores indicating more fatalistic beliefs) and patient activation (using the Patient Activation Measure; range 13-52 with higher scores indicating more patient activation). The Pearson Product Moment correlation between these scores was analyzed.

Results: Mean fatalism score was 5.6 (SD=2.9). Mean patient activation score was 40.7 (SD=4.9). The association between fatalism and patient activation was not statistically significant (r=.075, p=.098), suggesting that fatalistic beliefs did not relate to patient activation in this sample.

Conclusion: No relationship was found between fatalistic beliefs and patient activation in the current study. It is possible that this relationship is more complex and requires more sophisticated analyses and the inclusion of other covariates that were not part of the current study. Further research is needed to better understand the relationship between fatalism and patient activation among at-risk Hispanic patients.

368 12:30 pm HH

Informational and sensorial interventions for improving consumer acceptance of edible insects

Cassandra Maya, Nutritional Sciences (M)

Edible insects have high feed conversion rates, low environmental footprints, and good nutritional values, and can serve as a sustainable alternative to traditional livestock. Despite their great potentials to improve food security, insects are not well accepted as foods by United States consumers. Exposure to entomophagy has been identified as an important factor influencing perception of insect consumption. The objective of our study was to assess the effectiveness of informational and sensorial exposures to entomophagy on consumer acceptance of edible insects. A two-day Eating Insects Conference and Tasting Demonstration was hosted. The first day of the event consisted of five presentations on cultural importance, nutritional benefits, consumer acceptance, safety, and culinary significance of edible insects. On the following day, a professional chef prepared a ten-course tasting menu using edible insects as ingredients, which were available for the participants to try. Pre- and post-intervention surveys were conducted for each session to assess perception change. Analysis of variance with Tukey's post-hoc test, Kruskal-Wallis test, and chi-squared test were used to detect statistical differences for continuous, ordinal, and categorical variables, respectively. For paired pre- and post-intervention comparisons, Wilcoxon test (ordinal) and McNemar's test (categorical) were used. Bivariate correlations between the variables were conducted using Spearman's rho and Cramér's V as correlation coefficients for ordinal and categorical variables, respectively. Over 50 participants attended the event. Forty-three attendees completed the surveys. No significant difference was observed among different ages, genders, and ethnic groups. After attending the event, participants felt more knowledgeable about entomophagy ($P < 0.001$), which positively correlated with willingness to consume edible insects ($P < 0.05$). Participants who believed that entomophagy is sustainable were more willing to consume edible insects than those who did not ($P < 0.05$). Although all participants consumed insects at the tasting demonstration, those with prior consumption experiences had significantly higher post-intervention willingness scores ($P < 0.05$), indicating repeated exposures may be necessary for improving consumer acceptance of edible insects. The event raised awareness of using insects as food and provided useful information for developing effective interventions to promote insect consumption.

Session C-15

Poster Engineering & Computer Sciences 9
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

369 12:30 pm II

BRAF Oncogene Mutations in Non-Small Cell Lung Cancer

Christian Ramirez, Mechanical Engineering/ Bioengineering (U)

Background: Lung cancer is the leading cause of cancer deaths in the United States. Approximately 80-85% of lung cancer patients have non-small cell lung cancer (NSCLC) histology. An understanding of the most common genetic mutations leading to lung cancer have resulted in approved therapeutics targeting these gene locations. With greater improvements in high sensitivity genomic sequencing, more low-incidence mutations are being uncovered and investigated. Around 5% of NSCLC patients have driving mutations in the oncogene BRAF, making it a worthy target for future investigation. Methods: Data was accumulated from a cohort of sixty-six patients from various institutions in the United States. Patients were categorized by factors such as smoking history and treatment protocols, with the greatest emphasis placed on the categorization of BRAF mutation class as defined in a previous publication. Statistical analysis of patient outcome data was performed to gain insight into the apparent outcomes within patient groups. Analysis was performed using the Kaplan-Meier method and the log-rank test. Results: Patients with class I BRAF mutations who received FDA-approved anti-BRAF therapeutics had an increased median overall survival (OS) compared to those within

the same cohort who did not receive this treatment. There was an increase in median overall survival in patients treated with immune checkpoint inhibitors (ICB) across classes I and III.

Conclusions: Among the most significant improvements in patient outcome, anti-BRAF therapy was the most effective (for class I mutations), with immunotherapy being the second most significant treatment. For further investigation, a larger cohort with a more expanded treatment history may prove advantageous in analysis. Results support the effectiveness of targeted therapy directed against class I-related mutations, however the lack of clear outcomes for class II and III patients present an opportunity for future developments.

Acknowledgement: Research reported herein was supported by the National Cancer Institute of the National Institutes of Health under award numbers: U54CA132384 and U54CA132379.

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370 12:30 pm JJ

A Cellular Based Assay to Monitor the Cleavage of the Extracellular Matrix by Matrix Metalloproteinases as a Tool for Drug Discovery Against Metastasis

Ryan Doyle, Mechanical Engineering/Bioengineering (U)

One of the most important genes up-regulated in cancer is known as Matrix Metalloproteinase (MMPs). MMP's are enzymes critical for the remodeling of the protein matrix which surrounds and supports cells throughout the body known as the extracellular matrix (ECM). While this protein can be either secreted or membrane bound, it functions to remodel the extracellular environments in healthy individuals. However, in cancerous cells, its overexpression leads to the breakthrough of cancer cells from their original niche and their spread in metastasis.

In order to investigate novel ways to block metastasis, our lab has engineered in a new cellular Two-Tag Assay as a tool for drug discovery, enabling the search for inhibitors. The assay, based on a system we developed for HIV and Dengue Virus, was adapted to MMP-14, a critical membrane bound MMP responsible for ECM remodeling. The Two-Tag system relies on a scaffold composed of two antibody epitopes, HA and FLAG, flanking a protein substrate. As the FLAG epitope is encoded upstream of the substrate and HA, it is lost when cleavage occurs while HA remains attached to the cell membrane. We then use flow cytometry to monitor the presence of the HA and FLAG tags. Based on the presence of one or two tags, we can determine the robustness of cleavage. Previously, we have inserted viral proteases between the tags and showed autocatalytic cleavage or lack of while the protein travels through the classical secretory pathway. For the MMP-14 assay, we have replaced the viral protease with a consensus substrate of MMP-14 and then obtained a cell line through retroviral technology. In addition, we have expressed the MMP-14 enzyme, in the cell expressing the substrate or in a naive cell. Comparing substrate-expressing cells with substrate and enzyme expressing cells we have shown that MMP-14 cleaves the substrate. In order to corroborate that cleavage occurred specifically at the cell surface we have performed mixing experiments with substrate-expressing cells and enzyme-expressing cells. Results were corroborated with confocal microscopy and western blotting. Decrease in FLAG expression in the presence of MMP-14 proved the robustness of the assay and its utility for the discovery of new inhibitors of MMP-14 in an attempt to block metastasis.

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371 12:30 pm KK

Chemical Characteristics of sludge generated by parallel aerobic and anaerobic bioreactors

David Aponte, Environmental Engineering (U)

Anaerobic and aerobic wastewater treatments have been proven as effective methods in treating wastewater. Although both wastewater treatments are successful, the most common one used in the United States is aerobic due to its shorter retention time. Often overlooked because of its slower pace is anaerobic treatment which requires less energy and in return is more cost effective. Anaerobic bacteria are more efficient at degrading organic compounds than aerobic bacteria, and also generate less sludge. Therefore, it is hypothesized that anaerobic treatment degrades emerging organic contaminants (EOCs) more completely than aerobic treatment and its lower sludge production should result in lower mass of EOCs in the sludge.First sludge from the aerobic bioreactor and anaerobic baffled reactor (ABR) must be sampled by using a pump to manually collect from the bottom of the tanks, where the sludge builds up. The same amount of volume will be collected separately from both tanks, then left to settle so the sludge volume can be measured. The sludge is then diluted to meet the appropriate range when measuring for COD and nutrients. HACH kits are used to measure both COD and nutrients (i.e. ammonia, nitrite, nitrate, and phosphate).Measurements of COD concentration represent the total concentration of all oxidizable organic compounds, including EOCs, in both sludge samples. Once volume and concentration are measured, the mass of organics in both sludges will be calculated. Initial results indicate that anaerobic sludge wastes only 0.625 mL per L of wastewater treated, or less than 0.0625 % of its volume. Thus far, observations and anecdotal information suggest that anaerobic treatment results in lower volumes of sludge introduced to the environment. Upcoming research will provide more definitive results regarding the amount of EOCs introduced to the environment from sludge wasting. The results will have important implications for future wastewater treatment plants in the United States considering treating their wastewater under anaerobic conditions.

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

372 12:30 pm LL

IDH1 Mutation Effects on Cell Migration

Amanda Coale, Bioengineering (M)

Gliomas and glioblastomas are a type of tumor that originates in the brain. Mutations in the IDH1 gene, which encodes for the enzyme isocitrate dehydrogenase 1, drive >80% of lower grade gliomas and secondary glioblastomas. Normally, IDH1 catalyzes the conversion of isocitrate to alpha-ketoglutarate (AKG) in an NADP+-dependent reaction. AKG is necessary to maintain the citric acid cycle and thus ultimately production of ATP. IDH1 wild-type gliomas are aggressive and quickly progress, with generally poor overall survival. It has been shown that gliomas with a point mutation in the IDH1 gene, specifically the substitution of arginine with histidine at residue 132, have improved prognosis compared to wild-type IDH1 gliomas. The underlying mechanism of how this mutation confers longer survival is not yet completely understood. These mutations in IDH1 confer a neomorphic activity, the NADPH-dependent conversion of AKG to D-2-hydroxyglutarate, an oncometabolite that can inhibit collagen maturation enzymes. In this project we investigate how expression of wild type and mutant IDH1 affects migratory patterns and proliferation rates of the cell in response to the substrate stiffness. We prepared collagen-coated polyacrylamide gel matrices with a varying range of stiffness that may be present in brain tissue. To study migration rates, the time it takes for cells to close an open space and form a confluent monolayer was measured. Proliferation rate assays were performed by counting the number of cells over a period of time. We hypothesized that cells with the R132H IDH1 mutation move and reproduce slower than that of the wild type IDH1 within softer brain tissue mimicking environments. By quantifying the effects of substrate stiffness on cell fate, we can elucidate new genotype-phenotype mechanisms driving aggressive glioma progression.

373 12:30 pm MM

Genetic engineering of Methanococcus maripaludis and Shewanella oneidensis MR-1 for applications in bioelectrochemical systems

Tyler Myers, Bioengineering (D)

Climate change is an increasing threat to human health and the environment due to the growing use of fossil fuels and increasing carbon emissions. However, bioelectrochemical systems (BESs) are a promising technology that can be used to address climate change by recycling carbon dioxide (CO2) to methane (CH4) for use as a carbon-neutral energy source to displace fossil fuel use. Synthetic Biology can be used for understanding and improving BESs by knocking out key genes in methanogenesis or upregulating metabolic pathways involved in cathodic methanogenesis. Hydrogenase regulation in Methanococcus maripaludis and the fine tuning of genes involved in the MtrCAB porin-c-type cytochrome complex in Shewanella oneidensis are well studied genetic systems that are prime candidates for the application of Synthetic Biology in the recycling of CO2 for biomethane production.

Session C-16

Poster Biological & Agricultural Sciences 4

Friday, February 28, 2020, 12:30 pm

Location: Montezuma Hall

374 12:30 pm NN

Investigating Phage Immunogenicity for Pseudomonas Aeruginosa Phage PAK_P1

Isaura Villalba, Cell and Molecular Biology (U)

Multidrug resistant bacteria have been a rising health epidemic in which antibiotics are no longer effective. With the increasing demand of alternative therapeutics, phage therapy has shown much promise in treating patients with multidrug resistant bacterial infections. Phages (formally bacteriophages) are viruses that infect and kill bacteria. As viruses, however, they have the potential to elicit immune responses in mammals. For phages to be used as therapeutics, it is essential to ensure their safety by choosing phages that have little to no ability to cause an adverse immune reaction. To study the phage immunogenicity, we have co-cultured dendritic cells, an innate immune cell, with the Pseudomonas aeruginosa phage PAK_P1 and analyzed changes in proinflammatory cytokine gene expression using quantitative polymerase chain reaction (qPCR). In addition, we performed cytotoxicity assays that measure the amount of adenosine triphosphate (ATP) present, indicating the number of cells present in the culture. We show that phage PAK_P1 can cause an up-regulation of inflammatory cytokine genes and reduce ATP in cell supernatants in murine dendritic cells. This suggests that a phage PAK_P1 product treatment may acerbate infectious disease during treatment. Discerning the mechanistic interactions will implicate better selection of phages as human therapeutics.

375 12:30 pm OO

Analyzing Protein Expression for Genetic Engineering in Methylomicrobium alcaliphilum 20ZR: A Methanotrophic Bacteria

Dennis Krutkin, Cell and Molecular Biology (U)

Global carbon dioxide and methane emissions are the major contributing factors in the equation of accumulating atmospheric greenhouse gasses. Global warming has intensified radically in the last several decades, with carbon dioxide gas spearheading the drastic rise in global temperatures, especially in recent years. As more of the worldwide population becomes increasingly aware of the situation at hand, new solutions are being sought after to help offset the compounding effects. Bioengineering and biofiltration offer promising options for humans to harness and manipulate the biological efficiency of bacteria in order to mitigate greenhouse gas emissions. Methanotrophic prokaryotes are bacterial and archaeal species which utilize single-carbon compounds as their feedstock to sustain growth and replication. Their unique ability allows

them to be utilized as a biological platform with a duality in nature: consumption of greenhouse gasses and synthesizing compounds of biological interest. Methylomicrobium alcaliphilum 20ZR is an example of such a methanotroph; high-throughput analysis of transcriptomics, proteomics, and metabolomics have established 20ZR as an extremely versatile biological system which is capable of growth on a variety of substrates and different conditions. In conjunction with an existing metabolic model, the complete genome sequence allows genetic manipulation of metabolic pathways to re-direct cellular energetics and carbon fluxes depending on the desired synthesis targets. Computer-aided analysis of prior transcription and translation data has demonstrated alternative codon usage biases and ribosomal binding sites which 20ZR has selected for to maximize methane assimilation and synthetic efficiency. Existing work with the bacteria utilized fluorescent expression constructs in order to quantify protein production activity. Previously, a set of transcriptional fusions (i.e. promoter-gfp constructs), was analyzed with self-replicating plasmids which were introduced exogenously. In order to counterpoise disparities between plasmid and chromosomal gene expression, the previously described constructs have been incorporated onto the genome of 20ZR. Going forward, chromosomal expression will allow for more accurate metabolic predictions which will be crucial when considering genetic optimization, compound synthesis, and future work with related methanotrophs.

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376 12:30 pm PP

Phages isolation for the treatment of ulti-drug resistant Achromobacter sp. in Cystic Fibrosis lung infections

Bhumika Gode, Cellular and Molecular Biology (U)

Phages are viruses that infect and kill bacteria, even the ones that are multi-drug resistant. Phage therapy has the advantage of being a more targeted treatment, which means that phages are highly specific against the target bacteria. This type of treatment will not affect the human gut microbiome, unlike antibiotics that might kill even the healthy bacteria present in the body. According to recent studies, patients suffering from Cystic Fibrosis (CF) are dying prematurely due to chronic bacterial infections. The most common bacteria involved are Pseudomonas aeruginosa and Staphylococcus aureus. But, it has been recently discovered that Achromobacter species are found in large numbers in the lungs of CF patients. Patients infected with Achromobacter species require immediate lung transplant, else their condition will worsen, leading to premature death. Achromobacter xylosixidans is a multi-drug resistant species, and thus alternative treatments are required, such as bacteriophage therapy. The objective of the research is to isolate and characterize safe bacteriophages to administer to CF patients from San Diego, whose lungs have been infected by Achromobacter xylosoxidans. Phages are present in every environment. To narrow down the search of Achromobacter phages, a bioinformatics search of Achromobacter bacteria and phages was performed in publicly available metagenomes.

377 12:30 pm QQ

Role of Genes Located Downstream of SoxB1-2 in the Development of Sensory Neuron Populations in the Planarian Species Schmidtea mediterranea

Sarai Alvarez-Zepeda, Biology/Cell and Molecular Biology (U)

SOXB1 proteins are transcription factors that are required for neurogenesis in animals. These proteins play roles in establishing and maintaining stem cell populations, terminal neuronal differentiation, and maintaining differentiated cell fate and function. Mutations in SoxB1 genes can cause developmental defects in sensory organs, including the eye and inner ear, and knockout of the SoxB1 gene, Sox1, causes epileptic seizures in mice. However, little is known about the genes downstream of SOXB1 function that are required for proper neurogenesis and function in sensory neurons, especially during regeneration. In previous work, our lab started dissecting the regulatory pathways required for neural specification and maintenance in sensory populations using the planarian, Schmidtea mediterranea, because of their remarkable ability to completely regenerate their nervous system from a population of adult pluripotent stem cells. We discovered that when we inhibited a SoxB1 homolog named soxB1-2, planarians had seizure-like movements and lost function of a population of mechanosensory neurons necessary for the detection of water flow. We also identified a subset of downstream genes necessary for sensory neuron regeneration. In an on-going screen, we are studying additional genes that are differentially downregulated following soxB1-2 RNAi to determine if they are necessary for sensory neuron regeneration and to help us to identify the function of sensory neurons subtypes in planarians. We hypothesize that inhibition of some of these genes will result in failure to regenerate certain sensory neuron populations. We are currently studying the genes sppL2A, hypothetical protein-11972, kdsr, and loxhd1, which we chose based on functional orthology. We cloned these genes, made riboprobes for whole-mount in situ hybridization to determine expression, and made RNAi food to test for potential sensory neural phenotypes. Thus far, we have determined that these genes are co-expressed with soxB1-2 in sensory neurons according to single-cell RNA sequencing data and we are currently performing functional analyses. We conclude that the function of soxB1-2 and some of its downstream genes are necessary for sensory neuron regeneration and function. These on-going studies will determine the specific roles additional downstream genes play in these processes.

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378 12:30 pm RR

Sensory Neuron Differentiation through Pou4-2 Transcriptional Regulation

Ryan McCubbin, Cell and Molecular Biology (M)

Transcription factors play critical roles in cell type specification. By binding to DNA regulatory sequences to activate or suppress gene expression, they coordinate developmental programs that result in progenitors adopting one cell identity out of many possible fates. Because of their unparalleled ability to regenerate any lost or damaged tissue from a population of adult stem cells,

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

the freshwater planarian Schmidtea mediterranea offers a model to study the factors that direct pluripotent stem cells to particular fates. SoxB1-2 is a transcription factor required for differentiation and regeneration of epidermal cells and sensory neurons in planarians; when knocked down through RNA interference (RNAi), planarians exhibit movement defects and disrupted rheosensation—detection of water flow. Previous work in our lab has identified the transcription factor Pou4-2 as a crucial mediator of downstream targets of SoxB1-2 that are involved in rheosensory neuron specification and function. Similar to soxB1-2, knockdown of pou4-2 also disrupts rheosensation, demonstrating its role as a key regulator in specification and maintenance of ciliated mechanosensory neuron identity. Whole-mount in situ hybridization (WISH) analysis of soxB1-2(RNAi) planarians revealed that Pou4-2 is downstream of SoxB1-2, and WISH analysis of pou4-2(RNAi) animals indicates that Pou4-2 activity is necessary for the differentiation of at least three different populations of sensory neurons. However, gaps remain to understand how Pou4-2 activity leads to terminal differentiation of neuronal subtypes. To elucidate the function of Pou4-2, RNA-seq following pou4-2 RNAi will be carried out to compile a more comprehensive list of downstream targets. We will perform functional tests on candidate genes by performing RNAi experiments and test for sensory defects to determine whether the rheosensation phenotype seen following pou4-2 RNAi is the result of failure to activate these downstream targets. Revealing their expression patterns through WISH experiments will indicate possible physiological roles in particular cell types. These two points of data taken together are anticipated to expand our understanding of how Pou4-2 activity leads to differentiation of multiple sensory neuron types.

379 12:30 pm SS

Determining the molecular function of bacteria stimulated animal development

Kyle Malter, Cell and Molecular Biology (D)

Bacteria-animal interactions play a widespread role in stimulating the developmental transitions of marine invertebrates. While these interactions are critical for processes such as coral reef formation, life history transitions, and biofouling. we know little about the mechanisms mediating these beneficial bacteria-animal interactions. In many marine invertebrates, Protein Kinase C (PKC) signaling has been implicated in mediating bacteria sensing and response, which canonically signals via lipid second messengers to directly induce a targeted signal transduction cascade in eukaryotes. To this end we have shown via a pharmacological and knockdown approach, that the PKC pathway is both necessary and sufficient to induce metamorphosis in a model tubeworm, Hydroides elegans. This evidence demonstrates that bacteria stimulation occurs via the PKC signal transduction pathway. We further determined that the bacterium, Pseudoalteromonas luteoviolacea (P. luteo), injects a protein effector we call Mif1, for metamorphosis inducing factor, that induces tubeworm metamorphosis through the cellular PCK response. The effector protein shares no homology to any known proteins, however, via biochemical analysis, we have shown this protein exhibits lipase activity and the products are sufficient to induce metamorphosis. Using metabolomics and establishing RNAi assays and collaborating this data with known pharmacological data we can reliably show specificity for the PKC pathway and yields insight into bacteria-sensing systems animals use to mediate developmental timing and response.

Session C-17

Poster Physical & Mathematical Sciences 6
Friday, February 28, 2020, 12:30 pm
Location: Montezuma Hall

380 12:30 pm TT

Spectroscopic Properties of Fluorescent 8-DEA-tc DNA-RNA Heterduplexes

Grace Kim, Chemistry (U)

Fluorescence in situ hybridization (FISH) has been a useful method for visualizing and identifying specific sequences in biological samples. However, this method has proven unreliable due to false positives by hybridizing with similar sequences that may differ by 1-2 bases and expressing similar thermostability as if perfectly complimented. As a result, fluorescence is the direct result of preferential binding, not necessarily sequence recognition; emphasizing the limitation of FISH. Our lab's nucleoside analogue 8-diethyl amino tricyclic cytidine (8-DEA-tC), made using organic synthesis, can potentially discriminate sequences more accurately than current hybridization methods. 8-DEA-tC has low intrinsic fluorescence (Φem =0.010) as a monomer, however the emission can increase up to 0.12 when 8-DEA-tC pairs with guanosine in double-stranded DNA (dsDNA)[1]. The fluorescence turn-on does not occur when 8-DEA-tC is mismatched with A, which may enable the use of 8-DEA-tC in higher fidelity probes.

Fluorescent properties of 8-DEA-tC were examined using PTI QuantaMaster QM-400 fluorometer and Shimadzu UV-1700 Pharmaspec spectrophotometer to compare emission spectra and absorbance spectra respectively. 8-DEA-tC DNA-RNA heteroduplex fluorescence turn-on is greater with RNA as compared with DNA when using otherwise identical sequences. By testing eight sequences, we found GXC to be the highest performing sequence with Φem of 0.22 and CXT as the lowest performing with Φem values from 0.10-0.17. CD spectra indicates that the 8-DEA-tC DNA-RNA duplexes adopt the A-form conformation, changing the electronic interactions with neighboring bases because they have different geometry of stacking. Duplex structure contributes to greater fluorescence of 8-DEA-tC but the overall quantum yield is influenced by changes in environmental conditions such as pH, solvent, polarity, and strand sequence.

[1] Teppang, K.L.; et al. Chem. -A Eur. J. 2019, 25, 1249-1259

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

381 12:30 pm UU

Electrochemically Controlled Dimerization of Ferrocene Ureidopyrimidone Derivatives. The Effect of Ferrocene Position and Electrostatics of the System

Veronika Mikhaylova, Chemistry Biochemistry (U)

Ureidopyrimidones (UPy's) are well-known to dimerize in weakly polar solvents such as CH2Cl2, via the formation of four strong, linear H-bonds. This, coupled with their relative ease of synthesis, has led to their use as a linker in supramolecular polymers and gels. The attraction of such materials is their inherent self-healing properties, whereby a defect can be repaired by using heat or mechanical stress to reversibly break the polymer at the H-bond sites. This increases the fluidity of the material, allowing the defect to fill in. Upon cooling or relief of stress, the H-bonds reform and the defect is repaired. However, while the use of heat or mechanical stress as stimuli are clearly useful, neither is inherently very selective. On-going research in our lab is focused on increasing the versatility of the UPy system by creating electroactive UPy's in which dimerization strength can be controlled in a more selective manner through oxidation and reduction.

Previously, our group has shown that dimers based on the ferrocene-UPy derivative, 1, break apart upon oxidation of the ferrocene to the ferrocenium form at mM concentrations in CH2Cl2. This could be due both to the creation of electrostatic repulsion and a decrease in H-bond strength due to the reduced H-donor ability of the O and N on the pyrimidone side.

In this project, another Fc-UPy has been prepared, 2, in which the ferrocene is attached to the urea side of the molecule. In contrast to 1, oxidation of 2 shows a single reversible ferrocene CV wave in CH2Cl2 at mM concentrations. Under these conditions, 1H NMR indicates that 2 is fully dimerized, thus, it appears that, unlike with 1, oxidation has no significant effect on dimerization of 2. In both cases, oxidation would increase electrostatic repulsion. However, unlike in 1, oxidation of 2 should actually increase H-bond strength by making the urea NH a stronger H-donor. Therefore, it appears that the effect of oxidation on the H-donating or accepting ability is a more crucial factor for dimerization control than electrostatics in these systems.

382 12:30 pm VV

Improving regiocontrol of Minisci-type alkylations on N-heterocycles using a Lewis acid blocking strategy

Ernesto Millan Aceves, Chemistry (U)

Over 80% of marketed small molecule pharmaceuticals contain a N-heterocyclic fragment. Due to the difficulty of synthesizing pharmaceutical analogs, there is a necessity to develop new late-stage functionalization methodologies. In particular, functionalizing heterocycles is a widely desired feat yet to be obtained. Within recent years, Minisci radical additions been employed towards the functionalization of electron-poor N-heterocycles due to their high reactivity through a radical mechanism, but the regio-control of Minisci radicals has proved difficult. Here we present our efforts to regioselectively control radical additions on N-heterocycles by adopting a bulky Lewis acid strategy.

383 12:30 pm WW

Asymmetric methodology to obtain selective atropisomeric BTK Kinase Inhibitors

Mariami Basilaia, Chemistry (M)

One of the biggest and influential gene families is protein kinases which play huge role in regulating majority of biochemical pathways and phosphorylates 30% of cellular protein changing their affinity, activity and location. Mutations or dysregulation of protein kinases can cause major disorders including neurological, metabolic, immunological diseases and cancer. Protein kinases are involved in coordination of complex pathways and signal transduction which makes them good drug targets. However, drug resistance and obtaining good inhibitor selectivity and potency are still very challenging. One way to increase kinase inhibitor`s selectivity is by adjusting an extended form of chirality known as atropisomerism. Stereoisomers (or atropisomers) are created by hindered rotation around the asymmetric atropisomeric sp2-sp2 axis. Our research intends to increase selectivity and potency of a pyrazolopyrimidine-based (PP) Bruton Tyrosine Kinase (BTK) inhibitor called Ibrutinib which is used as a therapeutic drug for B-cell malignancies such as Chronic Lymphocytic Leukemia. Our group changed diphenyl ether substituent to naphthalene with methyl group which helped to lock inhibitor in a specific dihedral conformation and found its barrier to racemization was 31.7 kcal/mol. In accordance to previous findings from our group we hypothesized that quinine-based ionic catalyst with strong base can be used for asymmetric synthesis of PP scaffold. With the current reaction conditions, we obtain 60% yield with 65:35 enatiomeric ratio (e.r.). Our goal is to optimize the conditions to get better conversion and increase enantioselectivity to 90:10. Difference in kinase selectivity of these synthesized enantiopure and racemic analogs can be tested by subjecting them to inhibitor profiling across different kinases. Synthesized analogs can be tested in cellular models of BTK driven cancers to see how effective they are. This proposed research provides an enantioselective methodology to synthesize atropisomeric analogs of Ibrutinib in order to greatly advance drug discovery.

384 12:30 pm XX

Synthesis of Atropisomeric Diarylamines as Scaffold for Kinase Inhibitor Development

Beeta Heydari, Chemistry (M)

Diarylamines are a prominent scaffold in the field of modern drug discovery. These structural motifs are common in many FDA approved drugs, such as binimetinib and bosutinib, which exist as rapidly interconverting diarylamine atropisomers. Atropisomerism is a type of conformational chirality that occurs when there is hindered rotation about a single bond as a consequence of steric or electronic constraints. By

exerting conformational control on the atropisomeric axis of a compound, this can constrain the molecule in a specific conformation which can lead to selectivity towards a certain biological target. Diarylamines contain two atropisomeric axes which have the potential to result in lower than expected barriers to racemization via a gearing mechanism involving the independent rotation of the two N-aryl groups. By using computational methods, we can predict how to control 1) steric bulk and 2) electronic interactions adjacent to the atropisomeric axes in a fashion that will likely rigidify both axes lending to an atropisomerically stable diarylamine. In parallel, generating dihedral angle maps will allow us to elucidate how certain proteins prefer to bind their ligands, thus providing a guide on which substituents and accompanying dihedral angle we should pursue. Synthesis of these molecules will require 3 – 5 steps, ending with a nucleophilic aromatic substitution (SNAr) using a substituted aniline. To determine how stereochemically stable each inhibitor is, we will perform barrier to rotation studies using chiral phase HPLC. Enantiopure diarylamines will be tested in cell based assays against their respective targeted proteins to determine selectivity and potency. With the biological results from our in vitro assays, we hope to generate trends on how accessible conformations leads to greater selectivity against target proteins and validate the findings of our dihedral angle maps.

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385 12:30 pm WW

Investigation of Fluorescence Quenching and the Fluorescence-Turn-On-Effect In Fluorescent Nucleosides

Harrison Pearce, Chemistry (D)

Fluorescent probes are molecules that have a change in fluorescence (peak positions and/or fluorescence quantum yield) in response to their surroundings. This has important applications in nucleic acid chemistry, such as the study of G-quadruplexes and the binding of protein to the major groove. The Purse group has recently designed and synthesized a variety of fluorescent analogs of the cytosine nucleobase from tricyclic cytosine (tC) scaffolds for elucidation of rational design principles. One of these compounds, 8-diethylamine-tC, displays a 20-fold increase in fluorescence quantum yield upon entering a DNA duplex formation, as compared to the free nucleobase. Interestingly enough, this increase depends heavily on the electronic nature of the nucleobase (due to electron-donating or -withdrawing groups) as well as that of nearby nucleobases. Experimental evidence by the Purse group suggests that this is primarily due to excited state proton transfer (ESPT) as opposed to solvent quenching, chloride quenching, or the molecular rotor effect. This presentation reports on calculations using density functional theory for the determination of the contributions of ESPT and vibrational relaxation to fluorescence quenching in base-paired and base-stacked tC analogs.

SRS

Abstracts of Presentations

Session D

SAN DIEGO STATE UNIVERSITY

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

Session D-9

Poster Behavioral & Social Sciences 14
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

386 2:15 pm A

Correlation Between Stress and Comfort in a Commuting Setting

Rebeca Pozos, Urban Studies/Urban Sustainability (U)

Many students that attend SDSU live off campus. Therefore, a large number of the student body must find a mode of transportation that suits their own needs in order to get to school. Due to the lack of cheap and convenient factors, many students have to endure certain discomforts and stress. We hypothesized that women would feel more stressed using public transportation because of safety concerns. Hence, they would feel more comfortable using a more private mode of transportation such as a car. On the other hand, males would not feel threatened or uncomfortable using public transportation. Based on our hypothesis, we used data from Dr. Appleyard's SDSU Travel Survey conducted in Spring 2019 and looked at both male and female students. The survey asked questions on gender, the mode of transportation used to get to school, and how much time it took to commute to campus. The survey also included questions about the level of stress and comfort that students felt when commuting to campus. However, there may be a bias towards the data because the Travel survey was voluntary. Therefore, many students may have not taken the survey. This means that the survey may not accurately represent the student body at SDSU. Some key findings that are based on the maps created, were that men seem to travel shorter distances compared to women. This may also affect the outcome of the data because commuting long distances also plays a role in added discomfort and stress. Through our data, we have found that females have a higher level of comfort when using a mode of private transportation (drive alone) compared to public transportation (bus and trolley) and males. The levels of stress are also higher in females based on the mode of transportation they take. In order to gain a much broader understanding, we would include other data to help extend the correlation between comfort levels and stress levels regarding gender.

387 2:15 pm B

Market Failure of Parking Permits and Transit Pass at SDSU Campus

Daniel Mendoza, Economics/Public Policy (U)

In accordance with the SDSU climate action plan, there are currently 6 policy goals that aim to deter transportation related carbon emissions. My policy is based on market failure theory, where we will adjust the price of the parking permit and the transit pass. One way to reduce demand is to increase the price for parking permits and simultaneously decrease the price of the near substitute: the transit pass. This policy would increase the current parking permit price by implementing a pollution tax, included in the permit price. Furthermore, the revenue from the pollution tax can be reinvested to subsidize the transit pass and thereby making the transit pass cheaper for commuters. By using the tax revenue for the transit subsidy, we ensure that this policy is levied at no extra cost to the university.

Policy questions that will be answered in my research include: how much should the pollution tax be? Based on Economic theory, the correct market price should be where we have accounted for the negative externalities which in our case will be health costs created by SDSU commuters as estimated by Dr. Appleyard. Furthermore, I have developed a consumer demand model for this market by using data from the Spring 2019 travel survey where we asked participants on their respective willingness to pay.

The second part of my policy uses the tax revenue from the pollution tax to subsidize the transit pass. Questions facing this policy are: given the budget from the tax revenue, how much can we subsidize each transit pass? The same consumer demand model will be derived by using data from the travel survey.

By answering these questions, policy suggestions can be made to the university regarding the optimal price for the parking permit and the transit pass. The data will present how many commuters behavior we can expect to change with the new optimal prices and how much carbon emissions will be reduced. It is our hope that by researching innovative solutions other campuses can follow our policies and methods toward net carbon neutrality.

388 2:15 pm C

Value of Contingency Planning in the Face of Potential Family Separation

Lorena Garcia, Social Work (U)

Background: Immigration and Customs Enforcement (ICE) removals have dramatically increased during the past few years and an unprecedented number of undocumented Latinos living in the United States report having concerns about being deported. Despite the extensive negative effects of deportation on families and their increased concern, some families may not have a contingency plan in place in the event of deportation. This study examined the measures Latinos are taking to prepare

in the event of deportation, the factors that affect planning, and the consequences of not having a plan.

Methods: This qualitative study used data from 22 key-informant interviews. A purposeful and snowball sampling approach was used to recruit participants. The analytic sample included attorneys, legal assistants, community organizers, social workers, psychologists, labor union workers, and physicians that serve Latino families impacted by deportation. The participants' years of work experience ranged from one to 33 years, with an average of 11.45 years. Content analysis was used to develop codes and identify themes, using both an inductive and deductive approach.

Results: All participants acknowledged that family separation, as a result of deportation is a common occurrence among mixed citizenship status families in the U.S. Participants noted that while fear of deportation is prevalent among Latino immigrants, families are reluctant to develop contingency plans. Key-informants related this reluctance to denial, reliance on faith, and individuals not understanding the deportation process. Lastly, it was identified that not having a contingency plan can place families at risk for chronic psychological and functional sequelae, including anxiety, financial strain, homelessness and in some cases, children may fall under child welfare custody. One key-informant reported, "Due to ignorance of the process they waited to file their claim, by the time they did, the children had already been given up for adoption".

Conclusions: The increased number of ICE removals and detrimental effects of family separation noted in the literature suggest it is important for families to develop contingency plans. This study highlights some of the contributing factors to Latino families not developing plans and elucidates the need to develop culturally aware deportation readiness intervention programs.

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389 2:15 pm D

Environmental Aesthetics

Austin Cosler, Philosophy (M)

Throughout the semester in a course titled global aesthetics we have been looking at a variety of art forms and theories that could potentially constitute a universally accessible aesthetic experience. An aesthetic experience seems to involve a response to beauty that evokes a significant emotion and provides meaningful insight. Accordingly, I found that the most accessible activity is going outside to appreciate nature. I call this environmental aesthetics, and it is much more than just going outside, it is a spiritual experience if we let it be. The external environment becomes a catalyst for beauty, and in turn evokes an emotion in us that is enlightening. This process can change the way people live and view themselves in relation to all Creation. Environmental aesthetics can connect people in a deeply emotional way, and constitute a shift in our values. The different values that we perceive change the way we function and evolve as a society.

390 2:15 pm E

Sexual Exploitation Among College Students: An Exploratory Study In San Diego State University Student Body

Lauren Azar, Social Work (M)

Introduction: San Diego is ranked in the top ten cities for human trafficking in the US, yet less is known about the nature and extent of sexual exploitation on U.S. college campuses.

This study explores the nature and extent of sexual exploitation among college students. We hypothesize 1) a lack of basic needs (food, housing, etc.) are positively associated with likelihood of trading sex, and 2) help-seeking behavior is negatively associated with sex trade involvement, 3) the knowledge level of sex trade/sexual exploitation and reduced stigma towards those trading sex are positively associated.

Methods: A quantitative online survey gathered information from 100 college students/alumni recruited at SDSU to determine the level of knowledge, reduced stigma, and help-seeking support regarding sexual exploitation, and motives for entering the sex trade. The SDSU Institutional Review Board approved the protocol. Participants were convenience sampled; they responded to fliers posted in campus bathrooms. Survey measures included: knowledge of and attitudes towards sex trade, peer connections to sex trade, sex trade involvement (or likelihood of), motives for involvement, sex transaction characteristics, stigma, help-seeking behavior and socio-demographics (e.g., housing and food insecurity, prior experiences with sexual exploitation). A human trafficking survivor community leader vetted the measures.

Anticipated Results: Sex trade involvement and sexual exploitation are expected to be associated with 1) housing and food insecurity, 2) a fear of seeking help due to stigma or the potential perceived consequences of revealing one's involvement in sex trade to others, 3) less stigmatization with awareness.

Conclusion: Findings can shed light on knowledge of sexual exploitation and risk factors for becoming sexually exploited among college students. We hope to uncover a pattern of sexual exploitation, views on it, and potential associated stigma among SDSU students. Findings could inform a need for reducing stigma and discrimination towards students who engage in transactional sex to ensure they feel safe and comfortable seeking out necessary support without fearing penalization or shame.

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

391 2:15 pm F

Predictors of Suicidal Ideation among Pediatric Patients seen in an Emergency Department

Khusnnora Satybaldiyeva, Epidemiology (M)

Background: In the United States, suicide was the second leading cause of death among 10-17 year olds in 2017. Although the suicide rate among adolescents is increasing at an alarming rate, information regarding the prevalence, predictors, and treatment for suicide-related behaviors is lacking. Among the different suicidal behaviors, suicidal ideation has been shown to forecast suicidal attempts, even when controlling for depression symptoms. Therefore, it is important to prioritize riskfactors of suicidal ideation before exploring factors that cause someone to attempt suicide. Although a few studies have shown that children do plan and attempt suicide, very few have been able to identify the risk factors associated with suicidal ideation. The emergency department proves to be an ideal environment for the detection of risk factors among suicidal youth. This is due to the fact that there is an increasing number of children presenting to the emergency department for mental health reasons. Therefore, physicians who assess the suicidal children in the emergency room must be equipped with the proper knowledge and referrals to mental health resources. Suicidal ideation that is not identified in the emergency department has been shown to contribute to morbidity and mortality and is greatly associated with an increased health care cost. All of these components illustrate a need for a study that establishes the major predictors of suicidal ideation in prepubertal emergency department patients. It is important to determine key risk factors of

suicidal ideation in young adolescents seen in the emergency department in order to provide more targeted interventions for the highest at-risk populations. Therefore, identifying predictors of suicidal ideation and intervening early reduces the associated mortality and morbidity by making it possible to eliminate the need for any future intervention.

Methods: This was a retrospective, nested case-control study that was deemed exempt by the SDSU institutional review board. The study population consisted of children seen at Rady Children's Hospital in San Diego, California from June 1st, 2017 to May 31st, 2018. Data were abstracted from the electronic medical record (EMR) system. All patient records, identified electronically, were reviewed manually. Data collected included patient age, sex, race, ethnicity, health insurance, history of suicidal ideation, history of suicidal attempt, history of self-mutilation / cutting, current antipsychotic medications prescribed prior to the ED admission, chief complaint(s), ED length of stay (LOS), family functioning, family history of psychiatric disorders, psychiatric diagnoses, and patient disposition. Eligible subjects were children between the ages of 5 and 12 seen for behavioral health reasons in the emergency department (ED). Cases were defined as those with a chief complaint of suicidal ideation or suicidal attempt as identified using ICD-10 codes. Controls were defined as those with a psychiatric chief complaint that did not include suicidal ideation or suicidal attempt. Control subjects were not matched to the cases on age and gender in order to capture variability of suicidal ideation by age and sex. The dichotomous outcome of interest was suicidal ideation and was coded as 1= "yes" or 0 = "no". The analytic sample in this study consisted of XXX adolescents (without missing values on sex and race and ethnicity). In line with previously conducted research, we examined risk factors that were shown to be associated with suicidal ideation and suicide attempts. The sociodemographic predictors we assessed included age, race and ethnicity, and sex. Familial risk factors that were explored included living situation, family functioning, and a family history of psychiatric disorders.

Behavioral and psychological characteristics that were assessed included previous suicide attempts, depression, history of self-mutilation / cutting, psychiatric diagnoses, and a history of suicidal thoughts. Bivariate associations between suicidal ideation and the previously specified risk factors will be examined with $\chi 2$ tests of significance. The associations between the significant risk factors and suicidal behavior will be determined using a logistic regression model. All analyses will be performed by using SAS version 9.4. Results to follow.

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392 2:15 pm G

Impact of Advance Care Planning Education Intervention on Advance Directive Completion and End of Life Communication Among Hispanic Cancer Patients

Nayeli Gonzalez, Social Work (M)

Background: Advance care planning (ACP) is reflecting on end-of-life (EOL) care goals, engaging in EOL communication and documenting treatment wishes in an advance directive (AD). Despite positive recognition, Latinos are less likely to know and complete ADs. Patient navigator-led ACP education need has heightened, yet little is known about its effect with rural cancer patients.

Aim: To explore ACP intervention effectiveness to increase knowledge and behaviors in ACP and EOL care preferences in rural Latino cancer patients.

Design: One group pretest-post test was done with 40 Latino cancer patients who were the service recipients of Cancer Resource Center of the Desert.

Methods: This is part of a larger ACP study where patients without an AD were invited to receive a patient navigator-led ACP education with MI counseling approach. In total, 40 patients participated from Jan 2018-Jan 2020 via face to face and phone interviews at two time points: baseline and 6 month-follow up. Pre-test interview was 30-40 min and post-test interview was 15-20 min. Study was approved by the SDSU IRB.

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Data analysis: Descriptive statistics were used to report the participant's socio-demographic and health related information. Bivariate analysis using McNemar's chi-square test was done to examine pre-post proportion change in knowledge and behaviors in ACP and LST preferences.

Results: The majority were female (n=34). Half (n=21) had breast cancer and 21% (n=9) were diagnosed with cancer in Mexico. ACP intervention showed that after receiving education, 25% (n=10) completed ADs. Of those who had not had EOL communication with family (n=26), over half (n=14) reported communication with their family (p<.05). AD knowledge significantly improved with half of those without AD knowledge (n=14) (p<.05). No difference for EOL communication with MD and EOL care preferences was found.

Implication/ Conclusion: Findings indicate that Latino cancer patients haven't had EOL conversations with physicians, but AD education improved AD completion and EOL conversations with family. Results suggest that more efforts are needed for AD education for patients to increase AD knowledge and completion. More research is needed to know how to improve EOL communication between physicians and patients, like bidirectional education or health system changes.

Session D-10

Poster Health Nutrition & Clinical Sciences 4
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

393 2:15 pm H

Barriers and Supports Related to Exclusive Breastfeeding Duration among Hispanic Women

Flor Gallegos, Nursing (U)

Background: Exclusive breastfeeding is defined by the sole intake of breast milk during the infant's first six months of life. It is significant to exclusively breastfeed a newborn because of the abundance of nutrients that can lead to optimized overall health. Hispanic women are less likely to exclusively breastfeed their infants. Therefore, their infants are prone to not getting the proper nutritional benefits that breastmilk provides. Hispanics born in the United States are less likely to initiate breastfeeding compared to Hispanic immigrants and are less likely to continue exclusive breastfeeding than other ethnic groups.

Purpose: The purpose of this literature review was to identify the barriers and supports related to exclusive breastfeeding among Hispanic mothers living in the United States. In addition, to find out in detail what type of education has supported an increase in the duration of exclusive breastfeeding for Hispanic mothers.

Methods: A literature review was conducted using the Keywords of Hispanic women, exclusive breastfeeding, education, barriers, and supports. Google Scholar, PubMed, and CINAHL databases were searched. A total of twelve studies were reviewed. Studies were included if they were written in English, focusing on Hispanic mothers during their third trimester up to six months postpartum. Both qualitative and quantitative studies were included.

Results: Barriers and supports related to exclusively breastfeeding were recognized. Some of the barriers related to exclusive breastfeeding were limited information about the available resources, lack of family support especially for working mothers, and convenience and availability of formula feeding. Education supported both the initiation as well as the continuation of exclusive breastfeeding for the first 6 months. The two main forms of educational strategies that the literature demonstrated were traditional and e-learning.

Conclusion: The literature supported that providing education significantly impacts the duration of exclusive breastfeeding among Hispanic women. This literature review suggests further research regarding educational strategies that are associated with a higher intention to mothers exclusive breastfeeding.

394 2:15 pm I

HPV Vaccination Knowledge & Beliefs: A comparison between U.S- México Border Area Residents and Non Residents

Priscila Chagolla, Public Health (U)

Background: Disparities in cancer knowledge have been identified among residents living near the U.S. and Mexico border. Human papilloma virus (HPV) infection, linked to most cervical cancer cases, is preventable by vaccination. The purpose of this study was to assess HPV related knowledge, attitudes, and behaviors at a granular level among Mexico-US border residents .

Methods: San Diego Moores Cancer Center and San Diego State University Institute for Public Health collaborated to conduct a San Diego County assessment. A total of 5,000 surveys were randomly mailed out in both Spanish and English. In which 1,000 of those surveys were specifically sent out to households in ZIP codes along the US-Mexico border in San Diego County. In this analysis comparing those residing in border-adjacent ZIP codes (BA n=72) to the remainder of the county being considered (RC n=422) using t-tests and chi-square tests. The goal of the survey is to identify disparities in cancer knowledge, attitudes, beliefs and behaviors by race/ethnicity, SES, geographic area.

Results: It was reported that respondents who lived in a border region zip codes (BA) had a significantly higher misconceptions regarding the HPV vaccine when compared to respondents that live in non-border zip codes (RC). Respondents living in border region (BA) had a higher agreement that the HPV vaccine was not properly tested (36% versus 16% in RC; p=0.001). Significantly more BA reported agreeing HPV vaccine encourages promiscuity (31%) compared to RC (12%; p=0.001). A higher proportion of BA respondents also agreed with the statement HPV vaccine can give you HPV and cause cancer (24% versus 8% in RC; p=0.001).

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Discussion: Significant differences were identified between BA and RC. A higher level of misconceptions and understanding regarding the HPV vaccine were noted among BA residents when compared to RC. This leads to believe not enough resources may be available among border residents to provide and educate individuals, specifically when it comes to HPV vaccine. These findings also suggest further investigation in the comparison of demographic differences between BA and RC residents.

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395 2:15 pm J

The relationship between household food insufficiency and development of type 2 diabetes over 10 years in a sample of U.S. black and white adults

Cynthia Chow, Public Health/Epidemiology (M)

Objectives & Hypothesis: Our objectives were to test the relationship of 1) HFI during young to middle adulthood with odds of T2D over 10 y, and 2) transient (1-2 times) or persistent (3 times) HFI over 10 y with odds of T2D. We hypothesized that 1) HFI would be associated with higher 10-y odds of T2D, and 2) transient and persistent HFI over 10 y would be associated with higher odds of T2D.

Methods: We used Years 15, 20, and 25 data on black and white adults (n=2952; 32-49y) in the U.S. Coronary Artery Risk Development in Young Adults (CARDIA) Study (2000-2011). Participants with missing HFI or T2D data, diagnosed T2D at Year 15 (and Year 20 for objective 2), or reported pregnancy were excluded. A screener question with four response options captured HFI each year; participants were categorized with HFI if they reported that the food they had to eat was: not always what they wanted, sometimes not enough, or often not enough. If not, they were categorized as food sufficient. American Diabetes Association cutoffs for laboratory values of fasting glucose and glycated hemoglobin defined T2D. Multivariate-adjusted, repeated-measures generalized estimating equations tested the relationships between 1) HFI at Year 15 with odds of T2D at Year 25 and 2) transient or persistent HFI from Years 15 to 25 with T2D at Year 25.

Results: T2D prevalence in the sample was 0% at Year 15, 4.7% at Year 20, and 9.7% at Year 25. At Year 15, 13.2% reported HFI, and 22.1% and 3.4%, consecutively, were categorized with transient or persistent HFI across 10 y. Adjusted for age, sex, and race, HFI at Year 15 was associated with T2D by Year 25 (Odds Ratio (95% Confidence Interval (OR (95% CI)): 1.37 (1.01, 1.87); $p<0.05$), though the relationship was attenuated with education and income in the model (1.29 (0.93, 1.78)). Compared to food sufficiency over 10 y, participants with transient or persistent HFI had higher odds of T2D at Year 25 in fully-adjusted models (OR (95% CI): transient HFI: 1.59 (1.01, 2.52), $p<0.05$; persistent HFI: 2.17 (1.03, 4.59), $p<0.05$).

Conclusions: Repeated exposure to HFI in young to middle adulthood may be a risk factor for developing T2D among black and white adults. Preventing and reducing HFI may be a strategy to reduce socioeconomic and racial disparities in T2D prevalence in the U.S. Funding Sources: SDSU University Grants Program; NIH NHLBI K0.

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396 2:15 pm K

Student Nurse Empowerment in Death and Dying

Shaina Marie Jacob, Nursing (M)

Introduction: Death and dying are infrequently discussed in undergraduate nursing programs, yet are core aspects of nursing. There is an absence in the literature of student nurses' education regarding death and dying, their perceptions of their abilities to take care of a patient during this process, and their ability to incorporate these experiences meaningfully into their practice.

Purpose: To assess undergraduate nursing students' perceptions of their own empowerment to adequately provide care for people during end-of-life (EOL) and to assess the need for increased formal education and clinical experience.

Methods: A non-probability convenience sample of 64 senior undergraduate nursing students was obtained after the conclusion of class using a 28-item structured self-administered questionnaire assessing empowerment using the Psychological Empowerment Instrument. Empowerment was operationalized into four separate concepts: meaning, competence, self-determination, and impact.

Results: Of 64 participants, 75% reported having discussed the death and dying process with a clinical instructor or preceptor. 84% reported discussing this topic during pre-/post-conference of their clinical. The following empowerment subscale score averages indicated a high level of empowerment: meaning - 77.5%, competence - 71.9%, self-determination - 64.1%, impact - 64.2%. However, when asked if there was anything else about the dying process they wished to know, nearly 80% of students expressed concern and uncertainty. Themes extracted include: handling emotions (5.7%), what happens during and after death (14.2%), self-care (5.7%), providing a supportive presence (12.8%), and how to communicate with patients and families (38.5%).

Conclusions/Implications: Quantity or breadth of experience with EOL care did not appear to influence feelings of empowerment across the four domains of meaning, competence, self-determination, or impact. Clinician burnout, intention to quit, and depression is strongly associated with the provision of non-beneficial care (Lambden, 2019). Despite these motivators to engage more meaningfully in EOL discussions and care, the barriers to providing quality EOL care for nurses have changed very little in nearly twenty years (Beckstrand, 2017). Nurse educators should consider increasing both didactic and clinical learning opportunities related to the care of the dying.

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397 2:15 pm L

Use, Knowledge, and Perception of Electronic Cigarettes in Undergraduate Nursing Students

Brittany Kinsler, Nursing (M)

Background: The use of Electronic Cigarettes (EC) has increased rapidly over the past 10 years, possibly due to a belief that they are less harmful than traditional tobacco use. The FDA, CDC alongside state and local governments are investigating the growing cases of lung injuries, hospitalizations, and deaths in relation to EC use. Nursing students are well positioned to be educators if they have a full understanding of the consequences of EC use.

Purpose: Evaluate the use/exposure to, attitude towards, and knowledge of EC among undergraduate nursing students.

Design and Methods: A cross-sectional study was conducted using non-probability convenience sampling. A 56 item self-reported questionnaire was created in likeness from a similar study by Frank et al. in 2014. This replication study expanded on the Theory of Reasoned Actions framework. The framework led to the development of four additional questions to gain information about the likelihood of nursing students to engage in smoking cessation education in a clinical setting. Additional substantiation was completed using a CVI index to increase the validity of the entire questionnaire.

Results: This sample contained 63 senior undergraduate SDSU nursing students who were mostly females (90%) between the ages of 20-29 (95%). Almost a third of students reported smoking ECs at least once in the past year, while 87% believe that ECs are equally/more harmful than tobacco smoking. The majority of respondents (78%) do not perceive they have been equipped with adequate training to approach patients about cessation, and 62% believed an alternate medical professional is better equipped to help patients quit smoking. A fifth would not offer cessation education to tobacco users, while 24% would not offer cessation education to EC users, and 46% would be more likely to offer smoking cessation to a tobacco user than an EC user.

Conclusion: These findings may suggest that undergraduate nursing students perceived receiving less than adequate education on EC/tobacco cessation and its harmful effects. Students also reported not feeling equipped to educate future patients about smoking cessation. These students lack adequate empowerment and information to comfortably engage other on cessation engagement.

398 2:15 pm M

Language barriers in self-management outcomes for patients with heart disease

Phuong Nguyen, Public Health (M)

Introduction: In 2014, over 8.3 million Californians have at least one disease related to cardiovascular health. Self-management is an evidence-based solution that may lower hospitalization and death rate. The confidence of patients relates to the effectiveness of self-managing chronic diseases in adhering to the instructions of physicians. While many studies address racial/ethnic differences in heart disease treatment, less is known about the experiences of patients who are also limited English Proficient (LEP). Thus, we are unclear if LEP patients are engaging in self-management plans at a similar rate as well if they feel confident in managing and controlling their diseases as a result of these plans when compared with their English proficient (EP) peers. This study analyzes the relationship between English proficiency and self-management plan provided and confidence in managing their heart diseases.

Method: The California Health Interview Survey (CHIS) will be utilized to compare patients who are LEP and EP. Using sensitivity analysis (Chi-squared) to identify significant differences between groups between demographic characteristics and self-management plan provided and the patient's confidence. A logistics regression multivariable model will examine the association between plan provided and the patient's confidence among LEP and EP patients.

Expected Results: We anticipate our model to demonstrate significant differences in self-management plan uptake based on language proficiency and other factors. We expect the data will demonstrate patients who are LEP will be less likely to have their doctors provide a self-management plan. Further, we anticipate LEP individuals are less or more likely to be confident compared with their EP peers in controlling and managing their disease.

Discussion: Language barriers should be addressed as a role in heart health disparities in addition to race and ethnicity. Since communication difficulties might lead to the lack of confidence in self-management among heart disease patients, training doctors to enhance the communication between physicians and patients as well as improve access to appropriate education programs and materials could help to improve heart disease care and self-management.

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

Session D-11

Poster Behavioral & Social Sciences 15
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

399 2:15 pm N

Parallel processing of semantics in the flanker paradigm: Evidence from the N400

Jacqueline Manning, Psychology (U)

Previous studies have demonstrated that target words (e.g., wolf) elicit faster and more accurate responses following words that have related meanings (e.g., coyote) compared to following unrelated words (e.g., sock). This facilitated processing, known as semantic priming, is also reflected in the event-related potential (ERP) waveform. ERPs are used to measure the electrical activity of the brain. The N400 is a peak in the ERP waveform that occurs about 400 ms after a word is presented and is associated with lexico-semantic processing. When target words are presented after words that have related meanings, they elicit smaller N400 amplitudes, which reflects less effortful processing. Here, we investigated semantic priming in the flanker paradigm. In this paradigm, central target words are presented at the same time as parafoveal "flanker" words. Here, we presented participants with target words matched with semantically related flanker words (e.g., coyote wolf coyote) and unrelated flanker words (e.g., sock wolf sock). Their task was to indicate whether the target word was an animal or not. Analyses focused on animal targets. Finding a smaller N400 for targets presented with semantically related flanker words would suggest deep processing of foveally presented stimuli (i.e., a semantic priming effect in the flanker paradigm). In contrast, if the N400 elicited by targets in the related and unrelated conditions is comparable, then this would suggest that the semantics of the flanker words has little influence on target processing. We found a reduced N400 amplitude for targets in the related condition compared to the unrelated condition, indicative of a semantic priming effect in the flanker paradigm. We conclude that participants were processing the semantics of the parafoveal flankers even though they were irrelevant for the task at hand. Moreover, the targets and flankers appear to have been processed in parallel such that the semantics of the flankers could influence our on-line measure of target processing.

400 2:15 pm O

Blocked vs Random Design: Masked Repetition Priming using Event-Related Potentials

Emily Akers, Psychology (U)

The masked priming technique has been widely used in behavioral studies to isolate the earliest processes involved in visual word recognition. When combined with event-related potentials (ERPs), known for having excellent temporal resolution, this technique can reveal the time-course of the rapid low-level processes that happen within the first 500ms of word processing. The question of where in the brain these processes are originating is better addressed by a method with good spatial resolution such as functional magnetic resonance imaging (fMRI). Unfortunately, there are few such studies combining fMRI and masked priming. This might be because the typical random presentation design used in most fMRI studies produces very small effects. Blocked fMRI designs are known to increase fMRI effect sizes but historically are not used because they allow participants to develop strategies to help with the task. Because participants are not aware of the prime words in masked priming, they presumably cannot develop such strategies, so a blocked paradigm should be possible. Here we tested the feasibility of blocked masked priming in an ERP experiment contrasting repetition priming (repeated vs. unrelated target words) in a blocked versus the typical random mixed design. The block design consisted of a series of 12 trials in one condition (e.g., repeated -- table-TABLE, house-HOUSE) followed by 12 trials of the other condition (e.g., unrelated. e.g., sugar-PHONE, plate-WATER). The random design intermixed the two trial types (e.g., table-TABLE, sugar-PHONE) as is typically done in priming studies. In 20 participants we found the typical pattern of ERP masked priming on the N/P150, N250 and N400 components in the standard random mixed design run. Importantly, the same pattern of ERPs was found in the blocked design and there were no significant differences in the size or scalp distribution of these priming effects across the two design types. These data suggest that using a blocked design in an fMRI masked priming study is feasible.

401 2:15 pm P

Attention to Salient Emotional vs. Non-Emotional Stimuli in Anxiety

Megan Spence, Psychology (U)

Deficits in attentional processes are thought to be an important etiological factor in anxiety disorders. However, there are multiple processes of attention, and the specific aspects of attention that are impacted in anxiety are not well understood. To address this, the present study uses electroencephalography (EEG) to measure the event-related potentials (ERPs) of attention associated with the selection of a stimulus (the N2pc, measured over posterior regions) and the suppression

of a stimulus (the PD, measured over these same posterior regions). Furthermore, we measure these neural processes while participants perform two tasks: 1) a standard visual search task that includes a salient, non-emotional singleton distractor stimulus on each trial, and 2) a dot-probe task that includes stimuli that are conditioned to be emotionally threatening through an aversive fear conditioning procedure involving electric shock. By examining attentional processes in the context of salient stimuli that are emotional versus non-emotional in the same participants, we can better understand how attention differs as a function of the emotional nature of a stimulus. Moreover, we collect measures of anxiety levels in each participant to determine the precise relationships among attention, stimulus type, and anxiety. ERP results from both tasks as a function of anxiety level will be presented.

402 2:15 pm Q

Discriminating between autism-related social deficits and social anxiety in adolescents with autism spectrum disorders

Monica Deyski, Psychology (U)

There is some overlap in the presentation and manifestation of autism-related social deficits and symptoms of social anxiety, leading to a potential misidentification of an individual's diagnosis. The differential diagnosis of autism vs. social anxiety has considerable practical value, including initiation of appropriate treatments and interventions specific to each diagnosis. Given the gender imbalance in prevalence of both autism spectrum disorders (approximately 4:1 male to female ratio) and social anxiety (greater prevalence in females), this study set out to investigate social anxiety symptoms in male and female children with ASD and their typically developing (TD) peers. 126 children and adolescents (N=126; ASD: 66 males and 20 females, TD: 27 males and 13 females) between 7-19 years of age (mean=13.2), enrolled in the ongoing study of brain development in autism, completed the Screen for Child Anxiety Related Disorders (SCARED), a measure of anxiety symptoms, which provides specific indices of phobia, generalized anxiety disorder, separation anxiety, social anxiety, and school related anxiety. Social impairments were assessed with the Autism Diagnostic Observation Schedule (ADOS-2), a clinician-based measure of current autism symptoms, and the Social Responsivity Scale (SRS-2), a parent-reporting scale of the child's social behavior and communication. Results of two-way ANOVAs, with gender and diagnosis (ASD, TD) as independent variables, revealed main effects of diagnosis ($p<0.001$ for all SCARED scales) and gender ($p<0.05$ for overall, and generalized anxiety symptoms). Namely, children and adolescents with ASD reported significantly higher levels of anxiety, across all SCARED scales, in comparison to TD adolescents, while females displayed higher generalized anxiety than males. Second, to examine whether the level of autism-related social impairments (as measured with ADOS-2 or SRS-2) was differentially associated with the level of anxiety symptoms in males vs. females with ASD, we conducted multiple regressions, with gender and social impairments as predictors and SCARED Social Anxiety as a dependent variable. Results revealed no significant effects of social deficits on social anxiety symptoms. These results may have significant implications for the understanding of the differences between autism-related social deficits versus social anxiety across both genders in those affected by autism spectrum disorders.

403 2:15 pm R

Functional connectivity within the anxiety network is atypical in middle-aged adults with autism and associated with anxiety symptom severity

Ryan Tung, Psychology (U)

Functional connectivity within the anxiety network is atypical in middle-aged adults with autism and associated with anxiety symptom severity

Background: Behavioral evidence shows high prevalence of anxiety in autism spectrum disorders (ASDs). Brain regions implicated in social anxiety have been found to have atypical functional connectivity in autism. However, few functional MRI studies of ASD have taken comorbid anxiety into account, and it remains unclear whether atypical connectivity is directly related to anxiety levels in this population. Even fewer studies have focused on middle-aged adults with ASDs. The current study contrasted functional connectivity between brain regions within the anxiety network in adults with and without autism, and tested for differences in relationships between functional connectivity within the anxiety network and anxiety symptom severity across diagnostic groups.

Methods: 22 adults with ASD (16 male; Mage = 49.5 years) and 26 TC adults (22 male; Mage = 51.0 years) completed the Beck Anxiety Inventory (BAI) and a resting state functional MRI scan. An anxiety network consisting of 12 regions of interest was defined, based on a large meta-analysis in TC individuals and 2 previous studies on anxiety in autism. ANCOVA was used to test for main effects of group and group by anxiety interactions on functional connectivity within this anxiety network, controlling for head motion. Results were FDR corrected at $q < .1$ (corrected).

Results: Adults with ASD showed both higher anxiety scores and underconnectivity within the anxiety network, mostly involving the bilateral insula. Connectivity within the anxiety network in the ASD group showed distinct relationships with anxiety symptoms, but did not relate to autism symptom severity. Specifically, we found positive correlations between anxiety and functional connectivity involving the bilateral posterior insula in the ASD (but not the TC) group.

Conclusions: Increased levels of anxiety in middle-aged adults with ASD are associated with atypical functional connectivity, predominantly implicating bilateral insula. Results were not related to autism core symptom severity suggesting independence of anxiety-related differences.

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

404 2:15 pm S

Subcortical volumes in middle-aged adults with autism spectrum disorders and typical control adults

Emma Churchill, Psychology (U)

Autism Spectrum Disorders (ASDs) are characterized by impairments in communicative and social interactions as well as restrictive and repetitive behaviors. Abnormalities in subcortical brain structures, such as the amygdala, caudate, or accumbens may help explain these atypical behaviors. For example, greater caudate volume and atypical rates of development of the nucleus accumbens have been linked to repetitive behaviors in ASDs. Most previous imaging studies of ASD have focused on participants under eighteen years of age. However, possible brain and behavioral changes in aging are almost completely unstudied in ASD. As people with ASD age, there may be an increased risk to develop abnormalities or progressive neurological disorders, making this an important area of study.

Objective: Study differences between middle-aged adults with ASD and matched typical control (TC) subjects on volumes of subcortical brain structures and for effects of age on these structures.

A sample of 65 participants (31=ASD, 34=TC) aged 40-64 years was examined. ASD diagnosis was confirmed by clinical psychologists and supported by the Autism Diagnostic Observation Schedule, 2nd ed. (ADOS-2). IQ was assessed by the Wechsler Abbreviated Scale of Intelligence-II. Magnetic Resonance Imaging was used to collect brain images. The software package FreeSurfer was used to semi-automatically extract volumes for the right and left thalamus, caudate, putamen, accumbens, pallidum, hippocampus, and amygdala, as well as total brain volume (TBV) and results were visually inspected to confirm accuracy. Groups were matched on age, performance IQ, and TBV. Linear regression was used to test for group, age, and group-by-age effects on subcortical volumes while controlling for TBV.

Reduced volumes (ASD<TC) approached significance for the left caudate (t=1.82, p=.08) and right hippocampus (t=1.91, p=.06). Significant negative age effects were found in the left (t=-3.764, p<.01) and right (t=-2.68, p=.01) hippocampi, with a further trend toward a negative age effect for right accumbens (t=-1.79, p=.08). No significant group-by-age effects were found.

Although no significant group or group-by-age effects were found, the trends toward reduced left caudate and right hippocampus volumes merit further examination. Investigation of more homogeneous subgroups (e.g. based on symptom severity, or limited to oldest subjects) may reveal late-developing effects.

Session D-12

Poster Engineering & Computer Sciences 10
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

405 2:15 pm T

Post-fire soil processes in urban and Mediterranean watersheds

Rey Becerra, Civil Engineering (U)

Increasing wildfires can pose environmental challenges in urban watersheds by altering the physical and chemical properties of soil. In southern California, invasive plant species in urban riparian systems may contribute to geomorphic changes after fires. This research focuses on the Del Cerro fire in Alvarado Creek, a tributary to the San Diego River in California. The study area is characterized with dense non-native vegetation cover (primarily Arundo Donax), which is localized in the stream beds and highly flammable. This work analyzed the post-fire sediment response after the 2018-2019 storm events in upland and riparian areas of the creek. Sixteen soil samples were collected and consisted of a top (0”-6”) and bottom (6”-12”) layer. A Loss on Ignition (LOI) test was performed on soil specimens to measure the change in organic content. Particle size distributions for each soil layer were determined using a standard sieve analysis. Lastly, a Fall Cone Test was performed for the top layer soil samples to determine the shear strength at which sediments less than 0.450 mm are susceptible to transportation. The LOI analysis of the upland top layer revealed a 34% loss of organic matter after the first post-fire storm, while the riparian zone had an 11% decrease. The particle size distribution showed sediments between 0.425 mm to 0.180 mm were susceptible to erosion in both upland and riparian areas, sediment presence decreased from 13.4% to 2.85% by weighted mass in the hillslope area and in the riparian zone from 13.4% to 0.9%. The fall cone results showed that the upland soil increased 10% in water content at the liquid limit, which translated to particle transport due to the decrease in soil shear strength from 2.8 kPa to 1.9 kPa. Samples in riparian areas had poor particles size distributions and experienced lower rates of sediment movement after the storm events. This information will help to improve our understanding of the functions and interactions between upland and riparian soil processes in urban stream systems.

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406 2:15 pm U

Persistence of sewage-derived bacteria and viruses in soil

Mia Gil, Environmental Engineering (U)

Sewage spills and leakage from sewer infrastructure can pose health and environmental risks associated with exposure to pathogenic bacteria, viruses, and other microorganisms. During storm events, sanitary sewer overflows may also occur and result in sewage contamination of soils. For this research, the main objectives are to study the persistence of bacteria and viruses in soil and understand their decay rates. Near the Alvarado Creek, soil samples were collected and placed into sterilized falcon tubes to then be spiked with untreated wastewater from a water reclamation plant. All the samples were placed inside of a biosafety cabinet to be kept at an ambient temperature and then analyzed for dissolved organic carbon (DOC), total dissolved nitrogen (TDN), fecal indicator bacteria (FIB: total coliforms and E. coli), Pepper Mild Mottle Virus (PPMoV), and Bacteroides HF183. Flushing and decay experimental treatments were tested. The flushing experiment had spiked soils left overnight to dry and then repeatedly flushed with synthetic rainwater. The decay experiment had spiked soils left dry for different durations (1, 7, 14, 28, 60 and 121 days) and then subsequently flushed once with synthetic rainwater (decay experiment). Both experimental treatments were performed in duplicate. For the flushing treatment, FIB concentrations showed a 2- to 3-log reduction and HF183 showed a > 3-log reduction. However, 104 to 106 MPN/100mL of FIB were still detected after 20 flushes. After the long-term drying of spiked soil, there was a > 5-log reduction of E. coli, > 3-log reduction of HF183, and only <1-log reduction of PMMoV. Decay rates were -0.197 to -0.219 d-1 for E. coli, -0.0813 to -0.107 d-1 for HF183, and -0.028 to -0.037 d-1 for PMMoV, reflecting the greater resistance of PMMoV to degradation. Despite some reduction in bacterial and viral concentrations, there were still measurable concentrations of viable bacteria and other microbial markers in soils after repeated flushing and long term drying. These results have important implications for having more frequent inspections of sewage spills and leakage from sewers to help prevent long-term source of pathogenic bacteria that has the potential to impact river quality in arid environments.

407 2:15 pm V

Post-Fire Turbidity and Soil Erosion Modeling in an Urban Environment

Kevin O'Marah, Civil Engineering (U)

Urban areas tend to have increased runoff due to increased impervious surfaces. Urban stormwater quantity and quality are of concern due to increased human activity, which can lead to increased pollutant loads. Turbidity is an important parameter in water quality, which approximates the presence of suspended particulates in the water. High turbidity can decrease the amount of light passing through water, which can impact the photosynthetic activity of plants and algae, decreasing the concentration of oxygen. After a wildfire, turbidity generally increases due to increased surface water and sediment contribution. Less is known about the impact of a fire in urban areas on turbidity and the response over time. This research focuses on Alvarado Creek, a tributary of the San Diego River in California, which was burned by a fire in June 2018. Continuous data were collected and analyzed throughout the 2018-2019 storm season. Measurements of turbidity, water depth, conductivity, dissolved oxygen, and pH were measured with a Hydrolab HL4 sensor approximately every 20 minutes and consolidated into hourly or daily means for analysis. The prestorm turbidity was approximately 12 NTU and during a storm event, the turbidity was measured at up to 1655 NTU during the 2018 storm season and 338 NTU during the 2019 storm season. The data also showed that the first storm of the season resulted in the highest turbidity as well as a much lower peak turbidity between successive storm seasons. It was also observed that there was a significant decrease in dissolved oxygen during the first storm event of about 4 mg/L and a decrease in pH from approximately 7.5 to 6.5. Although the pH and dissolved oxygen returned to baseline levels, they continued to drop during storm events. This data will be compared to other relevant post-fire studies, models, and regional limits. This research provides a better understanding of the temporal patterns of turbidity in post-fire urban environments and how accurately computer programs such as DisturbWepp, AGWA, and ERMit can predict how the watershed will recover following a fire.

408 2:15 pm W

Flood after fire in Southern California – Incorporating Machine Learning to Identify Important Parameters for Process-based Hydrologic Models

Brenton Wilder, Civil Engineering/Water Resources (M)

Following wildfires, the probability of flooding and debris flows increase, posing risks to human lives, downstream communities and infrastructure, and ecosystems. In Southern California (USA), the Rowe, Countryman, and Storey (RCS) 1949 methodology is often used to rapidly estimate post-fire peak streamflows. RCS is an empirical method that predicts peak flow and is based on rainfall-runoff data collected prior to

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1949 and does not reflect current hydrogeomorphic conditions and extreme weather events due to climate change in Southern California. This research estimated post-fire peak streamflows for 28 watersheds in Southern California. To evaluate model performance, observed streamflow data were compared to RCS predictions before and after wildfire. Where data were available, RCS was used to predict peak flows up to 70 years after fire, indicating a full recovery of the watershed and a return to pre-fire conditions. RCS pre-fire results yielded mean absolute percent error of 167% for the 2-year event and 41% error for the 10-year event. RCS post-fire results, without bulking factors, under predicted post-fire peak streamflows for 2-, 5-, and 10-year events for 16 of the 28 watersheds during the post-wildfire recovery period. Local physiography, land cover, geology, slope, aspect, rainfall intensity, and soil burn severity were incorporated into a calibrated random forest (machine learning) algorithm to characterize model performance across various watersheds. Analyses demonstrate that the RCS model may be overgeneralizing watershed processes and may not represent the spatial and temporal variability present in systems affected by wildfire. This novel presentation of a machine learning technique to improve the characterization of post-fire response of small watersheds will guide future work towards the development of process-based hydrologic models for predicting post-fire peak streamflow.

Session D-13

Poster Health Nutrition & Clinical Sciences 5
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

409 2:15 pm X

Effects of balance training with visual perturbations on people with incomplete spinal cord injury

Angelica Mora, Kinesiology (U)

Background: Humans rely on sensory signals such as vision and proprioception to maintain balance. Proprioception is the perception of one's body in space and can be greatly affected after a spinal cord injury (SCI). Although vigorous exercise can improve walking speed and unobstructed walking, individuals with incomplete SCI still tend to rely more on vision rather than proprioception. Thus, their balance may be compromised, leading to falls and decreased balance confidence.

The purpose of this study was to determine the effects of using stroboscopic glasses (glasses that intermittently block vision) combined with vigorous exercise on walking speed and balance in individuals with incomplete SCI. By using stroboscopic glasses, patients are forced to rely less on vision and attend to residual proprioceptive information to maintain balance and maximize their rehabilitation potential.

Methods: Two individuals with incomplete SCI participated in 12 high intensity exercise sessions while wearing stroboscopic glasses. The glasses switched between transparent (8 seconds) and opaque (1.5 seconds).

Before and after the 12-session training period, participants completed assessments measuring their walking ability and balance (6 minute walk test (6MWT) and tandem standing,). During training, participants exercised for 40 minutes while wearing stroboscopic glasses. Exercises included walking on a treadmill and balance activities over ground. We assessed heart rate (HR) and rate of perceived exertion (RPE) throughout exercise. High intensity was defined as 70-85% of the participant's max HR or a 5-7 on the RPE scale.

Results: Both participants (P1 and P2) experienced improvements with their endurance and balance. For P1, time in tandem standing increased by 9.9s with eyes open and 1.7s with eyes closed. Distance in the 6MWT increased by 7.9m. For P2, time in tandem increased by 9.7s with eyes open and 26s with eyes closed. Distance in the 6MWT increased by 12.6m.

Discussion: Our results suggest exercise with stroboscopic glasses may help to improve walking balance in individuals with incomplete SCI. Further research with more participants and a control group is recommended to confirm whether the use of stroboscopic glasses improve a SCI patient's walking ability and balance.

410 2:15 pm Y

Reliability of NordBord Nordic Hamstring Exercise Testing in Healthy Adults

Justine Buenaventura, Kinesiology/Physical Therapy (U)

Purpose/Hypothesis: The Nordic Hamstring Exercise (NHE) is used for strengthening and rehabilitation of the hamstrings. The NordBord device (NB) was developed to objectively and simultaneously assesses bilateral HS muscle performance during the NHE. Research to date using the NB NHE has included high level athletes. The purpose of this study was to evaluate reliability of NB NHE testing in healthy adults.

Methods: Thirty-one participants (16 women), attended two test sessions. Participant characteristics (age, height, and bodyweight), activity level (Marx activity questionnaire), and determination of dominant lower extremity (LE) were obtained during a NHE familiarization session. A five-minute stationary bike warm-up was completed prior to performing the NHE testing. At each test session, two sets of five repetitions of the NB NHE were performed with a minimum two minute rest between sets. Peak force (newtons, N) was recorded for the dominant (DOM) and non-dominant (NDOM) LE. Reliability was evaluated with intra-class correlations. Paired t-tests assessed strength differences between legs. Pearson's r was conducted to assess correlations between Marx Activity Scale and peak LE force.

Results: ICC values ranged from 0.93 (DOM LE) to 0.94 (NDOM LE) for males and 0.96 (NDOM LE) to 0.98 (DOM LE) for females. Paired t-tests were significant for the first ($p=0.000$) and second ($p=0.006$) sets, and non-significant for the third and fourth sets ($p>0.12$). There was a small positive correlation

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(r=0.28 NDOM LE and r=0.31 DOM LE) between participant activity levels (Marx scale) and peak force.

Conclusion: Test-retest reliability of the NB NHE is very high in previously untrained healthy adults. There was a low correlation between NHE peak force and participant activity levels. NB NHE testing in young adults can be used with high reliability and is not contingent upon activity levels or prior NB NHE experience.

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411 2:15 pm Z

Associations between Sport Specialization, Income, and Injury among Collegiate Athletes

Bailey Bingham, Athletic Training (U)

Background/Objective: Sport specialization is defined as "year-round intensive training in a single sport, at the exclusion of other sports." While some research exists that has identified a correlation between specializing in a sport and injury prevalence, there is very little information regarding at what age these adverse effects begin to take place. In addition, income also places further limitations that may inhibit an athlete from receiving equal opportunities of access to both sport opportunities (i.e. club teams) and healthcare providers. This study aims to analyze associations between sport specialization, income, and injury prevalence.

Methods: 110 collegiate athletes (average age: 20.2±1.3 years old) participated in a cross-sectional survey that asked questions regarding age, home zip code (for estimating socioeconomic status), sport participation history, sport specialization status (using a validated scale), and injury history. To estimate socioeconomic status (SES), we used Census Bureau data to determine the median household income of a particular zip code. To analyze income data, participants divided into SES tertiles: low ($72,000 & below), medium ($72,001 to $99,000), and high ($99,001 & greater). When analyzing sport specialization status, participants were broken up into three age groups based on when they began specializing: Developmental (ages 4-11), Adolescent (ages 12-17), and Adult (ages 18+).

Results: We found that athletes who specialized earlier were more likely to report sustaining an injury during their sport career. Looking at the percentage of athletes that sustained an injury in high school, the Developmental specialization group (72%) reported the most, the Adolescent group (64%) second, and the Adult group (46%) the least. Among the high SES group, 92% of athletes specialized prior to adulthood, in comparison to the 79% and 84% of the low and medium groups respectively.

Conclusions: Our results suggest those of wealthier incomes have the resources available to specialize at an earlier age, but that an earlier age of specialization may increase the likelihood of sustaining an injury during their youth sports career. Further research is needed in specific sports to determine whether certain sports are at higher risk for long-term effects and what age is too young to begin specializing.

412 2:15 pm AA

Increased muscle co-contraction around the ankle joint and center of pressure beneath the foot associated with increased chance of falls in elderly adults

Khoa Vo, Kinesiology (U)

Some elderly adults can have balancing problems, causing them to fall. Balance is the ability to maintain and move within the body weight. Falls can cause disability, impaired function, and decreased quality of life for the elderly population. The purpose of this study is to see differences in muscle co-contraction around the ankle joint and the center of pressure beneath the foot, and to evaluate the correlation between the muscle co-contraction around the ankle joint and the center of pressure (COP) beneath the foot between young adults and elderly adults during static balance test. In this study, there are 8 young group (YG) (age: 21.8 ± 1.87 years; height: 171.6 ± 11.27 cm; weight: 66.6 ± 9.73 kg) and 8 elderly group (EG) (age: 68 ± 7.94 years; height: 158 ± 8.10 cm; weight: 60 ± 11.40 kg). Electromyography (EMG) and force plate were used for this study to record the electrical activity of tibialis anterior (TA) and gastrocnemius (GA) and COP during single leg stance. Each participant will perform 3 repetitions of maximal voluntary contraction (MVC) and 3 repetitions of single leg stance with eyes-open (EO) and eyes-closed (EC) for a maximum of 30 seconds. There is a difference of the muscle co-contraction around the ankle joint and COP beneath the foot between YG and EG during the single leg stance. However, there is no correlation between the muscle co-contraction around the ankle joint and the COP beneath the foot between YG and EG during single leg stance.

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413 2:15 pm BB

A fast-start pacing strategy does not improve locomotor fatigue dynamics but does improve supra-critical power work capacity

Tori Simon, Exercise Physiology (M)

The limit of tolerance for high-intensity constant power exercise is dictated by a hyperbolic relationship of power and duration. This relationship is defined by two parameters - the asymptote, termed critical power (CP) and the curvature constant (W'). Unexpectedly, the pacing strategy for which a participant expends W' also affects exercise performance. This suggests W' is far from a simple work constant. PURPOSE To measure locomotor muscle fatigue dynamics and exercise tolerance during a fast-start pacing strategy compared to a constant power task. METHODS Volunteers (N=15, 27±4yr, 176±7cm, 77±12kg) completed two constant power and one fast-start exercise tasks to the limit of tolerance above CP. The second constant power task controlled for a possible learning effect. Maximal isokinetic power was measured throughout as an index of locomotor fatigue. RESULTS Compared to

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constant power pacing, a fast-start pacing strategy resulted in augmented tolerance to supra-critical power exercise of 51 ± 50 s. Tolerance to constant power exercise was reproducible and was not different before and after the fast-start strategy bout. The decline in maximal isokinetic power was not different during constant power and fast-start pacing strategies, nor was there an interaction of pacing strategy and time (F[5, 168]=0.5, p=0.75). Maximal isokinetic power was lower during the fast-start strategy vs constant power when the data were normalized to baseline isokinetic power (F[1,168]=6.2, p=0.01). However, no interaction of pacing strategy and time was present (F[5,168]=0.39, p=0.85). CONCLUSIONS. While fast-start pacing improved exercise tolerance and augmented the supra-critical power work tolerance, the dynamics of locomotor fatigue were not different between conditions. Interestingly, our data argue against a fixed volume of work (W') above critical power and lend more evidence that W' is a result of a complex conflation of fatigue-related processes rather than an energy store.

414 2:15 pm CC

Greater Severity and Functional Impact of Post-Traumatic Headache in Veterans with Comorbid Neck Pain following Traumatic Brain Injury

Robyn Bursch, Physical Therapy (D)

Purpose/Hypothesis:Traumatic brain injury (TBI) affects 1.7 million people in the U.S. annually, the majority being mild in severity (mTBI). Post-traumatic headache (PTH) is one of the most common symptoms experienced after mTBI caused by head or neck trauma and is often refractory to treatment. Although military veterans commonly experience mTBI after blast or blunt injuries that likely affect musculoskeletal structures in the neck, the impact of cervical symptoms on PTH following mTBI have not been well characterized in veterans. This study aims to compare the severity and functional impact of PTH in veterans with and without comorbid neck pain following mTBI.

Materials and Methods: 33 veterans with PTH after a mTBI were identified from a secondary analysis of data from a prior study. Headache symptoms (Patient Health Headache Questionnaire (PHHQ)), fatigue (Multidimensional Fatigue Symptom Inventory Scale (MFSI-SF), insomnia (Insomnia Severity Index), mood disorders (Beck Depression (BDI) and Anxiety (BAI) Inventories), and physical and mental role function (SF-36) were compared between groups with and without comorbid neck pain.

Results:Twenty-two of 33 (67%) participants with PTH had co-morbid neck pain. Those with PTH and comorbid neck pain reported more severe headaches (P = 0.049), insomnia (P = 0.003), and fatigue (P = 0.040) as well as more physical role limitations (P = 0.036)and higher overall bodily pain (P = 0.012) compared to those without neck pain. Headache location, duration, and frequency did not significantly differ between groups (P ≥ 0.05). There were also no significant group differences in mood or mental role limitations (P ≥0.05).

Conclusions: Two-thirds of veterans with mTBI and PTH reported comorbid neck pain. Veterans with PTH and neck pain reported increased severity of headache and poor physical health compared to those without neck pain, despite no differences in emotional health. Greater symptom severity and poor physical role function in this subgroup of individuals suggest a need for future research to determine if veterans with PTH would benefit from targeted evaluation and treatment of cervical symptoms to improve headache outcomes.

Session D-14

Poster Behavioral & Social Sciences 16
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

415 2:15 pm DD

A Closer Look at Common Core Exemplars

Savannah Irwin, Psychology (U)

As an elementary school student, books serve as mirrors, windows, sliding glass doors, which allow students to connect with themselves and their school and classroom literature environments. Continuously, the connection children make between themselves and their curricula at a young age helps establish their future identity as adults. The CCBC reports that in 2018 there were 3653 books published and only 405 were about black people, 55 about American Indians, 249 about Latinx, and 314 about Asian or Pacific Islanders. Although we know that the teacher force is made up of 83% white females, we are aware that the student populations in these classrooms are much more diverse. This factor also contributes to the learning environment in which this curricula is taught and brought into the classroom. In using Ladson-Billings work around culturally relevant teaching and knowing the power of the literature used in classrooms, this study will explore the California Common Core State Standards for inclusion and representations of diversity. This study will look to explore the question: to what extent are the California CC Text Exemplars inclusive and representative of underrepresented cultures, and how these representative texts are present and promoted in the libraries and classrooms of Southern California schools? This project will use quantitative inquiry to investigate relationships between text exemplars in the CCSS and race, language, and ethnicity. The findings of this study will provide insight into the realities of inclusion and representation of race, language and culture within classroom literature and the California education system. It will also provide significant suggestions for updating

and inclusion practices for California's next adoption of the Common Core State Standards. Through this research we will gain insight on how this representation of different groups in text exemplars in its correlation specifically to the diverse population that can be seen in California classrooms. A secondary phase of this study will be to visit various community schools to assess whether the literature offered and available to the student body is representative of the ethinic makeup of the student population.

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416 2:15 pm EE

Minority vs. White Perspectives: Context Ethnic Diversity Indicators Differentially Predict State-Level Implicit Biases

Brigitte Tomma, Psychology (U)

Prior research documents that context ethnic diversity is related to implicit interethnic biases. However, these relationships are complex in the sense that different indicators of context diversity predicts distinct implicit interethnic biases. The aim of the present study was to examine the extent to which these relationships vary depending on the ethnic identity of participants. Individuals belonging to an ethnic minority group may differentially experience the diversity of the environment they are immersed in compared to White individuals. Large Project Implicit datasets were used to assess the direction and strength of implicit interethnic biases at the state level. Data were taken from the following four Implicit Association Tests: Black-White evaluative associations, Black-White weapon associations, Asian-European American identity associations, and Native-European American identity associations. These data were combined with three indicators of context diversity based on the 2010 U.S. Census. Minority representation was operationalized as the prevalence of a specific ethnic minority group in the state (Black, Asian, or Native Americans depending on the task). Variety reflected the extent to which various ethnic groups are evenly represented in the state. Integration referred to the extent to which ethnic groups are similarly distributed at the state vs. neighborhood levels. For each task, regression analyses were performed at the state level for minority and White participants. For minority participants, as their representation increased in the state, they displayed weaker implicit pro-White biases. For White participants, variety and integration were more consistently associated with weaker implicit pro-White biases, but it was the opposite for minority representation in one case (Black-White evaluative associations). The findings point to the relationships between context ethnic diversity and implicit interethnic biases being different as a function of participants' ethnic identity. Individuals belonging to an ethnic minority group seem particularly attuned to the visibility of their group in the context. In contrast, individuals belonging to the White majority are more sensitive to the multiethnic nature of the context.

417 2:15 pm FF

U.S. Students of Indigenous Descent Returning into the Mexican Educational System

Luis Betancourt, Latin American Studies (M)

This preliminary research attempts to identify the challenges that U.S. transnational students of indigenous descent enrolled in K-12, encounter when they return to their native community in Oaxaca, Mexico and reintegrate in the educational system. Zuñiga and Hamann (2019) define a transnational student as an individual who has completed his/her education in more than one country, in this case, between the U.S and Mexico. These authors identified two migratory periods that explain the increased of this student population in Mexican schools. The first period is known as the Great Migration, from 1986 when the United States government approved the Immigration Reform and Control Act (IRCA) to 2005. The second goes from 2005 until today and marks the Great Expulsion period in which thousands of mexican immigrants have returned to Mexico due to stricter migratory policies, an increase in racial and anti-migrant sentiment, and economic crisis. Based on this, most transnational students are at risk of experiencing a disruption in their education when they move to another country (Zuñiga & Hamann, 2006/2008/2013; Jacobo-Suarez, 2017; Cortez, 2015; Camacho-Rojas, et. al., 2017; Franco-García, 2017; Tacelosky, 2018; Despagne, et. al., 2016; Smith, et. al., 2003). This qualitative preliminary research was based on semi-structured interviews conducted face to face and field notes. A total of 9 individuals were interviewed including school officials, administrators and teachers. The questions were based on three areas of inquiry: 1. Are K-12 teachers being prepared to meet the needs of returning English dominant students?, 2. How are current teachers in indigenous communities of Oaxaca addressing English dominant students in their classrooms?, 3. How are families addressing the complexity of their children's integration in their natal communities with regards to identity and linguistic challenges? The hypothesis suggests that due to the Great Expulsion period the number of students in the community increased. However, the results showed that more students leave the community instead of returning. Only a small number have returned and stayed for a short period of time before moving back to the U.S. Suggestions about what can be done to smooth the transition of returning transnational student will be presented.

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418 2:15 pm GG

A Person-Centered Investigation of Time Urgency and Related Work-Outcomes

Rebecca Harmata, Industrial Organizational Psychology (M)

Time urgency is a multidimensional construct that describes an individual's concern with the passage of time. Previous research has provided evidence of seven distinct time urgency dimensions: time awareness, eating behavior, scheduling, nervous energy, list making, speech patterns, and deadline control. Previous studies examined the linear relationship between time urgency and work attitudes. However, this linear, variable-centered approach assumes the relationship between time urgent dimensions are homogeneous. Companies are increasingly requiring employees to work in fast-paced environments with tight schedules, but individuals tend to differ in their approach to time management and deadlines. Thus, there is an untapped need for research to explore possible variable configurations within the time urgency construct. The person-centered approach to time urgency classifies individuals into profiles based on their time urgency dispositions. These profiles can then be linked to relevant work outcomes. Three hundred and seventy travel agents from agencies in the United States were surveyed in a prior study (Conte, Ringenbach, Moran, & Landy, 2001) using Landy et al.'s (1991) time urgency Behaviorally Anchored Rating Scales (BARS). The current study focuses on the workplace outcomes of job satisfaction and psychological burnout. Latent profile analyses were conducted to extract profiles from the seven time urgency indicators. Three profiles emerged from the data: 1) Low Time Urgency, 2) Average Time Urgency, and 3) High Time Urgency. Additionally, these profiles significantly differed overall on intrinsic satisfaction, depersonalization, and personal accomplishment.

419 2:15 pm HH

Examining the Effects of Interleaved Solutions and Problem Solving on Math Fluency Outcomes

Brianna Wuensch, Psychology (M)

The objective of this study is to determine if the use of Interleaved Solutions and Problem Solving (ISPS) improves basic mathematic fluency and student attitudes towards math. ISPS is an intervention that provides interwoven solved examples on a worksheet to aid students in independently completing an assignment. The use of ISPS addresses motivational and behavioral factors that may influence a students' ability to solve problems quickly and accurately. The participants were two third-grade elementary students identified by their teachers as needing additional support in basic math computation skills. Results found a positive increase in math fluency outcomes, as well as, significantly higher scores on the Attitudes Towards Math survey for both participants. More research is needed to explore how behavior and motivation are pertinent components of successful mathematic interventions.

Session D-15

Poster Biological & Agricultural Sciences 5
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

420 2:15 pm II

Characterization of Q425: an anti-CD4 antibody

Citlayi Villaseñor, Chemistry/Biochemistry (U)

Mammalian immune systems employ proteins called antibodies that target and counteract the effects of harmful pathogens. Antibodies can also target antigens that are native to the environment within the body. We are studying the Q425 monoclonal mouse antibody that binds CD4 as its antigen. CD4 is a transmembrane glycoprotein expressed on the surface of T helper cells, which are important cells in the adaptive immune system. Although Q425 does not hinder HIV-gp120 binding to CD4, Q425 has been reported to prevent advancement of HIV infection. Due to Q425's amino acid sequence similarity with a previously crystalized metalloantibody, LT1009, we hypothesize that Q425 uses calcium in a similar manner to bind CD4. We employed the Bac-to-Bac baculovirus-encoded recombinant protein expression system to produce Q425 Fab fragments from Spodoptera frugiperda (Sf9) insect cells. Both heavy and light chains contain N-terminal secretion signals and the heavy chain possesses a histidine-tag at its C-terminus for affinity purification. We employed pulldown assays and western blot to confirm our recombinant antibody requires calcium to bind CD4. Additional western blot analysis provided evidence that Q425 does not bind phosphorylated amino acid residues of CD4. We are currently determining the epitope on CD4 that Q425 binds to by researching the best method of cleaving CD4 to generate peptides for LC-MS-MS analysis. Once the epitope is recognized, we aim to crystallize Q425 in complex with the CD4 epitope and calcium to determine the binding mode.
This project has been supported by a grant from the National Institute of General Medical Sciences of the National Institutes of Health: SDSU MARC U*STAR 5T34GM008303-29.

421 2:15 pm JJ

Characterization of Amplified Malate Dehydrogenase 1 (MDH1) in the Context of Squamous Cell Lung Cancer

Sati Alexander, Biology (U)

Cancer cells often reroute or stimulate their metabolism to support proliferation, which can require a change in the activity or regulation of key metabolic residues. Malate dehydrogenase 1 (MDH1) catalyzes the NADH-dependent conversion of oxaloacetate to malate, which can help drive glycolysis through the production of NAD+. MDH1 is amplified in many squamous cell lung carcinomas, the second leading cause

of cancer-related death, and this amplification is associated with a poor prognosis of 50% reduced survival. The precise role of MDH1 in driving squamous cell lung cancer and the mechanisms that regulate this protein are not yet well understood. Here, we sought to develop a tool to examine the effect of MDH1 amplification in an in vitro model of squamous cell lung carcinoma. We will examine how MDH1 amplification affects squamous cell carcinomas by using biochemical kinetics and cellular methods. We have found that MDH1 amplification influences the production of metabolites in the TCA cycle. Through monoclonal single cell isolation, we generated a squamous epithelial lung cancer cell line stably overexpressing MDH1. Using Western immunoblotting, we have identified cancer-relevant pathways that appear to be affected by MDH1 overexpression. We will also heterologously express and purify MDH1 mutants and perform kinetic assays to examine the impact of amplified MDH1. By understanding the effects of MDH1 amplification in tumor models, we hope to identify new pathways that may be targeted therapeutically.

422 2:15 pm KK

Mechanisms of malate dehydrogenase 1 regulation

Ngoc Huynh, Chemistry (M)

Malate dehydrogenase 1 (MDH1) catalyzes the reversible NADH-dependent reduction of oxaloacetate to malate in the cytosol, helping drive glycolysis by generating nicotinamide adenine dinucleotide (NAD+). Many cancers rely on increased rates of glycolysis to fuel the metabolic needs of rapidly proliferating cells. In non-small cell lung carcinomas (NSCLC), MDH1 appears to support proliferation of tumor cells by fueling glycolysis with the regeneration of NAD+. NSCLC patients with amplified MDH1 have a 50% reduction rate of survival and MDH1 is associated with poor prognosis. These findings suggest MDH1 may be a potential therapeutic target. However, studies of kinetics of human MDH1 is limited. Our goal is to characterize the kinetic activity of MDH1. We hypothesized that MDH1 activity is inhibited in the presence of reactive oxygen species (ROS). To test our hypothesis, we heterologous expressed MDH1 from Escherichia coli and purified the enzyme using affinity chromatography. The catalytic activity was determined by monitoring NADH consumption at 340 nm using a spectrophotometer upon incubating MDH1 with oxaloacetate and NADH under steady-state conditions. Then, we repeated this assay where we created an oxidative environment for the enzyme by adding oxidized glutathione (GSSG). The enzyme activity was 6-fold lower than that measured in reducing conditions. Glutathione alone does not oxidize NADH, which implies the observed loss in enzyme activity is due to the effect of glutathione on the enzyme conformation. In the future, we will employ site-directed mutagenesis to probe if cysteine residues are sensitive to oxidation to cause our observed inhibition.

423 2:15 pm LL

Using Metabolomics to Determine the Effect of Dihydromyricetin on Alcohol Metabolism

Kristin Hughes, Chemistry (M)

Alcohol is highly addictive with alcohol use disorder being the most common form of substance abuse. Chronic alcohol consumption has been attributed to the formation of acetaldehydes, oxidative stressors, proinflammatory cytokines, fatty acid ethyl esters, and hepatocyte lipid accumulation in the body. The toxicity of alcohol causes damage to the vital organs, most notably the liver, and can lead to a myriad of health complications such as cirrhosis and cancer. Dihydromyricetin (DHM) has been shown to counteract alcohol intoxication and antagonize the toxic effects of alcohol on the body. DHM, a flavonoid isolated from Ampelopsis grossedentata, has traditionally been used in Chinese medicine to alleviate the negative effects of alcohol and to treat hepatitis. In previous research, DHM has been shown not only to have antioxidant properties, but displayed anti-inflammatory, anti-microbial, and anti-diabetic behavior. In rats, drinking alcohol increased levels of malondialdehyde, a marker for oxidative stress, while antioxidant levels were decreased. However, treatment with DHM significantly reduced malondialdehyde levels and significantly increased antioxidant levels when compared to rats without DHM administration. It is believed that DHM may scavenge ROS to protect against oxidative stress. DHM is also known to inhibit the activity of alanine aminotransferase (ALT) and aspartate aminotransferase (AST) while increasing levels of alcohol dehydrogenase, thus minimizing damage of liver tissues. Although DHM has been shown to be beneficial, many of the mechanisms associated with its effects need to be explored further. This study will use untargeted metabolomic techniques such as liquid chromatography coupled with high-resolution mass spectrometry and bioinformatics to determine the unique metabolites that are present in the livers, kidneys, and spleens of DHM treated mice. These methods will indicate changes in the metabolic breakdown of alcohol and DHM's effect on the body. In doing so, this study hopes to elucidate what metabolic pathways may be affected by DHM and to draw definitive conclusions on how the metabolism of alcohol is altered when treated with DHM. I hypothesize that DHM directly affects the metabolism of alcohol in the body and will possesses hepatoprotective qualities that will be evident upon metabolomic analysis.

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

424 2:15 pm MM

Biomarker Detection via Capillary Electrophoresis for the Investigation of Extraterrestrial Life

Jessica Torres, Chemistry (M)

Ocean world moons such as Europa and Enceledus are a prime target in our exploration of potentially habitable worlds. These moons contain an ice shell over a liquid water ocean beneath which may contain extraterrestrial life. While extraterrestrial life may exist amongst these ocean waters, it is unknown which form “life” will take. To increase the possibility of detecting life, we plan to detect life at a molecular level. Biosignatures such as fatty acids are found in all three kingdoms of life on Earth and are the target for future space exploration missions.

Two approaches have been used for the detection of fatty acids in ocean water. Capillary electrophoresis coupled to laser induced fluorescence (CE-LIF) is an analytical method that has become widely used and effective tool for the analysis of proteins, peptides, and ions. This process is typically used for biochemical analysis and can achieve sub-part-per-billion limits of detection. The second method used is capillary electrophoresis coupled to electrospray ionization mass spectrometry (CESI-MS) a method which combines both CE and MS to provide a high efficiency separation and molecular mass information analysis. MS being a method that is ideal for planetary exploration as it allows identification of components in a sample.

This poster will present our method development process for the detection of fatty acids in ocean water samples. Fatty acids with carbon chain lengths between C2-C26 were fluorescently labeled and separated using our CESI-MS method providing nanomolar limits of detection. By using CESI-MS we have shown that the method developed would be suitable for detecting fatty acids in ocean water which could potentially be applied for future space exploration.

425 2:15 pm NN

Single Molecule Analysis on Membrane Recruitment of B-Raf

Andres Jimenez Salinas, Chemistry (D)

Rapidly Accelerated Fibrosarcoma kinase, RAF kinase, is an oncogenic protein found on the inner leaflet of the membrane bilayer and is part of the MAPK cascade, Ras-Raf-MEK-ERK. The pathway is activated through an extracellular signal, Raf transduces the signal to MEK through phosphorylation events at certain residues. This pathway is responsible for many mitogenic cellular events such as replication, differentiation and apoptosis. Raf kinase plays a crucial role in the regulation on the signal throughout the cascade and dysregulation of this Raf kinase can lead to uncontrolled cell growth which has been seen in a wide variety of cancers. The first step of Raf activation is membrane recruitment by Ras·GTP and lipid interactions with the Cysteine-Rich Domain (CRD). There has been an increased interest on B-Raf due to the paradoxical activation after the introduction of kinase inhibitors which may involve processes on the plasma membrane but is not entirely understood. Not much research has been done on specific lipid interactions of B-Raf. Studies have shown that certain basic residues found in A-Raf and C-Raf interact with the membrane, B-Raf has acidic residues in equivalent positions which could lead to unfavorable interactions with the membrane. We will use a supported lipid Ras bilayer to analyze the Conserved Region 1 (CR1), which consists of the Ras binding domain (RBD) and CRD in membrane like conditions using total internal reflection fluorescence (TIRF) microscopy. The conformational and physical characteristics of CR1 will be analyzed to determine the impact of lipid composition on membrane recruitment of Raf. Constructs will be tagged with Alexa-647 dye through a sortase tagging reaction, a dye-peptide construct would transfer the dye on to the protein of interest using sortase as the enzyme. Alexa-647 helps to visualize Raf without bulky visualization tags such as EGFP that may also interfere with normal Raf activity. Single molecule kinetic and step size distribution measurements will be taken using TIRF microscopy allowing us to visualize a shallow and specific area of the supported lipid bilayer. These experiments will lead to a better understanding of specific interactions during Raf membrane recruitment.

426 2:15 pm OO

Understanding IDH1 Regulation through Site Specific Acetylation Mimics

Joi Weeks, Cellular and Molecular Biology (D)

IDH1 is a cytoplasmic and peroxisomal enzyme that converts isocitrate (ICT) into a-ketoglutarate (aKG) using the coenzyme system NADP+/NADPH. Tumor-driving mutations in IDH1 primarily affect residue 132 in low grade gliomas and secondary glioblastomas leading to the NADPH-dependent production of the oncometabolite D-2-dehydroxyglutarate (D2HG) from aKG. Most mechanistic IDH1 studies focus on understanding mutant IDH1 and regulatory studies have focused on IDH1 in other organisms, leaving a gap in the mechanistic and regulatory information about human WT IDH1. Recent proteomics data identified lysine acetylation sites in WT IDH1, indicating IDH1 activity is potentially regulated by acetylation. We proposed to create lysine to glutamine (K-to-Q) acetylation mimics of identified sites of acetylation (Lys81, Lys224, Lys321) in IDH1 to determine their effects on WT and mutant activity. We hypothesized that acetylation would inhibit IDH1 activity when modified residues reside near the active site, and that this activity may affect WT and neomorphic activities differently. We show that IDH1 activity is mildly inhibited by non-enzymatic acetylation. We also show that WT IDH1 activity is inhibited upon mimicking acetylation at residues 81, 224 and 321, and that site-specific acetylation mimics can both amplify and inhibit the neomorphic activity catalyzed by R132H IDH1.

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Session D-16

Poster Engineering & Computer Sciences 11
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

427 2:15 pm PP

Baja Epi-Intra NeuroMEMS Device

Rene Arvizu, Mechanical Engineering/Bioengineering (U)

Introduction: Paraplegia affects over 300,000 people in the United States and is caused by a spinal cord injury which results in the loss of leg muscle function. Previously, the stimulation of spinal motor neurons was challenging due to the small size of the target area. In recent years there have been new methods to stimulate motor neurons to activate muscle groups that have been affected by spinal cord trauma. Our lab uses a Micro-Electro-Mechanical-System(MEMS) device with an array of glassy carbon electrodes layered with a neutral biocompatible flexible material. The device contains a penetrating shank that allows us to detect signals within the spinal cord. In collaboration with another lab, this device is being tested by implantation into the spine of mice.

Manufacturing and Characterization: The devices consist of using lithography to produce 5 layers; electrodes, base insulation, metal, polyimide, and top insulation. In order to determine the behavior of the glassy carbon electrodes, we used Electrochemical Impedance Spectroscopy(EIS) in a Gamry device and with a 3 probe set-up, a working electrode, reference electrode, and counter electrode and submerged it in a PBS solution. We used cyclic voltammetry(CV) to measure the reversibility of the electrode reactions and its charge capacity.

Baja Epi-Intra MEMS Device
Results: Fabrication of the devices is determined by the accuracy in the photolithography and development of the different layers of the device. During EIS we used a 1kHz because it is the characteristic frequency of a neural spike. the impedance at the metal bump pads was done using electrochemical impedance spectroscopy and satisfying the allow accurate measurement of signals. Impedance is measured through a range of frequencies, during testing, the glass carbon increased at a higher frequency, demonstrating capacitance behavior of the electrodes.

Discussion: We successfully were able to manufacture functional devices that are capable of being flexible while containing metal traces to transfer signals while implanted in the spine of a mouse. The characterization of the devices was successful and will continue to improve manufacturing processes.

428 2:15 pm QQ

Utilizing A 3D printer and Arduino Hardware to Build An Inexpensive Capillary Electrophoresis Instrument

Davis Klein, Biochemistry (U)

Capillary electrophoresis (CE) is a widely used and very effective technique to separate and quantify chemicals in complex mixtures, ranging from small ions in water, to the complete protein contents of a single cell. Though very useful, commercial CE instruments come with a high price-tag around $70,000, making CE a technology that isn't easily accessible to all.

The rise of additive and open-source technologies over the past decade has made the fabrication of even complex devices within reach for many. Using economically accessible parts and technologies, our aim is to build a CE instrument that can be made in-lab inexpensively. Though home-built CE instruments are not uncommon in academic settings, our device will incorporate automation which will allow the instrument to operate with minimal user intervention The parts for the instrument are custom designed and printed on a 3D printer The automation for the systems is accomplished with a mini-computer called an Arduino. The price tag of creating a CE device, including the cost of the 3D printer, currently stands around $1000, much lower then the $70,000 cost for commercial systems. This poster will discuss the usage of the Arduino for the control of several motors, a pressure valve, and the high voltage power supply in order to create a functioning CE instrument. It will also share methods and programming used to automate the functions of the CE and will explain how to use Excel as a simple programmable user interface for the CE instrument.

429 2:15 pm RR

Tri Hybrid Ultra Light Composites for Bio-applications

Christopher Oyuela, Mechanical Engineering (U)

The current research is focused on advancing microstructure tunability by designing micro-scale powders for use in novel tri-hybrid-ultra-light composites that should have use as new orthopedic implants with superior wear resistance and a modulus that matches that of bone. Previous work from our lab has shown success in dispersing titanium di-boride (TiB2) particles inside micro-scaled titanium powders to produce composite powders of Ti-TiB2. These powders are then mixed and sintered with pure titanium powder to produce Ti-TiBw dual matrix composites (through a high temperature in situ reaction that converts TiB2 to TiBw). The idea is to produce a titanium composites where the TiBw reinforcements are not homogeneously distributed but rather occupy regions of the microstructure that are separated by pure Ti. This

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microstructure creates superior tailorability of the properties and allow significantly improved properties than that of conventional composite, even at the same volume fraction of TiBw. However, we have previously found that these TiBw whiskers tend to grow outside the region and go inside the supposedly pure titanium regions. Hence this project is designed to produce dual matrix composites with whiskers totally bound within the microscopic regions. This is accomplished by milling Ti-TiB2 powders followed by converting the TiB2 to TiBw through high temperature annealing then remilling to entrap the grown whiskers back into the Ti-TiBw particles followed by mixing with titanium powder and sintering. An additional step will be to add to the Ti-TiBw/titanium powder mixtures to foaming precursor (Ti-TiH2) powders to produce tri-hybrid (partially foamed) composites.

430 2:15 pm SS

Effect of Outflow Graft Size on Stroke Risk of the Aortic Arch

Shelby Angel, Mechanical Engineering (M)

Heart Failure affects approximately 2.4% of the population with 500,000 new cases reported each year. Left Ventricular Assist Device (LVAD) is a mechanical pump that is surgically connected to the heart to boost blood flow. One devastating complication that can occur when using a LVAD, is stroke. The aim of this study is to visualize the blood flow within the aortic arch and pulsatility in the vessels. Measuring the flow velocity helps to assess the thrombosis potential since higher flow velocitys can cause blood cells to linger within the aortic arch and therefore form blood clots which can later cause a brain stroke.

Experimental studies were performed with a glass aorta, silicone model of the left ventricle, 14mm Tygon tubing outflow graft, and an LVAD. Fluorescent particles (PMMA-Rhb) were used to image the blood flow throughout the system. Pressure and flow rate were obtained using LabChart software. Distribution of particles was captured using LaVision Digital Particle Imaging Velocimetry software, CCD image intense camera, and a laser.

Boundary conditions were replicated from a study by Baht. Baht's study contained of a mean arterial pressure (MAP) of 105mmHg and aorta flow speed of 3.6L/min. Flow sensors were placed at the branches outlet and following the descending aorta. While collecting the continuous pressure and flow measurements, LVAD speed was increased from 8,000 to 11,000krpm. Clamps on Tygon tubing were adjusted to maintain a 1:3 branch to aorta flow ratio. Regions of Interest method was used to restrain the analysis to only the middle region of each branch to obtain the average flow distribution during the cardiac cycle.

Preliminary study demonstrated a post-LVAD mean pressure of 97.83±1.60mmHg, and a MAP of 101.25±1.61mmHg, like Bhat conditions, when ran at 11,000 krpm. Bhat reported a flow distribution of 73% systemic, 14.8% brachiocephalic, 4.7% carotid, and 7.3% subclavian for a 14mm graft at 45°. The 14mm 55° graft used in this study yield a flow distribution of 9.8% brachiocephalic, 8.3% carotid, and 8.9% subclavian. Flow distribution is similar to Bhats study but consist of a tighter variance. The velocity range of 0.3±0.15 m/s is comparable.

431 2:15 pm TT

Mathematical modeling and simulations of centriole positioning during mitosis of cells in confined environments

Nadia Beydoun, Bioengineering (M)

In order to properly undergo mitosis, epithelial cells pass through various biological checkpoints that cause cells to round up, stiffen and divide into two daughter cells. These checkpoints are influenced by biochemical and mechanical factors. Contrary to normal cell division, confined oncogenic cells are able to forgo mitotic rounding and proceed to divide into three to five viable progeny. Why cancerous cells are able to undergo mitosis in confined compact environments is not well understood. We hypothesize that success with confined cell division is at least partly driven by changes in the mechanistic properties and cortical rigidity of cancer cells. To test this hypothesis, we simulate microtubule-motor assembly driven mitotic spindle formation and the alignment of chromosomes along the metaphase plate as the cell rounds up during mitosis. We simulate the cell rounding process with and without confinement and identify the differences in spindle formation dynamics and spindle structure in the two scenarios. These findings will provide insights into the mechanistic pathways driving cancer cell proliferation during tumor growth.

432 2:15 pm UU

Receptor cross-talk prediction in epithelial cell stress signaling based on boolean network

Esra Tiftik, Engineering Sciences/Bioengineering (D)

Adrenergic signaling promotes tumor survival, growth and metastasis. The tumor is innervated by sympathetic nervous system and, in response to stress, these nerves secrete norepinephrine. During the exposition of stress, cellular processes are tightly coordinated by signaling molecules and their receptors. Understanding how epithelial cells synthesize multiple biochemical signals catalyze the development of novel therapeutic strategies to combat cancer. A boolean network with randomly assigned interactions and update rules exhibits rich dynamical behaviour. Combinatorial and statistical methods in boolean signaling have provided detailed knowledge about the properties of critical nodes and edge types. This study proposes a signal transduction model

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highlighting the cross-talk between key receptors, enzymes and effector proteins involved in epithelial stress signalling which leads to cell migration. From experimental and pathway databases, we construct a reaction network model and analyze its dynamics. We identify relationships between receptor activation and cellular function and show the cross-talks are crucial to phenotype determination. The network converges to a unique set of output states that correspond to known cell phenotypes: migratory, proliferating, quiescent, spreading. The model also predicts combined phenotypes where cells are involved in both migration and proliferation. Finally, our goal is to build a concrete stochastic tool to study inhibition, define the phenotype of epithelial cells, and to suggest molecular targets for cancer therapies.

Session D-17

Poster Physical & Mathematical Sciences 7
Friday, February 28, 2020, 2:15 pm
Location: Montezuma Hall

433 2:15 pm VV

Silver Nanoparticles as Catalysts for Conversion of Carbon Dioxide to Useful Products

Nicholas Smith, Chemistry (U)

Catalysis is an essential component of academic and industrial chemistry due to the rates of many important reactions being too slow for practical use. The goal of the project is to investigate the conversion of CO2 into simple organic molecules in a process catalyzed by silver nanoparticles. The direct conversion of a greenhouse gas into a useable product is an interesting and potentially useful area of study. In these experiments, silver nanoparticles are grown directly on an etched silicon surface by immersion in a solution of dilute silver nitrate, in a process developed in our research group by Nobuyuki Yamamoto, PhD. After growth of the silver nanoparticles is complete, the presence of organic molecules on the surface is confirmed by surface enhanced Raman spectroscopy. A specialized reaction vessel was created to allow for spectra to be measured without exposing the surface to the atmosphere, reducing the impact of contamination on experimental results. Reaction parameters such as time in etching solution, concentration of CO2 in reaction vessel, and isotopic composition of the solvent are altered across experimental trials to observe changes in the structure of the silver nanoparticles attached to the silicon wafer and the measured Raman spectra. Preliminary results from Raman spectroscopy suggest that the species are formaldehyde (H2CO) and the related ion, formate (HCOO–), though further research is necessary to confirm the results.

434 2:15 pm WW

Improving Solar Cell Performance by Incorporating Silver Nanocubes and Nanostars

Carla Hyppolite, Chemistry (U)

This project focuses on synthesizing different shapes of silver nanoparticles that can be attached onto silicon solar cells in order to improve the performance of the cells. Because the efficiency of solar cells decreases significantly in the red and near-infrared regions of the solar spectrum and silver nanoparticles can be made to absorb and scatter light intensely in these regions, we hypothesize that the solar cell efficiency can be improved if the silver nanoparticles are incorporated on the solar cell surface. By manipulating the size and shape of the silver nanoparticles, the optical properties of the nanoparticles can be changed and thus maximize the effect and performance of the particles. The method of this project involves synthesizing nanostars through a one-step synthesis and nanocubes through a multistep aqueous method that was discovered to be more environmentally friendly and yielded nanocubes with sharper corners and edges compared to those produced using the “polyol” process. Our nanocube synthesis is based on a protocol from the literature, but uses different reagents more suitable to our work. So far, the reagents were stirred together in one vial and heated at constant temperature for several hours, where nanocubes were expected to eventually form. The procedure has not yet yielded nanocubes, so adjustments to the synthesis are still being made. Likewise, synthesis of the nanostars is ongoing and is based on a literature protocol that we have modified using previous results from our group regarding silver nanosphere production. UV-visible spectroscopy, dynamic light scattering, and scanning electron microscopy will be used to analyze the nanoparticles. Eventually, we plan on attaching the nanocubes and nanostars to the silicon solar cells and measure their effect on the performance of the solar cells. Although the project is still in process, we expect the nanostars will perform better than the nanocubes due to having a complex structure of sharper points where more electrons will be able to localize to provide a higher electric field that can interact with the solar cell.

435 2:15 pm XX

Sensitive and Selective Detection of Breast Cancer Biomarker HER2 Using Laser Wave-Mixing Detector Interfaced to Microfluidics

Nino Shatirishvili, Chemistry (M)

Novel nonlinear laser wave-mixing detector interfaced to microfluidics is demonstrated as a sensitive and selective detection method for potential early diagnosis of breast cancer. Although there are no FDA-approved biomarkers for early diagnosis of breast cancer, human epidermal growth factor receptor 2 (HER2) is a candidate biomarker. Patients with lower HER2 overexpression are generally in a better condition and there are FDA-approved agents targeting

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HER2. Our wave-mixing technique has inherent advantages including small (nanoliter to picoliter) probe volumes and micrometer-thin samples, and hence, high spatial resolution for single-cell analyses, and convenient interfacing to microfluidics, microarrays and capillary-based separation systems. Capillary electrophoresis allows both high chemical selectivity and sensitivity levels. Microarray-based wave-mixing detection systems allow high throughput analyses. The wave-mixing signal has a quadratic dependence on analyte concentration, and hence, it yields big changes in signal for small changes in analyte concentration. Therefore, it is an ideal sensor for monitoring small changes or progress of a disease. In addition, the wave-mixing signal is a coherent laser-like signal and it can be collected with high signal-to-noise ratios to achieve zeptomole-level detection sensitivity that is comparable or better than those of current detection methods including immunohistochemistry (IHC) and fluorescence-in-situ hybridization (FISH). Wave mixing is also more cost-effective and does not require time-consuming sample preparation steps. In addition, wave mixing is an optical absorption-based method, and hence, it can detect both fluorescing and non-fluorescing analytes. One could use visible lasers to detect analytes labeled by fluorophores or chromophores or use a compact UV laser to detect label-free analytes in their native form. Since both UV and visible lasers are compact, our wave-mixing detectors are portable for field use.

Acknowledgment: We acknowledge partial support of this work by the NIH (R01), NIGMS IMSD (2R25GM058906), NSF, U.S. Dept. of Defense, Army Research Office, and U.S. Dept. of Homeland Security Science and Technology Directorate.

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436 2:15 pm WW

Modifying Electroosmotic Flow Mid-separation as a Method of Sample Stacking

Muhand Rashid, Chemistry (M)

Separation and analysis of proteins from complex mixtures, such as cell lysates, by capillary electrophoresis is made difficult by two related factors; the adsorption of the proteins to the capillary surface, and the lack of sensitivity to detect low abundance proteins. Protein separations in capillary electrophoresis (CE) suffer from adsorption of analytes to the capillary surface by either electrostatic or hydrophobic interactions. Fortunately, semi-permanent phospholipid bilayer coatings may hold the solution to both challenges. Such bilayer coatings have been used to prevent protein adsorption to the capillary wall, and regeneration of the bilayers can be easily regenerated between separations ensuring the reproducibility of the separations.

The bilayers also allow unique levels of control over the electroosmotic flow (EOF), even allowing the direction of the EOF to be reversed based on the buffer employed in the separation. This can be a basis through which we can improve our sensitivity by effectively increasing the concentration of our analyte compounds. In this work, we have developed a strategy of which we exploit these properties of the phospholipid bilayer in manner to performing sample concentration in the capillary. By modifying the capillary coating mid-separation, we can alter the direction of EOF in a manner which can concentrate exceedingly low amounts of protein samples into a short zone of the capillary, enhancing sensitivity.

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437 2:15 pm ZZ

Tuning Morphology of Nanostructured Silicon Interfaces Using Magnetic Nanoparticles for Photoelectrochemical Water Splitting

Margaret Patrick, Chemistry (M)

Reducing cost and increasing the functional lifetime of photoabsorbing materials used in photoelectrochemical (PEC) water splitting remains a major challenge in solar energy conversion. Nanostructured black silicon (b-Si) is a promising candidate with great potential to address these challenges, however its performance is sensitive to its interface nanostructure. The purpose of this research is to achieve refined shape control during etching of silicon interfaces using magnetic metal nanoparticles, leading to more efficient and durable photoabsorbers. Further, we could correlate the catalytic performance towards PEC with its refined interface morphology. Current methods for producing b-Si require coating wafers in silver ions then etching in a hydrofluoric acid and hydrogen peroxide bath, resulting in straight nanoporous channels which oxidize easily, losing its activity. Preliminary scanning electron microscopy (SEM) results from samples produced by a modified metal-assisted chemical etching method using Fe3O4@Ag core-shell nanoparticles in the presence of a magnet suggest modification of the subsurface channel morphology into novel, ultra-high surface area serpentine forms is possible, potentially improving photoelectrode's performance and lifetime. Cross-sectional SEM images show samples produced with or without a magnetic field present, respectively, have different channel patterns. Samples produced in the absence of a magnetic field showed relatively straight channels, while samples in a static magnetic field perpendicular to the chemical etching direction showed teardrop shapes on the cross-section, suggesting the tunnels curved and exited the side of the material. In addition to 2D shapes produced by static magnetic fields, 3D subsurface morphologies using dynamic fields are being tested. Other parameters, including burial solution composition and reaction conditions, are also being studied. Optimizing the shape of these channels is key to maximizing catalytic activity. This material could be used in many renewable energy systems, including in our previously reported bioanode-photocathode hydrogen generation cell to enhance photoelectrochemical hydrogen evolution and reduce cost.

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438 2:15 pm AAA

Sensitive Detection of Heart-Failure Biomarkers Using Multi-Photon Laser Wave-Mixing Spectroscopy

James Suprapto, Chemistry (D)

Laser wave-mixing spectroscopy is demonstrated as an ultrasensitive detection method for heart-failure biomarkers pro-atrial natriuretic peptide (proANP) and brain natriuretic peptide (BNP). Wave mixing is an optical absorption-based method, and hence, it can detect both fluorescing and non-fluorescing analytes and biomarkers. Using a UV laser, one can detect biomarkers in their label-free native form without the use of time-consuming labeling steps. The wave-mixing signal beam is strong, collimated and coherent (laser-like) and it can be collected by a simple photodetector with an excellent signal-to-noise ratio (S/N). To enhance chemical selectivity further, wave mixing can be conveniently interfaced to capillary electrophoresis and microfluidics. Additionally, the wave-mixing signal has a cubic dependence on laser power and a quadratic dependence on analyte concentration, and hence, it is an ideal sensor, i.e., small chemical changes yield big signal changes. Compared to currently available detection methods, wave mixing offers a number of inherent advantages such as small sample requirements, ultrasensitive detection limits, and native label-free detection of a wide range of sample including biomarkers, viruses, cancer cells, single biocells, chem/bio agents, etc. Our nonlinear multi-photon detectors can also be modified as portable battery-powered devices that are more suitable for field use.

Acknowledgment: We acknowledge partial support of this work by the U.S. Dept. of Homeland Security Science and Technology Directorate, U.S. Dept. of Defense, Army Research Office, NSF, NIH (R01), and NIGMS IMSD (2R25GM058906).

SRS

Abstracts of Presentations

Session E, F, G and H

SAN DIEGO STATE UNIVERSITY

Session E-1

Poster Behavioral & Social Sciences 17 F
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

439 4:00 pm A

Comparing Cancer Beliefs and Practices across the US-Mexico Border: A Binational Study

Elvira Hernandez, Psychology (U)

The relationship between scientific and other explanatory systems is a central question for cognitive psychology. A common assumption is that scientific knowledge eventually replaces intuitive or folk beliefs (e.g., Piaget, 1954). A growing body of evidence, however, shows that this is not the case (Legare et al., 2012). The co-existence of seemingly incompatible beliefs is particularly common when individuals are confronted with a life-threatening illness such as cancer that resists an easy explanation or cure. Cognitive psychologists studying such questions, however, tend to overlook structural factors including access to healthcare that can influence both behaviors and beliefs. In the present study, we examine how both cultural and structural factors shape the causal beliefs and treatment choices of people diagnosed with cancer residing near the US-Mexico border in the Imperial Valley, CA, and in Mexicali, Mexico.This binational context, where people frequently cross the border for healthcare services, provides an ideal location to examine the factors affecting healthcare beliefs and practices across both sides of the border. We conducted in-depth interviews with 20 individuals diagnosed with cancer in the Imperial Valley and 10 individuals in Mexicali. Our protocol included open-ended questions about participants' conception of cancer including what it is, its causes and treatments, and more focused questions regarding their experiences with their illness and with healthcare. In a more structured section, we asked participants to endorse different potential causes of cancer and their beliefs about the efficacy of different possible treatments using a 5-point Likert-type scale, including biomedical/natural, socio relational, and

supernatural probes. We also collected data on demographic factors including education, language, migration and work history. Our analysis revealed that both groups of participants endorsed biomedical and, to a lesser extent, socio relational causes and treatments. The US participants, however, were less likely than Mexican participants to endorse supernatural beliefs. All participants, however, tended to use the most accessible and affordable treatments, sometimes despite their explanatory beliefs and cultural background. This work has implications for the design of cancer education and treatment programs targeting this and similar populations.

440 4:00 pm B

Cultural Factors the Influence African American/ Black Women's Adherence to Breast Cancer Treatments: A Review of the Literature

Victoria A. Davis, Psychology (U)

Despite having lower breast cancer incidence rates than Caucasian/White women, African American/Black women have higher mortality rates and are more likely to delay or discontinue treatments. The purpose of this review was to identify cultural factors that contribute to delays in or discontinuation of breast cancer treatments among African American/Black women.

This scientific literature review identified and investigated cultural factors specific to African American/Black women that help explain why their adherence rate to breast cancer treatments is lower than those of their Caucasian/White counterparts. This review was conducted utilizing literature from the last 10 years (2009-2019). The following databases were searched for recent literature: PsycINFO, MEDLINE, CINAHL Plus, and ERIC. To cover all literature, the following key terms were utilized: adherence, African American, black, breast cancer, compliance, cultural factors, racial differences, treatment, and women. Reference lists of key citations were reviewed.

Only a small amount of literature has examined cultural factors that may explain the difference between African American/Black women's delay and adherence to breast cancer treatments in comparison to Caucasian/White women. Potential cultural factors are spirituality, family dynamics, and beliefs. Studies reported African American/Black women rely on their spirituality or faith in God when it comes to their breast cancer experience. Additionally, these women worry about the effects of their diagnosis on their family function, and therefore are more likely to prioritize family needs over their own. Beliefs influencing delay and adherence can be categorized into myths about breast cancer treatment, internalized stereotypes and stigma within medical interactions.

Further research is necessary to better understand cultural factors influencing African American/Black women's challenges in adhering to breast cancer treatments. In order to improve breast cancer treatment outcomes, studies need to explore historical African American/Black traditions regarding healthcare participation and enhance cultural competency in medical institutions.

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441 4:00 pm C

Barriers to Advance Care Planning in Latino/ Hispanic Cancer Patient Communities: A Review of the Literature

Aleigha Binda, Psychology (U)

Background/Purpose: In Advance Care Planning (ACP), cancer patients, families, and care providers communicate about end-of-life care preferences, which may improve quality of death and avert unwanted medical interventions. Latino/ Hispanic patients are less likely to engage in ACP than non-Hispanic Whites. This literature review explored possible barriers to explain this disparity.

Methods: This review searched for relevant studies in the following databases: CINAHL, Medline, PsycINFO, ERIC, Chicano Database, and BIOSIS Previews. The key search terms included Latino or Hispanic, end-of-life care, Advance Care Planning, cancer patients, hospice care, quality of life, and disparities. The search was restricted to studies published between 2009 and 2019, for which the full text was available.

Results/Findings: The search yielded fifteen articles. Six prominent barriers were identified. Compared to non-Hispanic Whites, Latino/Hispanic cancer patients had lower general knowledge about ACP, including health insurance coverage of ACP. Latinos/Hispanics were more likely to perceive ACP as unnecessary. Less acculturated Latinos/Hispanics were less likely to engage in ACP. The cultural practice of making decisions as a family likely precludes formal ACP. Latinos/ Hispanics harbor greater medical mistrust, which hinders engagement in ACP. Higher uninsured rates among Latinos/ Hispanics limits access to ACP.

Discussion: Latino/Hispanic cancer patients experience unique barriers to engaging in ACP. As a result, their end-of-life care may not reflect their wishes and preferences. Currently, there are few intervention efforts to promote adequate knowledge and discussions about ACP with their cancer care team.

442 4:00 pm D

Advance Care Planning: Barriers and Facilitators among Rural Latino Cancer Patients in the US-Mexico Border

John Moreno Jr., Psychology (U)

Advance Directives (AD) are legally binding documents, and instruct healthcare professionals of medical decisions patients would like carried out. This allows patients to communicate their end of life care wishes when they are no longer able, such as in a medical crisis. This document is important, yet only 37% of US residents have completed it, predominantly Caucasians. This study explores experiences of EOL decision making, and similarities and differences between AD completers and non-completers among rural Latino cancer patients at the US-Mexico border.

Among cancer patients who received patient navigator-led AD interventions, 30 patients were randomly selected for in-depth of interviews. Face-to face interviews were conducted by trained staff members at a cancer organization in Imperial County, CA. Semi-structured interviews explored cancer patients' experiences with EOL decision making. Interviews were audio-recorded, transcribed, and translated from Spanish to English. Data were analyzed using thematic analysis.

The majority were female (80%, n=24) and the average age was 59.8 years old. Over half (53.3%, n=16) were diagnosed with breast cancer. Among participants, 20% (n=6) reported completion or near completion of an AD. Common themes found from both groups (completers and non-completers) included emotional safeguarding for family, and religiosity, but within different contexts. For example, non-AD completers wanted to protect family from having an EOL care discussion, whereas AD completers felt having an AD would safeguard their family from emotional distress later. Three additional facilitators were found among AD completers: past EOL care experiences, self-determination, and acceptance of death. Denial, lack of prioritization, and avoidance, were barriers found among non-AD completers.

This study illustrates factors for consideration by healthcare professionals, such as awareness of cultural beliefs and values guiding EOL decision making among Latinos. EOL care approaches should be tailored to patients' and family's level of comfort. Another point to consider is that EOL care dialogue should be started and maintained as a regular component of a person's medical planning. This will result in an increased quality of life for the patient, and reduced decision-making burden for family.

443 4:00 pm E

Gender and the Link Between Fitness and Cancer Risk/Mortality: A Review of the Literature

Andrea Ramos, Foods and Nutrition (U)

Background/Purpose: Improving physical fitness can decrease cancer risk and mortality. However, there are gender disparities in both fitness and cancer. This review of the literature examined whether the gender disparities in physical fitness and cancer risk/mortality are linked.

Methods: A narrative literature on gender differences in physical fitness and cancer risk/mortality was conducted using the CINAHL, AgeLine, Applied Science & Technology Abstracts, MathSciNet, PsycARTICLES, Academic Search Premier, ERIC, PsycINFO and MEDLINE databases, and the Google Scholar search engine. Major search terms used were fitness, cancer, mortality, risk, gender, and gender differences. Reference lists of key articles were reviewed to identify additional relevant studies.

Results: Forty articles examined the relationship between physical fitness and cancer risk and/or mortality. One study

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reported that men and women with moderate to high fitness levels experience reduced overall risk of cancer. Women with high fitness had the lowest risk of cancer, compared to men of comparable fitness. Women's fitness was positively correlated with cancer risk reduction. Moderate fitness produced moderate reduction; higher fitness, higher reduction. However, other studies demonstrated that men who maintained moderate to high fitness throughout their life had lower risk of cancer mortality/risk, providing no difference between the two levels. To date, women are understudied.

Conclusion: Limited evidence suggest that gender differences in cancer risk and mortality may be explained by gender differences in fitness. Women may need to achieve higher fitness to achieve reductions in cancer risk comparable to men. The underlying cause of this gender disparity requires further study.

444 4:00 pm F

rAAV as Potential Therapeutic for Glioblastoma

Sharon Sengphanith, Interdisciplinary Studies (U)

Glioblastoma Multiforme is a rare, aggressive form of cancer that affects the Central Nervous System. As of now, there are no known cures for the disease and life expectancy for those with the disease is around 15-16 months. Current therapies include radiation, chemotherapy, and surgery. However, recent studies performed at the Shtrahman lab has discovered that recombinant adeno associated virus (rAAV) kills dividing neural stem cells in the hippocampus and has led us to believe that rAAV has potential oncolytic activity against Glioblastoma cancer stem cells. Recombinant adeno associated virus is a promising therapy for this disease because it is a safe and efficient viral vector with no known significant toxicity or pathogenicity. We hypothesize that the inverted terminal repeats (ITRs) that flank the genome are responsible for the toxicity associated with rAAV. Goal 1 of our study is to demonstrate that rAAV is effective at killing tumor cells both in vitro and in vivo. To do this, we plan to conduct in vitro studies to show dose response curves in multiple cancer cell lines. We employ IncuCyte studies to show the confluence of these cell lines post viral transduction over a specific period of time. For in vivo studies, we inject mice with these cancer stem cells both in the flank, as well as intracranially, inject with virus, and monitor survival and growth. Goal 2 of our study is to better understand the mechanism behind the oncolytic activity. To do this, we conduct pull-down experiments in order to determine the specific cancer cell proteins that bind to the ITRs. Our final goal of the study is to optimize the AAV/ITRs to kill Glioblastoma cancer stem cells.

Session E-2

Poster Engineering & Computer Sciences 12
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

445 4:00 pm G

The Utilization of Flue Gas for Desalination

Marina Balcazar, Environmental Engineering (U)

Drinking water supply is one of the major challenges of our time. Seawater offers unlimited sources. Current sweater desalination methods include reverse osmosis (RO), multi-stage flash (MSF) and multiple effect distillation (MED). RO systems are mostly driven by pressure while MSF and MED are thermal based. The problem with thermal methods is the huge energy consumption due to use of electricity or fossil fuels for heating saline water. In this research, we used a shell & tube heat exchanger (HEX) and low-grade waste heat at temperature of about 225 ^{0}C to heat the saline water up to 100 ^{0}C. Hot water enters an evaporation pool right after HEX and evaporates while the cooled water of the pool returns to the saline water storage and circulates continuously. The water vapor is collected by a tube on top of the pool and passed through a condensation system equipped with vacuum pump. The produced condensate then will be analyzed for conductivity, salinity and pH, using pH-conductivity meter.

From the results of preliminary experiments, we estimate a production of about 500 L distilled water per day per square meter of pool surface. Furthermore, experiments on a range of salt concentrations from 5 to 30 g/L resulted a mean reduction of 99.95% of conductivity after distillation. The same removal of 99.95% also determined for salinity, as an example, in the range of 30 g/L. The salinity of water reduced from 26.9 ppt in saline water to 6.3 ppm in distilled water. There was no significant change in pH for saline and distilled water. The main challenge for this system is the need for a complete flush out of impurities and residuals from the pool, HEX and the condensation system after each run.

In conclusion, the use of low-grade waste heat, e.g power plant flue gas, the high removal efficiency of salinity from the saline water, the low capital, operation and maintenance costs, and the simplicity of the process, the proposed approach is a promising method for desalination of sweater in the near future.

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446 4:00 pm H

Zero-Valent Iron Enhancement of Bioelectrochemical Methanogenesis

Sarah Perkins, Environmental Engineering (U)

Extracting and burning fossil fuels over time has increased the amount of carbon in the atmosphere which contributes to climate change. Methanogenic bioelectrical systems (BESs) may be used to recover energy by recycling carbon and producing a carbon-neutral fuel. Methanogenic BESs convert wastewater-derived carbon dioxide (CO2) to methane (CH4), which may be used on site as a fuel or injected into a natural gas pipeline for energy credits. Zero-valent iron (ZVI) has previously been shown to improve biocathode CH4 production. However, the mechanism for ZVI improvement, being the precipitate formed or the change in microbial community of the biocathode, has not yet been confirmed. Therefore, the objective of this research was to determine how ZVI affects the development of the biocathode microbial community. To achieve this objective, the effect of biocathode ZVI on BES performance at 1 g/L initial ZVI concentrations and with a -1.0 V (vs. Ag/AgCl) cathode potential was assessed. The performance and microbial community composition of each biocathode inoculated with an enrichment culture was monitored by voltage, gas pressure, anode acetate, pH, gas composition, DNA analysis, and metagenomic and 16s rRNA sequencing.

447 4:00 pm I

Horizontal Flame Spread Research on Thermally-Thin PMMA at Varied Opposed Flow Velocities in Simulated Micro-gravity Environments

Joseph Schottmiller, Mechanical Engineering (U)

Flame spread in outer space has put our astronaut crews in great danger throughout past events. This risk presented to our brave men and women risking their lives for the advancement of mankind has been the motivation behind many advancements in field of microgravity combustion research. Fire safety has caused engineers to rethink many of the materials they bring into their space stations. This research was conducted to provide a better understanding towards how a common material, Polymethylmethacrylate (PMMA) burns in various opposed flow velocities within a microgravity environment. This microgravity environment is meant to simulate the conditions this material is typically found in within our space stations. By mitigating the effects of buoyancy on the area above the fuel sample, this mimics the lack of gravity this material experiences in a microgravity environment.

Flame spread experiments were conducted at several different opposed flow velocities to study how this condition can impact the flammability of this highly used PMMA material. These tests on this material were performed with the San Diego State University Narrow Channel Apparatus A (NCA A). The NCA A microgravity simulator has proved its reliability in the past for mimicking microgravity environments throughout previous research studies which showed its effective ability to mitigate flame buoyancy across material.

Every test sample was tested at a consistent thin fuel thickness of 75 µm. Pressure throughout the apparatus was consistently held at 1 atm while O2 concentration remained at 21%. Opposed flow velocities were tested between 3 cm/s and 75 cm/s to demonstrate the reliance of flame spread on the opposed oxidizer flow velocity. These flames produced at these various flow velocities were tracked using a cross-platform GUI-based tracking software called Spotlight and used to create a final Flame Spread Rate vs. Opposed Flow Velocity graph. This graph proved max flame spread at an opposed flow velocity of 25 cm/s and steep drop offs at opposed flow values outside of the 10 cm/s to 40 cm/s range.

448 4:00 pm J

Carbon Nanoparticle Production through Hydrocarbon Pyrolysis Experimentation and Modeling

Nicholas Bauer, Mechanical Engineering (M)

The Combustion and Solar Energy Lab (CSEL) at San Diego State University (SDSU) has been working to increase the efficiency of a solar power plant by using carbon microparticles mixed with air as a solar absorption medium. These carbon microparticles are produced through pyrolysis, where propane is heated in the absence of oxygen in a Carbon Particle Generator (CPG). The efficacy of this power plant relies heavily on carbon particles of a specific size being produced. This research focuses on the conditions needed to produce particle sizes between 500 nm - 1000 nm. A lab-scale CPG has been built at CSEL, and used to test particle generation conditions varying reactor temperature, propane mole fraction, and the inlet gas flow rate. The CPG operated between 1000 °C and 1200 °C, and a pressure of 6 bar. Testing conditions of the CPG were first modeled on ANSYS CHEMKIN-PRO, a reaction modeling software, and later performed through lab-scale experimentation.

Particle sizing was analyzed using a Scanning Electron Microscope (SEM) and a Diesel Particle Scatterometer (DPS). After exiting the CPG, particles were captured on a filter for analysis using the SEM, where a relative particle size distribution was found using FiJi to examine the SEM images. Downstream of this, the particle mixture were further analyzed in real time using the DPS. The DPS utilizes Mie theory from

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light scattering off of the particles to calculate a relative particle size distribution and index of refraction. These two sampling methods were compared to determine the conditions for optimal particle sizing.

Further analysis was done using an extinction tube at the exit of the CPG. As the particle-laden flow passed through the extinction tube, a 532 nm laser would shine through the mixture, and its intensity was measured with a photodiode detector. Laser intensity measurements were used in a modified Beer's law equation, along with values supplied by the DPS software, to calculate the mass loading of carbon at the CPG exit. Mass loading was ultimately used to determine the carbon conversion efficiency of the CPG.

449 4:00 pm K

Towards physics-based turbulence modeling of pressure-related terms

Jose Moreto, Engineering Science (D)

Characterization of the pressure-related turbulence terms including pressure–rate-of-strain, pressure diffusion, and velocity–pressure-gradient tensor in the Reynolds stress transport equation in canonical turbulent flows is of critical importance for calibrating and improving turbulence models for RANS (Reynolds-Averaged Navier Stokes) based flow simulation. Recent work of Liu and Katz (2018) based on planar-PIV clearly shows the complex nature of the pressure-related terms and their substantial impact on the dynamics of turbulence transport throughout a shear layer flow past an open cavity. The work also demonstrates the need for a full three-dimensional characterization of the pressure-related terms around the cavity trailing corner. In response to this call, a research project aiming to directly measure all 3D components of the pressure-related terms in Reynolds stress budget for a turbulent shear layer flow past a cavity is currently carried out at SDSU. The measurement utilizes time-resolved tomographic PIV coupled with a non-intrusive pressure measurement technique. This presentation reports the results of the free stream flow quality characterization in the 4"x5"x24" test section of a newly built water tunnel facility as the initial stage of the project. The turbulence intensity, Reynolds normal and shear stresses, and mean velocity profiles at representative locations are shown for a free stream speed of 1.2m/s2.

Session E-3

Poster Biological & Agricultural Sciences 6
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

450 4:00 pm L

Assessing the Therapeutic Potential of Cannabinoids using a Drosophila (fruit fly) Based Traumatic Brain Injury Model

Natasha Sam, Biology (U)

The legalization and use of cannabis derived products have become increasingly popular to the point where one compound, cannabidiol (CBD) is presently being used for the treatment of a wide range of ailments, including anxiety, chronic pain, sleep disorders, PTSD and traumatic brain injury. However, a relatively limited amount of research has been completed that clarifies the relative safety, effectiveness and potential molecular mechanism of cannabinoids for these therapeutic roles. Drosophila melanogaster (fruit fly) has been an effective model used to study conserved genetic and physiological factors impacting longevity, neural aging and traumatic brain injury (TBI). In addition, the Finley group has developed an integrated drug testing platform using Drosophila that examines the therapeutic of compounds, including cannabinoids for the treatment of individuals exposed to TBI. These studies focused on the administration (oral) of cannabidiol (CBD), Δ^9-tetrahydrocannabinol (THC), and cannabinol (CBN) to adult flies before or following exposure to highly defined TBI conditions. Both treatment programs, with each compound, helped maintain behaviors and extend average lifespans following exposure to trauma. Pre-treatment with cannabinoids lowered baseline expression levels of NF-κB signaling targets (antimicrobial peptides) in neural tissues. This indicates that cannabinoid treatment suppresses the NF-κB pathway and may lower inflammatory factors typically associated traumatic injury. Overall, exposure to CBD, THC, and CBN showed unique responses in adult Drosophila exposed to TBI. These findings underscore the versatility of Drosophila as a rapid model system to examine neuro-therapeutic compounds and highlights the potential test a wide range of novel compounds individually or as part of unique combinations.

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451 4:00 pm M

Testing the Toxicity and Neural Protective Potential of Cannabinoid Compounds by Examining Adult Drosophila (fruit fly) Longevity and Behavior Profiles

Alec Candib, Cellular and Molecular Biology (U)

The legalization and use of cannabis derived products (+500 biologically active) has become increasingly popular. Indeed, one compound, cannabidiol (CBD) is being widely used to treat a wide range of ailments. However, a relatively limited amount of systematic research has been done that clarifies the relative safety, effectiveness and potential molecular mechanism of cannabinoids for these therapeutic roles. Drosophila melanogaster (fruit fly) is an effective model used to study genetic factors impacting longevity and neural aging. We have developed an integrated drug testing platform using Drosophila to examine the potential impacts of cannabinoid treatment on aging. These studies focused on the oral administration of cannabidiol (CBD), Δ^9-tetrahydrocannabinol (THC), and cannabinol (CBN) to adult flies. Treatment with CBD and CBN promoted longevity and helped to slow the age-dependent decline in locomotor behaviors (negative geotaxis response, NGR). In contrast, THC treatment resulted in a modest decrease in lifespan and worsened the decrease of the negative geotaxis response with age. In addition, CBD and THC did not affect sleep or circadian cycle behaviors and appeared non-sedating to Drosophila. The impact of cannabinoids on the progressive buildup of neural aggregates was also assessed. Of particular interest was the finding that cannabinoid treatment altered the basal expression profiles of downstream targets of NF-κB signaling. Overall, flies showed unique responses to CBD, THC, and CBN, with select dosages of CBD and CBN improving the age-dependent decline to neural function. These findings demonstrate the versatility of Drosophila as an aging and neuro-therapeutic model system and highlights future transcriptomic studies designed to examine the molecular underpinnings of cannabis's impact on complex biological systems

452 4:00 pm N

Design and testing native CRISPR-based gene editing for genetic manipulations in Methylomicrobium alcaliphilumStrain 20ZR, a model methanotroph

Pedro D'Alo, Biology (U)

Methane is a powerful greenhouse gas. Some microorganisms, known as methanotrophs, use methane as their only supply of carbon and energy. Understanding and engineering these organisms to capture and convert anthropogenic methane can have a positive impact on the environment. That requires an expanded genetic toolbox for efficient genetic manipulations. In this work, we tested the applicability of CRISPR-based gene editing for genetic manipulations in Methylomicrobium alcaliphilum Strain 20ZR, a model methanotroph. CRISPR is an autoimmune system in prokaryotes, defined as an array of short host-specific repeated DNA sequences separating unique spacers of foreign origin. Spacers, in this case, provide immunity to foreign DNA from being expressed or replicated in host cells. I proposed to use the native CRIPRR system for genetic engineering the strain. The native 20ZR-CRISPR array was cloned into a replicative plasmid pMGK. Two spacers were subsequently changed to sequences complementary to a green fluorescent protein in order to test the applicability of the system for the construction of CRISPR-guided knockouts. The resulted plasmids (pMGK21 and pMGK22) were introduced into Methylomicrobium alcaliphilum Strain 20ZR-GFP, which harbors and constitutively expressed GFP protein to study CRISPR-Cas efficiency. The efficiency was estimated as a% of non-fluorescent colonies, i.e. gfp-knockouts A total of 415 colonies were counted for the pMGK21-construct, with a frequency of 9.683% being fluorescent, while strain 22 had 683 colonies while none were fluorescent. It can be said that because pMGK22 provides high efficiency and represents it is a good system for manipulation in Methylomicrobium alcaliphilum 20ZR

453 4:00 pm O

Assessing the Role of Hsp60A in Inclusion Body Myopathy Type 3 Utilizing a Drosophila Model

Megan Bacabac, Biology (U)

Inclusion body myopathy type 3 (IBM-3) is an autosomal dominant disease characterized by progressive muscular weakness and caused by an E706K substitution in the SH1 helix of myosin heavy chain IIa. Our lab developed a Drosophila model of IBM-3 which reproduced features of the human disease in the indirect flight muscle (IFM) such as progressive sarcomere deterioration, inclusion bodies, and rimmed vacuoles. To identify proteins in the inclusion bodies, we isolated insoluble fractions from the IFM of young and old homozygous IBM-3 mutants. Quantitative proteomics on the insoluble fractions defined 18 proteins with >1.5-fold difference in relative abundance at both ages in mutants vs. controls. Hsp60A, a molecular chaperone protein localized to the mitochondrial membrane that functions in refolding unfolded polypeptides generated under stress conditions, was reduced in mutants compared to age-matched controls. We hypothesize that decreased levels of Hsp60A will exacerbate myopathic defects and increased levels will ameliorate them. To investigate this, we utilized the GAL4/UAS system. Gene transcription under UAS control is activated by the presence of GAL4. To knock down Hsp60A, we crossed wild-type flies with a UAS-RNAi construct with flies expressing one of two GAL4 drivers, Act88F or fln. Act88F has high expression and begins in the early pupal stage. Fln has moderate level expression and begins in the mid-pupal stage. Flight tests performed on Hsp60A knockdown with the Act88F driver shows age-dependent reduction in flight ability. With the fln driver,

no effect was observed. These results suggest that Hsp60A is more significant at early developmental stages. Further flight tests and confocal microscopy studies on wild-type and heterozygous IBM-3 mutant flies with altered Hsp60A expression will reveal whether increased levels of Hsp60A can rescue myopathic defects in an IBM-3 Drosophila model and may implicate Hsp60A as a therapeutic target for IBM-3 patients.

454 4:00 pm P

Characterization of the ultrastructure of the common marmoset (Callithrix jacchus) hippocampus using electron microscopy

Casey Vanderlip, Biology (U)

Despite billions of dollars spent over several decades of research, the underlying mechanisms responsible for the onset of Alzheimer's disease (AD) remain poorly understood, and there is no cure. The number one risk factor for AD is aging, but we do not understand how this yields vulnerability. The common marmoset (Callithrix jacchus) is an ideal model for investigating aging due to their neuroanatomical similarity to humans and relatively short (~10 year) lifespan. Ultrastructural analysis of marmoset brain tissue has the potential to provide insight into the anatomical basis of aging-related deficits. In this preliminary study, a young adult, five-year-old, marmoset was perfused using a four-compartment high pressure hypoxia-resistant protocol. Serial section electron micrographs were collected from the stratum radiatum of the CA1 subregion of the hippocampus, a brain area chosen due to its importance in new memory formation, role in neurodegenerative diseases, such as AD, and vulnerability to aging. Segmentation was performed using VAST Lite software to characterize synaptic, mitochondrial, and dendritic spine morphologies. The ultrastructure of the tissue shows intact cytological structures indicative of a perfusion that successfully avoided hypoxia. Mitochondria appeared to be intact, with no obvious evidence of anoxia, and without any gross malformations or perforated membranes. Axon terminals contain intact synaptic vesicles that are normally distributed. Similar to human brain tissue, multiple dendritic spine shapes (thin and mushroom) and morphologies (fenestrated, horseshoe, segmented), were observed. Further quantitative analysis is ongoing and may help elucidate age-related changes in neuroanatomical structure.

455 4:00 pm Q

Impacts of TCPMOH Exposure on Zebrafish Embryonic Development

Peyton Wilson, Environmental Science (U)

The toxicant, tris(4-chlorophenyl)methanol (TCPMOH), is a human made chemical that has been detected in aquatic species and other environmental samples since the late 1980s. The occurrence of TCPMOH is associated with dichlorodiphenyltrichloroethane (DDT) production and is also used in the production of synthetic high polymers, certain dyes, and some agrochemicals. It is becoming an increasingly prevalent bioaccumulative contaminant in marine species. The toxicant has been found in many different animal tissues as well as sediment samples in multiple continents. The impacts of TCMPOH on embryonic development are largely unknown despite its widespread occurrence in environmental samples (National Toxicology Program 2009). In this study, image analysis of zebrafish, Danio rerio, after being exposed to the toxicant will be used to assess the pathological impact on embryo development. Groups of fertilized embryos, exposed to different doses of TCPMOH, were individually imaged, once a day, for seven days. The groups of embryos included a control group with no exposure to the toxicant and 4 other groups exposed to varying amounts of the toxicant. Throughout the experiment, the dosed zebrafish embryos showed various extreme birth defects. As the dose of TCPMOH was increased, the mortality rate jumped 90% from the lowest dosed to the highest dosed embryos. Incidence of numerous structural defects was increased by TCPMOH exposures, including pericardial edemas (31%), yolk edemas (40%), craniofacial malformations (29%), and spinal deformities (10%). Overall, this research demonstrates that developmental TCPMOH exposures increase embryonic mortality and incidence of structural defects.

456 4:00 pm R

Gastrointestinal Stromal Tumors Expression of Truncated KIT

Antonio Delgado, Kinesiology (U)

Background: Gastrointestinal stromal tumor (GIST) is the most common sarcoma in the U.S. About 70% of GISTs are driven by oncogenic KIT mutations and nearly all GISTs express the KIT protein on the cell surface. In other epithelial carcinomas, including prostate, colon, and renal cell, KIT can be transcribed as a truncated form (tr-KIT, 306 bases), which lacks exons 1-15 that correspond to the protein's extracellular and transmembrane domains. This short form protein is ligand-independent, but can induce downstream signal transduction of pathways including the Src. We hypothesized that tr-KIT may be present in GIST and have a functional role in GIST biology.

Methods: GIST-T1 and GIST882 cells were cultured in vitro. Protein expression of full-length KIT and tr-KIT was assessed

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by immunoblot analysis using anti-KIT primary antibody (Santa Cruz). Findings were confirmed with messenger RNA (mRNA) derived from resected human GISTs under an IRB-approved protocol (090401). mRNA was extracted using column-based collection kit (Qiagen). The mRNA was reverse transcribed to cDNA and reverse-transcription polymerase chain reaction (RT-PCR) was performed using DNA primers was previously reported (Paronetto, American Journal of Pathology, 2004).

Results: In both GIST-T1 (KIT exon 11 mutant) and GIST882 (KIT exon 13 mutant), we observe expression of full-length KIT and tr-KIT protein as detected by immunoblot. The presence of tr-KIT mRNA was identified in resected human GISTs (n=4) using RT-PCR.

Summary: For the first time, we identify the presence of tr-KIT in human GIST cell lines and primary human tumors. This tr-KIT may signal transduce in a ligand-independent and oncogenic mutation-independent fashion. In turn, it remains to be determined: 1) how it signal transduces in GIST; 1) how it regulates cell biology in GIST; and 3) whether this form of KIT is inhibited by tyrosine kinase inhibitors. In conclusion, tr-KIT may serve as unappreciated mechanism of in drug-resistance in GIST. In the future, we intend to replicate the aforementioned in additional cell line models and human tumors, in the present and absence of drug therapy.

Session E-4

Poster Behavioral & Social Sciences 18
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

457 4:00 pm S

First Trimester Equivalent Binge-like Alcohol Exposure in Mice

Deva Reign, Psychology (U)

Prenatal alcohol exposure (PAE) can disrupt the development of an embryo/fetus, and cause subsequent growth retardation, neurobehavioral impairment, among other deficits. The detrimental outcomes caused by PAE are referred to as Fetal Alcohol Spectrum Disorders (FASD). Approximately 10% of pregnant women report consuming alcohol and 3% report binge drinking. Mouse models of first-trimester equivalent binge-like PAE have reported detrimental impact on offspring brain size with disproportionate effects on the olfactory bulbs. Our study aimed to determine if such exposure would also impact olfactory detection. Additionally, we assessed body weight, activity level, and brain weight in mice, as prior research has shown these to be affected in rodents with PAE. On gestation days 7, 9, 11, and 13, female C57BL/6J mice were intraperitoneally injected with 3 g/kg ethanol (20% v/v) or an equivalent volume of saline. Their offspring's weight was measured on postnatal days (PND) 10 and 20, locomotor activity was monitored in open field chambers on PND 22, and mice were tested using an olfactory habituation paradigm on PND 23. On PND 24 mice were euthanized and brains were extracted to determine brain weight. Data were analyzed with independent t-tests and results considered significant at $p<.01$. Results showed that mice with PAE weighed significantly less than controls on PND 10 and 20. The alcohol exposure did not appear to affect general locomotor activity or olfaction in these mice. However, the brains from alcohol-exposed mice weighed significantly less than control brains. These results indicate that the first-trimester equivalent alcohol exposure impacted the growth and development of both the body and brain. Future studies will look at additional behaviors and examine alcohol's impact on other mouse strains. Funded by a grant from the National Institute of General Medical Sciences (NIGMS) of the National Institutes of Health (NIH): SDSU MARC U*STAR 5T34GM008303.

458 4:00 pm T

The Effects of Chronic Drinking in Pregnant C57BL/6J x FVB/NJ F1 Hybrid Mice

Yanna Roumeliotis, Psychology (U)

Alcohol is a known developmental teratogen. Prenatal alcohol exposure can result in both neurobehavioral and physical deficits in children. Fetal Alcohol Spectrum Disorders (FASD) is an umbrella term used to encompass the various detrimental outcomes caused by prenatal alcohol exposure (PAE). The current study examined the effects of PAE using a mouse model. It was hypothesized that mice with PAE would show greater anxiety-like behaviors, hyperactivity, poor motor coordination, and reduced sensitivity to alcohol in comparison to controls.

Pregnant C57BL/6J x FVB/NJ F1 hybrid mice were provided access to either water or alcohol (ethanol) using a 24 hour two bottle voluntary drinking paradigm throughout gestational days (GD) 0-19. Each dam was offered two sipper tubes everyday. For control dams, both sipper tubes contained water. For ethanol dams, one sipper contained ethanol and one contained autoclaved water. Ethanol concentrations began at 3% (v/v) and progressively increased every four days until reaching 15%. F2 hybrid offspring were tested on a different behavioral task each day during postnatal days (PND) 35-41. First offspring were tested on the elevated plus maze to measure anxiety-like behavior. Next, offspring were placed in an automated open field activity chamber for 30 minutes to measure general locomotor activity. The third test used a balance beam to measure gross motor skill. On the last day mice were challenged with a 4g/kg intraperitoneal injection of 20% (v/v) ethanol solution and placed on their backs within v-shaped troughs in order to test their loss of righting reflex. At the end

of behavioral testing, offspring were sacrificed and the whole brain was extracted to compare gross brain weights. Data were analyzed with analysis of variance (ANOVA) and the results were considered significant at $p < 0.05$.

Preliminary results indicate a significant difference between treatment groups on mean crossing time such that the water offspring crossed the balance beam faster ($M = 21.6$) than the ethanol offspring ($M = 79.3$; $F(1, 13) = 5.1$, $p = 0.04$). No other significant differences between treatment groups were identified.

Preliminary findings indicate that voluntary alcohol drinking during pregnancy in C57BL/6J x FVB/NJ F1 hybrid mice is sufficient to induce gross motor function deficits in offspring.

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459 4:00 pm U

The Effects of Prenatal Nicotine and THC Exposure on Motor Coordination in Rats

Samirah Hussain, Psychology (M)

Tobacco is the most commonly used drug by pregnant women in the United States. Unfortunately, it is well established that prenatal tobacco exposure can alter behavioral development. For example, impaired motor coordination has been observed in both clinical and preclinical studies examining prenatal nicotine exposure. However, many pregnant women combine nicotine consumption with other drugs, particularly cannabis. Importantly, little is known about effects of combined prenatal exposure to nicotine and cannabis, particularly with exposure via electronic cigarettes (e-cigs). Recent research from our lab has shown that developmental exposure to synthetic cannabinoids alters motor development and leads to long-lasting motor impairments, but the effects of prenatal THC exposure are still relatively unknown. Thus, the present study used a rodent model examined how e-cigarette exposure to prenatal nicotine, THC, and the combination impacts motor coordination in offspring. Pregnant Sprague Dawley rats were exposed to nicotine (36 mg/mL), THC (100 mg/mL), the combination, or vehicle (propylene glycol) via vapor inhalation (e-cigarettes) from gestational days 5-20. Following birth, offspring motor coordination was examined using a parallel bar motor coordination task on postnatal days 30-32, equivalent to human adolescence. Preliminary data indicate that prenatal THC exposure may impair motor coordination, particularly among female offspring. Unexpectedly, long-lasting impairments on motor coordination were not seen in offspring exposed to nicotine, although data collection is still underway. This clinically relevant vapor inhalation model can help us elucidate how prenatal exposure to nicotine and/or THC via e-cigs may affect offspring motor development, which has important implications for understanding teratogenic effects of these drugs via newer routes of administration. Supported by TRDRP 28IP-0026.

460 4:00 pm V

The Effects of Prenatal Nicotine and THC Exposure via E-Cigarette on Working Memory in a Rat Model

Cristina Rodriguez, Psychology (M)

Tobacco is the most commonly used licit drug by pregnant women. Exposure to prenatal nicotine, the psychoactive constituent in tobacco, has been associated with cognitive abnormalities, such as impairments in learning and memory, in the offspring. Similarly, prenatal exposure to cannabis, the most commonly used illicit among pregnant women, has also been associated with cognitive impairments in the offspring, although the effects on memory performance have been inconsistent. Electronic cigarette (e-cigarette) consumption (vaping) has become increasingly popular among women of child-bearing age, and nicotine and cannabis are commonly consumed together via e-cigarettes. Yet little is known about the effects of combined exposure during pregnancy. The present study is using a rodent model to determine the effects of exposure to combined prenatal nicotine and delta-9-tetrahydrocannabinol (THC), the primary psychoactive component in cannabis, via vapor inhalation on working memory performance. From gestational days 5-20, pregnant Sprague-Dawley rats were exposed to nicotine (36 mg/mL), a combination of the nicotine and THC (100 mg/mL), or a vehicle (propylene glycol) via e-cigarettes. Offspring were tested on a spatial working memory task during early adulthood (postnatal days 55-60). In this task, offspring are trained to locate a hidden escape platform submerged in a water tank. During each session, subjects are trained to find the platform in a novel location, followed by a test trial to measure memory of the platform location, with either a 0-sec or 60-sec intertrial interval. Preliminary data indicate that prenatal nicotine, alone or in combination with THC, impaired memory when memory was challenged with a 60-sec intertrial interval, but only among males. Interestingly, the combination of prenatal nicotine and THC exposure may slow swimming speeds, possibly indicating differences in motor function among offspring in this exposure group. Importantly, data are still being collected so we may better understand how memory processes are affected by prenatal nicotine or THC exposure. These data will have important implications for educating women about e-cigarette use during pregnancy and development of public policy decisions. Supported by TRDRP 28IP-0026.

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461 4:00 pm W

Olfactory Detection in C57BL/6J FVB/NJ F2 Hybrid Mice with Prenatal Alcohol Exposure

Lindsey Aguilar, Psychology (M)

Statement: Prenatal alcohol exposure can result in the disruption of embryonic and fetal development, causing various cognitive, behavioral, and developmental problems. The range adverse effects associated with prenatal alcohol exposure are referred to as fetal alcohol spectrum disorders (FASD). One possible consequence of FASD is impaired olfactory ability, as reported in children with heavy prenatal alcohol exposure. Studies with rodent models have shown that prenatal alcohol exposure throughout gestation causes abnormal olfactory bulb development and impaired odor discrimation. Additionally, prior studies have shown that alcohol exposure during early prenatal development can detrimentally impact the olfactory bulbs. However, olfactory deficits from first-trimester equivalent exposures have not been extensively studied in animal models of FASD. Using a mouse model, the present study examined whether first-trimester equivalent binge-like prenatal alcohol exposure resulted in the impairment of odor detection.

Methods: Pregnant C57BL/6J x FVB/NJ F1 hybrid dams were administered intraperitoneal injections of 2g/kg ethanol (20% v/v) or an equivalent volume of saline twice daily (2h apart) on gestational days 7, 9, 11, and 13. F2 hybrid offspring were tested on postnatal day 23 in an olfactory habituation procedure. Offspring were presented with a neutral stimulus (mineral oil) for 50s over three trials with 25s intertrial intervals. On the fourth trial, mice were presented with almond oil for 50s. Stimulus inspections were counted for each trial. Data were analyzed with a repeated measures analysis of variance with exposure group as the between-subjects factor and the third and fourth trials as within-subjects factors.

Results: A significant exposure group x trial interaction was detected ($p<.05$). Saline-exposed mice increased inspections when almond oil was presented, however, alcohol-exposed mice did not.

Conclusions: These data indicate that mice with a first-trimester equivalent binge-like alcohol exposure were unable to detect a novel odor stimulus. Future studies will examine the impact of prenatal alcohol exposure on odor discrimination and the relation between olfaction and brain structure. We would like to thank Ami Ikeda for her support maintaining the mouse colony. This work was supported by K99/R00 ASession A-22661.

462 4:00 pm X

Examination of Hippocampal Subfield Volumes in Adolescents and Adults with Fetal Alcohol Spectrum Disorders

Emily Sones, Psychology (M)

Purpose: Rodent studies have demonstrated that the hippocampus is vulnerable to the effects of prenatal alcohol exposure (PAE). However, there have been mixed findings in neuroimaging studies of humans with fetal alcohol spectrum disorders (FASD), with some studies reporting disproportionately smaller hippocampus while others report relative sparing. We sought to determine if PAE is associated with smaller bilateral hippocampi volume and if specific subfields are particularly vulnerable.

Methods: We conducted secondary analyses on an archival dataset of 155 (76 female, 79 male) subjects, aged 14-30 ($M=19.13$, $SD=4.38$), who completed 1.5T T1-weighted structural magnetic resonance imaging at the University of Washington between 1997-2000. Participants were categorized into three groups: fetal alcohol syndrome (FAS), fetal alcohol effects (FAE), and controls (CON). Volumes of the subfields were segmented using FreeSurfer 6.0. Group and sex differences were analyzed using multivariate analysis of variance and followed up with univariate tests when appropriate. Fisher's LSD comparisons were made to isolate group differences (significance threshold of $p<.05$).

Results: Group differences in all hippocampal subfield volumes were observed bilaterally (CON>FAS,FAE). Subjects diagnosed with FAS had significantly smaller dentate gyrus and CA4 of the left hippocampus compared to those with FAE. Sex differences were observed in all hippocampal subfields, except the left CA3 (male>female). After adjusting for whole brain volume, group differences in hippocampal subfields were no longer significant.

Conclusions: Individuals with FASD have smaller hippocampi than controls; however, these effects were proportional to the general impact of PAE on the brain, suggesting that in utero alcohol exposure does not cause selective damage to the hippocampus in adolescents and young adults with FASD. Future studies should use longitudinal methods to examine the hippocampus in subjects with FASD to determine if the impact of PAE changes with development.

Acknowledgements: The contributions of AP Streissguth, FL Bookstein, PD Sampson, and PD Connor under research supported by ASession A-1455, AA10836, AA11037, and GM37251 enabled this secondary analysis, which was supported by grants U24 ASession A-14811, K99/R00 ASession A-22661, and R01 ASession A-26994. We thank T. Grant for providing access to the images and E. Sullivan and A. Pfefferbaum for converting the images to an analyzable format.

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Session E-5

Poster Health Nutrition & Clinical Sciences 6
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

463 4:00 pm Y

Does environmental PPARγ crosstalk with Nrf2 signaling pathways?

Alexa Garcia, Environmental Science (U)

Peroxisome Proliferator-Activated Receptor gamma (PPARγ) is a metabolic pathway implicated in a wide range of physiological states, including metabolic diseases. Many chemicals in the environment activate PPARγ, including endocrine disrupting compounds (EDCs) that are widely associated with metabolic dysfunction and birth defects in epidemiological studies. Here we used Rosiglitazone, an anti-diabetic drug, as a model PPARγ activator to elucidate the role of PPARγ in development and to investigate crosstalk with other detoxification pathways which may enhance toxicity. Zebrafish embryos were exposed to a 10μM concentration of Rosiglitazone daily, and examined microscopically at 0, 24, 48 and 72 hpf in well plates for defects. QPCR was used to analyze genes in the Nrf2 pathway, which has been suggested to crosstalk with PPAR signaling and aid in adaptation. Our work has found that PPARγ activation does not impact embryonic survival, nor increase the incidence of developmental deformities ($p>0.05$). However, PPARγ activation decreased hatching success at 72 hpf, indicative of decreased fitness and future survival ($p=0.003$). Expression of nrf2a was not impacted by PPARγ activation ($p>0.05$). Overall, this work demonstrates that exogenous PPARγ activation is unlikely to cause structural deformities or mortality in human embryos, but decreased hatching suggests that there may be more subtle health consequences that need further investigation. Though other work suggests that there is crosstalk between PPAR and Nrf2 signaling pathways, this work did not support this hypothesis.

464 4:00 pm Z

Role of olfactory imagery on eating patterns and weight gain - A Narrative Review

Melissa Favela-Ayala, Foods and Nutrition (U)

Background: Exposure to food cues, such as food smells, increase appetite and encourage eating, even in the absence of physiologic hunger. The ability to experience smells by generating mental images of those odors is known as olfactory imagery (OI). OI generates similar physiological, perceptual, and neural responses as sensorially perceived odors. More importantly, imagining odors may also induce similar eating behaviors as smelling real odors, possibly causing overeating and weight gain. Here, we summarize evidence on the role of OI on eating-related behaviors and body weight in humans. Methods: We searched PubMed, SDSU Library databases, and Google Scholar using keywords such as: olfaction, OI, eating behaviors, food craving, and weight gain. A secondary review of reference list from key articles was also conducted. Of the articles published between years 1980 to 2019, only six studies discussed a relationship between OI and eating behavior related variables. Outcomes: Studies show that having people imagine food related scenarios, such as the smell of their favorite food, induced cravings for that specific food. Studies also reported a significant increase in saliva secretion, especially when the OI was accompanied with a picture. Interestingly, imagining a smell also enhanced perception of taste of water solutions. Only one study that examined the role of OI on food intake, reported an increase in the amount of food consumed after the participants were asked to imagine the smell. Furthermore, the only study that attempted to connect body weight and imagery capacity, showed that better OI ability is positively correlated with body mass index (BMI). Conclusion: Limited existing literature shows that OI may affect eating behaviors by inducing food craving, increasing salivation, and enhancing taste perception. Although a correlation between OI and BMI was established by a single study, no long-term contribution to food consumption and weight gain has been explored. Furthermore, no research has been conducted to use OI as a tool to prevent excess weight increase. Several such gaps need to be addressed to better understand the relationship between OI eating behaviors and body weight.

465 4:00 pm AA

A Rodent Model of Prenatal THC and Nicotine E-Cigarette Exposure

Karen Thomas, Cellular and Molecular Biology (U)

Among pregnant women, tobacco and cannabis are the most commonly used licit and illicit drugs. Nicotine consumption via electronic cigarette (e-cig) is becoming increasingly popular; yet, the effects of prenatal e-cig exposure on fetal development are not well understood. Additionally, the possible consequences of prenatal exposure to cannabis are still unclear, particularly as the potency of delta-9-tetrahydrocannabinol (THC), the psychoactive constituent of cannabis, continues to rise. Moreover, these drugs are commonly consumed together, yet little is known of how combined exposure to nicotine and THC influences fetal development and whether these drugs interact with one another. The purpose of this study was to develop a novel vapor inhalation paradigm to administer nicotine and THC to pregnant rats using commercially available e-cigarettes. Pregnant Sprague-Dawley rats received THC (100 mg/mL), nicotine (36 mg/mL), the combination, or a vapor

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vehicle (propylene glycol), via e-cigs daily from gestational days 5-20. Maternal blood samples were collected to measure drug and metabolite levels and core temperature changes were monitored throughout pregnancy to confirm intoxication effects. In addition, maternal food and water intake were recorded daily, as were gestational length, litter size, sex ratios, and birth weight of the offspring. Prenatal nicotine exposure, alone or in combination with THC, did not alter the percentage of maternal weight gain or food and water consumption during gestation. However, nicotine exposure gradually decreased basal core temperatures across gestation among pregnant rats. In contrast, THC exposure decreased maternal core temperatures during intoxication, consistent with previous studies. Neither prenatal nicotine nor THC exposure affected gestational length, sex ratio or birth weights; however, prenatal THC exposure may increase litter size. Blood levels of drug and metabolites are currently being analyzed to verify that we attained target levels. In sum, this vapor inhalation model in rodents will help us better understand the effects of nicotine and cannabis exposure on fetal brain and behavioral development, and allow researchers to better educate pregnant women about e-cig use during pregnancy. Supported by TRDRP 28IP-0026.

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466 4:00 pm BB

Demographic, Psychological, and Physical Predictors of Comorbid Health Conditions among People with Fibromyalgia

Alan Patrus, Biology (U)

Fibromyalgia syndrome (FMS) is a chronic widespread pain condition accompanied by fatigue, poor sleep, and depression, which affects approximately five million people in the United States. Patients with FMS often develop comorbid health conditions that further disrupt well-being and complicate clinical health management. Previous researchers have suggested that various demographic, psychological, and physical factors correlate with levels of symptom severity among the FMS population. However, this relationship, and the development of comorbid health conditions in patients with FMS, is not well established. In the present study, we examined the role of several factors in predicting the presence of comorbid health conditions in patients with FMS. Baseline data from a previous intervention study of 600 participants with FMS who completed self-report measures were used for this study. In order to examine whether demographic variables, psychological variables, and physical health variables in people with FMS were significant predictors of their comorbid health conditions, a three-stage hierarchical multiple linear regression was performed. The eleven comorbid health conditions were combined to create a single dependent variable of comorbid conditions. In stage one, the demographic variables significantly predicted comorbid health conditions, $F(7, 281) = 3.304$, $p = 002$, $r2 = .076$. In stage two, the psychological variables explained an additional 2.9% of the variability in comorbid conditions, $F(14, 274) = 2.29$, $p = .006$. Finally, in stage three, the physical health variables explained an additional 6.3% of the variability in comorbid conditions, above and beyond demographic and psychological variables, $F(20, 268) = 2.693$, $p < .001$. In the overall model, the unique individual predictors of comorbid conditions were age in years ($\beta = .215$, $p = .001$), ethnic origin ($\beta = -.146$, $p = .013$), employment status ($\beta = -.217$, $p = .009$), number of hours worked per week ($\beta = .177$, $p = .036$) and body mass index ($\beta = .206$, $p = .001$). These results indicate that a combination of predetermined factors and lifestyle elements contributes to comorbidity in patients with FMS. Future researchers may want to create interventions to prevent comorbidity in patients with FMS within these demographic, psychological, and physical realms.

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467 4:00 pm CC

The Effects of Smoking on the Gut Microbiome: The Relationship to Colorectal Cancer Disparities for African-American Men

Shawn Barrowcliff, Biology (U)

Background (49 Words): African-American men are diagnosed with colorectal cancer more often than other racial/ethnic groups. A compromised gut biome is associated with the development of colorectal cancer. This literature review evaluated whether the smoking behavior of African-American men compromises the gut biome, contributing to the high incidence of colorectal cancer.

Method (56 Words): This literature review searched for relevant articles published since 2009 via the MEDLINE database and the Web of Science platform. The key search terms included African-American men, colorectal cancer, gut microbiome, smoking, and nicotine. Additional studies were identified by reviewing the reference lists of key articles. Articles were excluded if the full text was not available.

Results/Findings (85 Words): Twenty-two articles examined the effects of smoking on the gut microbiome and its relationship to colorectal cancer. Studies have linked smoking and nicotine to the development of colon tumors. Evidence pointed to the Clostridium difficile infection (a pathogenic bacterium) found in the gut microbiome of smokers as the mechanism. Survey data reported that more African-American men (21%) smoke than any other ethnic/racial group. However, no studies specifically investigated the association between the gut microbiome of African-American male smokers and the diagnosis of colorectal cancer.

Discussion: (49 Words): Smokers' gut microbiomes are infected by C. difficile, evidencing the role of smoking in the development of colorectal cancer. African-American male smokers may be at high risk of a compromised gut microbiome. Whether the smoking behavior of African-American men explains the disparity in colorectal cancer incidence requires further study.

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468 4:00 pm DD

PyFBA: Simulating Genome-Scale Metabolic Models

Shane Levi, Biological and Medical Informatics (M)

Multi-omics studies are becoming increasingly dependent on computational techniques to analyze vast quantities of biological data, but are limited by the availability of specialized research tools. Flux-Balance Analysis (FBA) is a mathematical approach for modeling metabolic networks and simulating the flow of metabolites through them. Using an organism's sequenced and annotated genome it is possible to reconstruct their complete metabolic map and predict phenotypic response to a set of imposed conditions. PyFBA is an open-source python package designed to generate, gap-fill, and simulate these metabolic models using gene annotations from RAST in conjunction with the ModelSEED biochemistry database.

Session E-6

Poster Physical & Mathematical Sciences 8
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

469 4:00 pm EE

Nucleophilic Substitution Methodologies Towards Pharmaceutically Relevant Atropisomers

Deane Gordon, Chemistry (U)

Within this last decade, there has been a renewed interest in leveraging stable atropisomerism to synthesize more efficacious and selective N-heterocyclic pharmaceuticals. One unaddressed challenge is the narrow window of synthetic methodologies to directly access these important atropisomeric scaffolds on desired "gram-scale" quantities. Herein we report an enantioselective nucleophilic aromatic substitution towards a diverse range of these aforementioned compounds in high enantioselectivities and optimal yields. With leaving groups such as a fluoride or chloride, we perform kinetic resolutions and dynamic kinetic resolutions using nucleophilic thiophenols. Twice oxidation to the sulfone can lead to a subsequent nucleophilic substitution to virtually any functionality that medicinal chemistry would be interested in (e.g. various amines, methoxy-groups). Examples of N-heterocycles we have directly functionalized with this chemistry include 3-aryl pyrrolopyrimidines (PPYs, a well-studied kinase inhibiting scaffold) and 3-aryl quinolines (which are found in many FDA-approved drugs and bioactive compounds).

470 4:00 pm FF

Total Synthesis of Palmyramide A: A Promising Therapeutic Agent Against Colon Cancer

Melody Matthe, Chemistry (U)

Palmyramide A is a cyclic depsipeptide, isolated from cyanobacteria found off the Palmyra atoll. This molecule has been shown to be active against colon cancer. The availability of this molecule from natural sources is extremely low; therefore, our goal is to increase its availability by proposing and completing a total synthesis of this molecule to obtain enough material for further biological evaluation. Palmyramide A is a cyclic depsipeptide composed of three amino acids and three hydroxy-acids. Fragments of this molecule can be synthesized from commercially available products. Once all pieces are synthesized, steps can be taken to put the complete molecule together. We have previously synthesized the L-phenyllactic acid region of the molecule via diazotization of commercially available L-phenylalanine and putting a TBS protection on it. Currently we are working on optimizing the synthesis of R-DMHHA (dimethylhydroxyhexanoic acid), an uncommon α-hydroxy acid sometimes found in marine bacteria. We are using novel chemistry developed in our lab to do a one pot silyl conjugate addition and enolate alkylation to a substituted chiral oxazolidinone. We are currently synthesizing regions of Palmyramide A in order to put the molecule together. Once the synthesis is complete, the molecule can be further tested against colon cancer and will hopefully aid the population that is affected.

471 4:00 pm GG

Fine Tuning Dihedral Angles for Novel Pyrazolopyrimidine Inhibitor Scaffolds

Bahar Heydari, Chemistry (M)

Pyrazolopyrimidines (PPs) are prevalent scaffolds throughout drug discovery, as they are reported to have anti-cancer activity against a variety of protein kinases. Atropisomerism is a type of chirality that arises from hindered rotation about a bond. Atropisomerism differs from other types of chirality in that atropisomers can exist as either stereochemically stable or rapidly interconverting enantiomers depending on the barrier to rotation about the chiral axis. Unstable atropisomerism is ubiquitous in drug development, leading to small molecule inhibitors that can access the majority of dihedral angle conformations around the bond axis. This lack of specificity can lead to undesirable side effects that are common in numerous FDA approved drugs. Here, we aim to improve potency and selectivity in a promiscuous PP drug scaffold by restricting the accessible range of dihedral angles through 1) adjusting steric bulk adjacent to the chiral axis, 2) introducing intramolecular H-bonding, and 3) covalently tethering the molecule together. To better understand the preferred dihedral angle conformations of PP ligands for their given targets, we will measure and plot the dihedral angles co-crystallized with their target found

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on Protein Data Bank (PDB). This will allow us to generate a library of PP substrates with different accessible dihedral angle conformations to selectively bind certain targets. The synthesis of unstable PP analogues will be accomplished by iodination of the core scaffold, followed by cross coupling to generate the atropisomeric axis. For more bulky PP substrates and those containing pyridines, a Grignard reaction, followed by oxidation, and the addition of hydrazine, will be performed to synthesize the core scaffold. To determine how stereochemically stable each inhibitor is, we will perform barrier to rotation studies using chiral phase HPLC. In the future, we aim to test these compounds in vitro to determine their biological activity towards particular targets.

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472 4:00 pm HH

Cu tuned Lead-Halide Perovskite for N-N bond formation

Jovan San Martin, Chemistry (M)

Lead-halide perovskite, a powerful material used in solar cells, has recently been shown to be capable of conducting organic photoredox reactions and can be easily tuned in many ways to conduct different types of organic synthesis. However, transition metal tuning with lead-halide perovskite has yet to been accomplished with respect to organic synthesis. In this work, we report a new system that combines the strengths of photocatalysis and the power of transition metal catalysis to establish a new hybrid heterogeneous catalyst system that can accomplish interesting N-N bond formations. This was accomplished by combining the well-studied properties of the transition metal, Cu, with the easily tunable properties of lead-halide perovskites. Here we report the bond formation of several heterocycles from diamine compounds that can be of great interest for building blocks of biologically relevant molecules. We also extensively characterize the properties of our new hybrid heterogeneous catalyst and provide its unique strengths with respect to other well established photocatalysts. Our new system is the beginning of a potentially new avenue for the formation of exotic bonds previously unobtainable using this new hybrid catalyst system.

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473 4:00 pm II

Metal Dichalcogenides for Facile and Selective Direct Electrochemical Co-enzyme Regeneration!

Nicholas Williams, Chemistry/Biochemistry (D)

In efforts to address the future of Earth's climate change and the increasing demand for energy, the capture, and conversion of greenhouse gases are essential. Enzymatic catalysis offers a means to solve this problem under mild conditions, with a great potential to convert CO2, an overabundant greenhouse gas, into useful value-added organic molecules, like methanol or formaldehyde. Current methods to produce these simple molecules, like the Formox process for formaldehyde, are energy-intensive processes which requires the input of high temperatures, pressures, and expensive catalysts. The caveat to using free enzymes is that they require coenzymes as sacrificial reagents, which are expensive and must be recycled to make them economically feasible for industrial utilization. Herein, our study focuses on the direct electrochemical regeneration of one such coenzyme, nicotinamide adenine dinucleotide (NAD) to its reduced form (NADH). To inhibit the production of inactive byproducts such as NAD dimers and inactive isomers, catalysts are required to facilitate the concerted proton to electron transfer selectively to produce the active NADH isomer. Previous studies involve metallic transition metals to regenerate NADH electrochemically. Herein, we aim to expand the field of coenzyme regeneration to include more current materials, such as molybdenum disulfide (MoS2). Initial results show that MoS2 can be used for more complex reactions than simply to produce hydrogen, outperforming other common electrocatalysts used for NADH regeneration such as metal nanoparticles. Additionally, this study investigates the effect of changing the crystalline properties of MoS2 affects selectivity for coenzyme regeneration. Amorphous MoS2 grown via conventional hydrothermal methods showed an optimal faradaic efficiency of 16% with the caveat of a significantly reduced rate of NADH generation. Microwave-assisted growth of MoS2 onto carbon fiber yielded a more crystalline product that consistently underperformed compared to its amorphous counterpart. Our findings open a new area of potential catalysts for coenzyme regeneration.

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474 4:00 pm JJ

Peptide Stapling by Lewis Base/Bronsted Acid Catalyzed Sulfenylation of Tryptophan

Zachary Brown, Chemistry (D)

Peptide stapling is the process of linking two sites of a peptide together in the effort to create and maintain its three-dimensional shape. The function of peptides and proteins relies solely on the integrity of the three-dimensional shape; therefore, increasing the durability of the shape of a peptide or protein directly increases it's effectiveness in a biological setting. Stapling a peptide will increase its resistance to environmental perturbations, including changes in temperature, pH, and solvent composition. Current strategies to staple peptides require the use of expensive artificial amino acids or extreme reaction conditions. We take a different approach by focusing on mild conditions and a natural amino acid, tryptophan. We have developed a Lewis base-Brønsted acid catalyzed sulfenylation of tryptophan in the practice of stapling peptides. We synthesized sulfur containing polyethylene glycol derivatives, which we have successfully used as a link between two tryptophan amino acids on a peptide. Successful peptide stapling is analyzed by reverse phase chromatography, Matrix Assisted Laser Desorption Ionization (MALDI), LCMS, protein NMR, and circular dichroism. We have been working with therapeutically relevant peptides, and we are conducting cell assays to measure the efficacy of our stapled peptides.

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475 4:00 pm KK

Comparison of Fluorogenic Cytidine Nucleosides: Developing a New Analogue to Test Structure and Properties

Casey Heaney, Cellular and Molecular Biology (U)

Fluorescent nucleoside probes are important in advancing knowledge of how cells use their genetic code, especially in DNA replication, expression, and maintenance. Originally synthesized by Matteucci and Wilhelmsson, tricyclic cytidine analogues such as 8-DEA-tC now include a family of compounds and exhibit a range of fluorescent properties. 1Fluorescent tricyclic cytidine analogues are currently used widely in DNA/RNA polymerase studies, measuring DNA–protein interactions, and FRET experiments.1 In response to base pairing and stacking, the fluorescent properties of the analogues become altered. As a free nucleoside, 8-DEA-tC is nearly nonfluorescent at Φem = 0.006, and increases fluorescence up to Φem = 0.12 when base-paired with guanosine in double-stranded DNA.2 The mechanism for this change in fluorescence differs from the mechanism for other fluorescent nucleosides as evidenced by solvation studies.2We are synthesizing a related compound, the oxygen-containing analogue 8-DEA-tCo, as a source of comparison to better examine the mechanism for the fluorescence turn-on for 8-DEA-tC.3 The five-step synthesis of 8-DEA-tCo includes the challenging step of adding 4-diethylamino-2-aminophenol to a protected 5-bromouridine, with activation by POCl3 and 1H-triazole. The synthesis of the compound 4-diethylamino-2-aminophenol is completed in four steps with an overall 40% yield. Once 8-DEA-tCo is synthesized, a phosphoramidite substituent of the nucleoside will be made in two steps to make oligonucleotides for further testing. Ultimately, 8-DEA-tCo will be compared to 8-DEA-tC to further elucidate the mechanism of fluorescence turn-on, and detect how changing the substituent atom for this compound alters the vibrational fine structure or the quantum emission. It has been demonstrated that changing the substituent atoms, such as a carbon atom to an oxygen atom in this study, alters the photophysical properties of the nucleoside probe. These studies provide a greater understanding of the relationship between structural and photophysical properties of analogues and will allow for better design of fluorescent probes with predictable properties for nucleic acid structure and dynamics research.

References: [1] Wilhelmsson, L, Quart. Rev. Biophys. 2010, 43(2), 159. [2] Purse, B. W., et al. J. Am. Chem. Soc. 2017, 139, 1372. [3] Purse, B. W., et al. Chem. Eur. J. 2019, 25, 1249.

Session E-7

Poster Biological & Agricultural Sciences 7
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

476 4:00 pm LL

An Overview of the Microhabitat on Cylindropuntia Wolfii Fruits

Carlos Portillo, Biology (U)

Introduction: Cylindropuntia wolfii is a native endemic cactus that is well adapted to the South Western desert region. It is a predominant species of the Jacumba area close to the border of USA and Mexico. Although C. wolfii has been producing a lot of flowers every spring, their fruits are not producing well developed mature seeds. C. wolfiii can also reproduce by dropping vegetative segments but that might produce clones and keep the genetic diversity constant in the population which will in turn increase their vulnerability. Our lab identified that C. wolfii is functionally dioecious. There are no studies documenting the biodiversity associated with this species of cactus.

Objective: To document the biodiversity associated with aborted fruits of this dominant, but narrowly distributed species.

Methodology: We collected fruits from male and female individuals. We evaluated if they had viable seeds. The fruits were sectioned using gardening shears. The ovaries were observed under the LEICA M125 compound dissecting microscope. The number of seeds/aborted ovules were counted manually. Presence of insects and microorganisms was documented. The fruit images were obtained under SMZ25 Nikon Stereoscopic microscope. The differences between sexes were plotted in excel.

Results: The aborted fruits of C. wolfii were observed to provide support to different species. Interestingly, the dry fruits have provided architectural support for the spiders. We observed 6 aborted fruits out of 201 that had spider webs. Male and female fruits were found to have been occupied by spiders, predicted to be of the genus Phidippus. We will increase our sample size in future collections. We also observed mold on some of the aborted fruits of C. wolfii. The mold was only observed affecting male aborted fruits and none of the females. Other insects have been found will be identified soon.

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

477 4:00 pm MM

Effects of new bacterial pathogen species, Bordetella atroposiae, on the genetic fitness of Oschieus Tipulae

Munira Ali, Microbiology (U)

Intracellular bacterial pathogens have long been known to cause infectious diseases within the human population. Obligate intracellular pathogens, like Rickettsia parkeri survive and reproduce solely within the host cell, whereas facultative pathogens, like Listeria monocytogenes, are able to exploit multiple host niches. To fully understand the microbial interactions taking place in the host epithelia, we sample for natural pathogens of wild rhabditid nematodes, like Caenorhabditis elegans and Oscheius tipulae. These nematodes are great in vivo models because they have short generational cycles and and are fully transparent, allowing infection to be followed throughout its development. From ecological sampling in Finestere, France, we discovered a new pathogenic bacteria adhering to a wild isolate of O. tipulae, that we named Bordetella atroposiae. Characteristically, B. atroposiae has a coccobacilli morphology and exhibits a unique filamentation mechanism for intracellular cell-to-cell spreading.

With the main purpose of understanding the effects of B. atroposiae on the genetic fitness of the cognate strain, we conducted lifespan and broodsize assays to determine any health and reproductive impacts of the bacterium. Multiple trials found that the worms placed on B. atraposie lived on average for 3 days, compared to worms on non-pathogenic E.coli food source (OP50), that lived on average for 7 days. Broodsize assays to determine the number of progeny also showed that a JU1501-A2 worm on B. atroposiae produced on average 2 progeny, compared to an individual worm on OP50 which produced on average 185 progeny. Furthermore, we tested a panel of wild isolates of O. tipulae and found two strains that are naturally resistant to B. atroposiae. We conducted the same lifespan assay on theses resistant isolates, BA1009 and JU457, and found increased lifespans compared to the susceptible strains.

Collectively, we discovered a new species of facultative intracellular pathogen, Bordetella atroposiae, with a high pathogenicity in the cognate and wild type strains of O. tipulae. We have also found certain wild isolates of O. tipulae have natural resistance to B. atroposiae, indicating some level of coevolution occurring between this bacterium and O. tipulae. In the future, we will map the O. tipulae alleles leading to Bordetella resistance.

478 4:00 pm NN

Discovery of a Buttiauxella species that adheres to intestinal cells and is likely a commensal microbe of wild C. elegans

Jonah Faye Longares, Microbiology (U)

The diverse microbial community of intestinal microbiota are of interest to human health. Current research in the human intestinal microbiome seeks to understand microbial interactions with host intestinal epithelia. Caenorhabditis elegans is a transparent, microscopic nematode that is used as a model organism, and it has a simple intestinal system which can greatly benefit microbiome research. We therefore underwent ecological sampling for C. elegans in the wild that have natural bacteria in their intestine. Our sampling around San Diego lead to the discovery of wild C. elegans isolates with an unknown bacterium adhering to the intestinal epithelial cells in the lumen. Phenotypically this bacterium has a rod-like shape which grows perpendicularly along the inner sides of the lumen and is seen throughout the intestine along the anterior-posterior axis. We approximate 95-99% of the worms in a clonal population are colonized by this bacterium.

To identify this bacterium, we first cleaned the wild isolate and identified the bacterium in the Enterobacteriaceae family, close to the Buttiauxella genus. We then made a fluorescence in situ hybridization (FISH) probe and verified our identification via microscopy. We then tested this probe against 15 other wild isolates found globally with intestinal-adhering bacteria and found that the majority of these isolates are colonized by this Buttiauxella species. We tested the genetic fitness of C. elegans colonized by this Buttiauxella and found it to have minimal impact on the worm lifespan or number of progeny. By contrast, we have discovered another bacterium that binds in the same manner as this Buttiauxella bacterium that when colonized in C. elegans has a severe impact on genetic fitness, suggesting a pathogenic effect.

Altogether, we discovered and identified a new species of Buttiauxella bacterium that likely represents a part of the natural microbiome of C. elegans globally. To date, we have identified other natural bacteria adhering to the lumen of C. elegans, making them a great tool to explore the relationship between natural bacteria colonization and their symbiotic or pathogenic effects. We expect that our future experiments with this system will aid in understanding microbe interactions with host intestinal epithelia.

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479 4:00 pm OO

Exploring the genetic elements of methane-based chemotaxis in Methylomicrobium alcaliphilum 20 Z

Cassandra Ortiz-Nelsen, Microbiology (U)

The temperature of the Earth rises as methane and other greenhouse gases are released from natural and anthropogenic sources and absorb the sun's thermal energy. Fortunately, methanotrophic bacteria consume methane as their sole energy and carbon source and are able to mitigate the rapidly increasing emissions of methane before it impacts the Earth's atmosphere. Proteobacteria are known to travel towards their food and energy sources by using their flagella in a process known as chemotaxis. It is not known what genes are responsible for chemotaxis in methanotrophic families of proteobacteria; in this work we examined the genetic basis of methane-based chemotaxis in the robust methanotroph Methylomicrobium alcaliphilum 20Z. The chemotaxis system was identified through features observed in cryo electron microscopy and led to identification of three gene clusters annotated with chemotaxis functions. One candidate gene MALCv4_2872 was identified through structural characterization to have an atypical arrangement of domains found in methyl-accepting chemotaxis proteins (MCPs) and was selected as the first target related to methane-based chemotaxis. To evaluate if MALCv_2872 is responsible for methane sensing, a markerless deletion was created using an established mutagenesis protocol in 20Z. These mutants were then compared to wild-type cells in their ability to move towards methane containing gas mixtures using a modified chemotaxis protocol. Test tubes containing a semi-soft media agar containing the indicator TTC was used to contain gas mixtures and dipped into a culture of wild type or delta2872 strains. Initial results showed that both strains retained a methane-based chemotaxis phenotype, indicating a function related to other sensing by MALCv4_2872 or potential crosstalk between the numerous chemotaxis genes. Additional experiments comparing aerotaxis in these strains additional mutations in other chemotaxis genes are planned. Unlocking the basis of methane-sensing by organisms will be a powerful step in biotechnology based methane detection in the future.

480 4:00 pm PP

Assessment of chondrichthyan biodiversity in western India

Isabella Livingston, Biology (U)

Chondrichthyes (sharks, rays, skates, and chimaeras), one of the most diverse classes of extant vertebrates, are critical to top-down regulation of trophic interactions in marine ecosystems. Demand for chondrichthyan products has increased fishing pressure, threatening ~30% of species with extinction. Additionally, ~46% of species are data deficient, which poses challenges to conservation of remaining populations. India is the second largest contributor of chondrichthyan landings globally. Among chondrichthyan species found in India, ~30% are threatened, and 37% are data deficient. Providing data for distribution and population numbers, for these species is critical for conservation efforts. Here, we use biodiversity surveys of landing sites in western India to determine species being targeted by fisheries. Sampling was done at four primary chondrichthyan landing sites along the western coast of India -Okha, Veraval, Mangrol, and Porbandar. Chondrichthyan specimen samples from these sites were analyzed to determine taxonomic identities using morphological and molecular parameters. 102 samples were uploaded to the iNaturalist species identification database, where 31 species were identified. Possible range extensions were discovered for 3 species: Spotted Guitarfish (Rhonobatos punctifer), Gulf Torpedo (Torpedo sinuspersici), and the Spot-tail Shark (Carcharhinus sorrah), by comparing landing site locations and known geographic ranges from the IUCN Red List database. Data from these studies will reduce data deficiency affecting Chondrichthyes and will inform conservation measures.

481 4:00 pm QQ

Skin microbiome of the round stingray, Urobatis halleri, in southern California

Emma Ker, Biology (U)

Microbiomes, or all of the microorganisms associated with an organism, provide insight into the health of an organism. Rays are part of the class Chondrichthyes, and have several features that may affect the structure of the skin microbiome, including mucus production and benthic lifestyles. Here we describe the skin microbiome composition of the round stingray, Urobatis halleri, and use the analysis to investigate if phylosymbiosis is the microbial assemblage pattern occurring in sharks and rays. Phylosymbiosis is a microbial assemblage pattern where the phylogeny of the host is mirrored in the similarities of the microbiome. This is independent of the phylogeny of the microbes themselves. While sharks and rays are related, sharks are covered in dermal denticles with minimal mucus, whereas stingrays have a layer of mucus on their skin, which is a trait more similar to teleost fish. We will analyze whether the microbiomes of sharks and rays, the two phylogenetically related groups, is more similar than the two unrelated groups, rays and fish, that have a similar trait (skin covered with mucus). The skin microbiome of forty rays was collected from eight locations across southern California, including Long Beach, San Onofre, Oceanside, San Diego Bay, LA Harbor, Dana Point, Coronado (2019) and Mission Bay (2017). To date four metagenomes collected in 2017 have been sequenced on Illumina and annotated using Focus and Superfocus, two kmer based programs. A Pairwise test the taxonomic composition of the skin microbiome of sharks and rays are least similar (average similarity 41.42) whereas the skin microbiome of

teleost fish and sharks are the most similar (average similarity 57.92). Clostridia microbes are one class of microbes driving the differences between host microbiomes. MG-RAST was used to analyze the functional genes of Clostridia microbes. In the stingray microbiomes, carbohydrates, DNA metabolism and protein metabolism were all over represented compared to the other microbes. In the future, the microbiome from the remaining rays will be compared to the microbiomes of sharks and teleost fish.

Session E-8

Poster Behavioral & Social Sciences 19
Friday, February 28, 2020, 4:00 pm
Location: Montezuma Hall

482 4:00 pm RR

Ravens and Other Small Birds of Grasshopper Pueblo

Francesca Beaird, Anthropology (U)

In the 13th and 14th centuries in central-eastern Arizona, Grasshopper Pueblo (AD 1275-1400) arose a large Pueblo settlement. The settlement's large population was a convergence of several distinct groups, brought together by migration, climate change, resource abundance of the Mogollon Rim, and trade opportunities. The division of Zooarchaeology, the study of animal bone from archaeology sites, is important to understanding the people at Grasshopper Pueblo, and how they adapted to this new location and their new neighbors. Previous work on the archeological faunal remains at Grasshopper Pueblo emphasized the ritual importance of large birds such as raptors, turkeys, and macaws as well as the calorie economy of a range of vertebrate faunal remains. The quantity of faunal remains and the site's large size allow for a more detailed analysis on the significance and roles of birds. The data from the original analysis was stored on physical cards, and was digitized as part of this study. Using legacy data, this study seeks to revisit Grasshopper with a new lens particular to Avifauna through a critical analysis of small bird species, parts and colors, as well as the locations of the interments. These data are compared to nearby sites in the region, which have been published since 1990, to create a regional comparison of the varying types of ritual deposition of birds. This project aims to facilitate better accessibility to the zooarchaeology legacy data compiled by past archeologists building a digital archive for future researchers.

483 4:00 pm SS

Exploring the spatial resolution of the pit organ system of pitvipers through evoked behavioral responses to standardized stimuli

Ann Doan, Biology/Zoology (U)

Pit vipers have specialized sensory organs located near their eyes known as pit organs. Pit organs detect thermal contrast between objects in the environment and integrate that information with the visual field of the optic tectum. These pit organs aid in a pit viper's ability to detect and capture prey. The basic function of pit organs is understood, but specific physiological parameters are still unknown, including the spatial resolution of the system. Biophysical modeling indicates spatial resolution should be extremely poor, yet pitvipers seem to be able to form viable thermal images of relatively small and distant objects in their environment. . We are studying pit organ sensitivity of southern Pacific rattlesnakes (Crotalus oreganus helleri) by examining their responses to a standardized thermal stimuli, a swinging pendulum. Our initial research provided proof-of-concept for our testing apparatus and identified optimal testing parameters. We are currently examining spatial resolution by presenting rattlesnakes with a pendulum stimulus that has the average temperature of a thermally heterogenous gridded background. Initially results indicate spatial resolution of the pit organ system to be relatively poor compared to visual systems.

484 4:00 pm TT

How Host-Parasite Interactions Impact Behavior in a Salt Marsh System

Melissa Belen-Gonzalez, Biology (U)

Ecologists have established the importance of species interactions in shaping the community structures of different habitats. Two well studied species interactions are non-lethal trait mediated interactions, such as changes in prey behavior, and lethal trait mediated interactions such as parasite-host relationships. The California horn snail, Cerithiopsis californica, is both a primary consumer and the first intermediate host for larval tremadote parasites (cercariae) within Southern California salt marshes. Thus, the goal of this study was to observe how C. californica may potentially depict how parasites alter behavioral changes in comparison to uninfected snails through a manipulative laboratory climbing experiment. Preliminary experiments depicted a potential change in climbing behavior in the presence and absence of a predatory swimming crab. Smaller snails (<20mm) were then shed of cercariae to become uninfected, and allowed to climb in the absence and presence of a predator and compared to infected snails. The potential results of this study may confirm whether or not the tremadote parasites impact host behavior as depicted in higher levels of salt marsh organisms.

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485 4:00 pm UU

Spanish land-use methods on California ecosystems in the Mission and early post-Mission periods

Kellen Lovel, Anthropology (U)

My poster presentation reports the findings from a geoarchaeological research project using soil analysis and chemical testing to understand the potential impacts of Spanish land-use methods on California ecosystems in the Mission and early post-Mission periods. We analyzed core samples collected from the Santa Margarita Ecological Reserve. The purpose of my research is to determine if there is substantial change in soil compositions and chemistry at different depths in order to understand temporal changes in soil fertility and erosion rates and potential human impacts over the past 500 years. Sediments were collected with a manual soil sampling auger in 10-cm levels. Constant-volume samples of sediments from each level were weighed, dehydrated for 48 to 72 hours, and then-weighed to determine moisture content. The dried samples were separated via a mechanical sieve shaker with standard geological sieves to determine the percentage of clasts in the standard Udden-Wentworth particle categories, including pebbles, gravels, sands, and fines. The percentage of silt and clay in the fines is then determined using the Bouyoucos soil hydrometer method, which measures the density of suspended particles over time. Particle morphometry of the sand and gravel sizes are then measured under low microscopy. Finally each sample is subjected to simple chemical tests in order to estimate the amount of total nitrogen, phosphorus potassium, sulphate and chloride. Through these tests and analyses, I will obtain the necessary data to form a hypothesis about changes to soil fertility, potential human impact and land-use in the region throughout recent history. Thus far our initial tests suggest a change in landscape processes at a depth of around 30 cm that is consistent with the potential types of impacts that could be related to the newly introduced European style of land use in this area. Final conclusions await the last analyses and combined results, but preliminary, it appears that the method holds the promise for understanding changes in past human land-use in San Diego County.

486 4:00 pm VV

A Model Based Approach to Human Impact and Extinction

Miriam Kopels, Anthropology (M)

This project, titled, “A Model Based Approach to Human Impact and Extinction: The Case of the Giant Buffalo,” explores larger themes of extinction and anthropogenic landscape modification through a model-based case study: the extinction of the giant buffalo during the Late Pleistocene at the Klasies River Mouth, South Africa. The fossil record for the giant buffalo is unique for two reasons: 1) the large quantity of remains recovered from important archaeological sites, and 2) it is simple to use dentition to categorize most individuals into one of two age categories: neonates or mature adults. This pattern is unique to the giant buffalo. Prominent researcher, Richard Klein, hypothesizes that the fossil record of giant buffalo in the Late Pleistocene is evidence of a novel hunting pattern, in which hunters deliberately sought out post-partum females to avoid the costs of hunting dangerous males. He argues that this pattern was not sustainable and therefore accelerated the extinction of this species. To test Klein’s hypothesis, I created a computer simulation model in NetLogo of human-giant buffalo interactions. The model is coded so that male and female buffaloes can be given different processing costs and caloric payoffs. I gave my hunters agency to select prey based on these costs and benefits. I hypothesize that prehistoric hunters were either: 1) avoiding large males, or 2) deliberately hunting postnatal females. The differences between these two strategies are slight but lead to significant differences in the tradeoffs between perceived costs and benefits, and therefore differentially impact herd demographics. Initial results suggest that Klein’s hypothesis is feasible, and a female-preference strategy may have accelerated extinction. This paper analyzes the effect of adding environmental patches into the model to test how climate and/or environmental change could impact giant buffalo demographics beyond the hunter/prey dynamic. In a larger sense, these results characterize humans as catalysts of extinction and dynamic molders of the landscape – far before the modern era. I frame the data within the Palaeoanthropocene debate and a deep-time perspective of anthropogenic extinction, arguing that our current extinction crisis is a continuation of a process that began 50,000 years ago.

487 4:00 pm WW

Osteological Analysis of a Burial from the Lower Río Verde Valley

Scott Miller, Anthropology (M)

This is the preliminary osteological analysis of a burial (B111) found at Río Viejo, an ancient city located in the lower Río Verde Valley of Oaxaca, Mexico. Excavations commenced under the directorship of Drs. Arthur A. Joyce and Sarah B. Barber as part of The Río Verde Project-2019—the most recent phase in a long-term archaeological survey of the lower Río Verde Valley. After we removed the burial from the site, I excavated its pedestal at our field laboratory and created a skeletal inventory. I determined that the burial consisted of one individual (I123). I then estimated the age and sex of this individual by using scoring systems outlined in the 1994 publication Standards for Data Collection from Human Skeletal Remains, edited by Jane Buikstra and Douglas Ubelaker. Lastly, I examined the bones for pathologies. Although the remains are highly fragmented, the majority of

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the skeleton is present. However, most of the skull and pelvic girdle is missing. This fact made estimating age and sex with certainty difficult. By examining dental development and cranial suture closure, I determined that the individual is likely a young adult between 21 and 35 years of age. The individual is also a probable female. I determined the sex by observing the morphology of the mandible and long bones. Pelvic morphology is a much more reliable indicator of sex, but the pelvis was unobservable. I observed moderate dental wear on all present teeth. No other pathologies were observable. Burial 111 consists of one young adult female between the ages of 21 and 35. She was relatively healthy but did have moderate dental wear—particularly on her maxillary molars. The degree of dental wear suggests a gritty diet while the lack of pathological markers indicates that this individual did not suffer from chronic illness.

Session F-1

Exhibit Exhibit 1
Friday, February 28, 2020, 9:00 am
Location: Montezuma Hall

488 9:00 am

History of surbversive music of Brazil

John Mollet, History (U)

The presentation will analysis music of brazil of the 20th and 21th century, primarily dealing with what was seen by the national population as culturally and sonically and historically subversive however revolutionary. By not only providing traditional academic research but projections and physical manifestions through the channels of screen printing, graphic design and collages, I hope to show the historical and zeitgeist sound history and space of brazil's contemporary period.

489 9:00 am

Use of Virtual Reality in Geographic Education

Christian Mejia, Geographic Information Science (M)

Virtual and Augmented reality are becoming increasingly commonplace among consumer electronics.I feel that this is going to become a common avenue for education and would like to be able to prepare some trial applications that harness this new technology.

A simple VR application that is intended to help educate people about Locational Geography.

Session G-1

Performance Arts Performance Arts 1
Friday, February 28, 2020, 1:30 pm
Location: Montezuma Theater

490 1:30 pm

Worship of a Decaying Martyr

William Lambert, Creative Writing (M)

The crucifixion of Jesus Christ is one of the most well-known images in art and religion. While the crucifixion has been seen as a symbol of hope and salvation, my flash fiction Worship of a Decaying Martyr deconstructs that image and turns it into something horrifying by showing a more realistic depiction of the crucifixion. In this Historical fiction, Jesus never gains a burial or comes back to life. Instead he is left rotting on the cross. What follows is a story about the aftermath, how his followers kept his name alive through stories and rumors. More importantly, it is about the state of martyrdom and how religion, no matter how good the intentions are, become a means of discrimination, injustice, and control.

As someone who finds religion fascinating on both a literary and historical perspective, I wanted to take this well-known image and deconstruct it into something unfamiliar. Before I started writing, I researched Roman crucifixion and studied biblical passages from the Gospels. What stood out to me was that most prisoners, especially Jewish citizens were left on the cross to rot. It was very rare for prisoners to receive a burial after crucifixion. Regardless of what really happened, I based the story on the law of probability, of what would have most likely happened under ancient Roman law. Furthermore, I wanted present this narrative through a span of time, from Ancient Rome to the present to explore the impact of Jesus' crucifixion and its consequences, which still persist today.

491 1:45 pm

Mesmerized: A 3'13" Serialism Piece about Today's Distracted Students

Andres Wong, Music Professional Studies (U)

Serialism is a compositional method that revolutionized twentieth-century music and began with the concept of twelve-tone music introduced by Arnold Schoenberg in 1923, with his Suite for Piano Opus 25, where all the twelve tones in the Western musical scale are utilized before any single pitch is repeated, replacing the traditional rules of melody, harmony, and tonality. After the first set of twelve tones, the succeeding sets observe a serialization based on either the transposition of the first set, its inversion, its retrograde, or its retrograde inversion, resulting in atonal music, deemed to be the future of music, as there is no single pitch emphasized as the tonal center.

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I used this compositional method to reflect the lack of focus that most students experience because of the distractions in our society: cellphones that easily access social media, videos, and music; the lure of quick money and fame; the availability of mind-altering drugs; and many others.

Also composed in hexachordal combinatoriality (the first six pitches of one of two simultaneous musical lines can be swapped with the second six pitches of the other line without violating the established serialization of notes in any of the two lines), this symbolizes how easily one can get off-track when one gets captivated by distractions.

This piece features four stages, beginning with an arpeggiated Cmaj7 chord superimposed on an arpeggiated C#6/11/F chord and proceeds with other dissonant arpeggiated chords. This represents one's indulgence in distractions, characterized by segments of rising nebulous notes produced by woodwind instruments. This also symbolizes how one's mind is carried away from the task at hand towards the clouds of mesmerization above.

The second stage reflects the tension resulting from one's realization of how far one has gone away from one's task and is characterized by all the dissonant chords by all instruments.

The third communicates the resolve to get back to one's assignment, characterized by rushed staccato notes which symbolizes determination. But Alas! It lasts only a few seconds.

The fourth shows one succumbing back to mesmerization characterized by segments of descending notes and ending with a foggy C#maj7(#9) chord.

Session H-1

Oral Humanities, History, Literature, Philosophy 4
Saturday, February 29, 2020, 10:00 am
Location: Pride Suite

492 10:00 am

Film as medium for sustainability

Sebastian Frias, Philosophy (U)

This presentation will explore the power of fictional and non-fictional film in the midst of a global crisis. Although it is fair to still debate about the role of art in activism or for art-for-art's-sake, the issue of climate change has pushed back those types of debates to first deal with the immediate and immense catastrophe unfolding before our eyes. It is a poisoned arrow we shot ourselves with and although few still question the veracity of its claims, millions of people and other species already deal with its repercussions. Film has some major advantages over other artforms because of its nature of moving images combined with sound and therefore its representation of reality and its way of depicting it can be very effective and realistic. I will argue for the aesthetic power of film as well as its contemporary importance as one of the most consumed mediums worldwide and one that is also able to transcend language barriers. Many people know but fail to accept the severity of the problem, and most only slightly change their behavior. Consequently, most governments and corporations do not act accordingly although they account for the most harmful emissions. I will also argue that film needs to be aesthetically powerful while its factual information is secondary. Although documentary seems to be the best medium to show actual catastrophes and slow violence, the numbers and facts are failing to spark the ideological revolution needed to stop this catastrophe. The presentation looks at Take Shelter, Moonlight, Lessons from Darkness, Before the Flood and Climate Refugees for possible different approaches to promote change and a connection to nature, some direct and others indirect, some fictional and others non-fictional.

493 10:15 am

Shame and Misogyny

Tawny Whaley, Philosophy (M)

In utilizing Kate Manne's framework of misogyny this research seeks to explore the ways in which shame operates in effectively using misogyny as a policing tool in maintaining patriarchal gender roles. Shame is used not only as a tool by misogynists to justify violence against women but also as a self-policing mechanism that forces women to monitor themselves to align with patriarchal gender roles. This researcher further examines the role of shame on violence against transwomen. Shame's effect on misogynistic violence can be utilized in attempting to explain why violence against transwomen is often much more brutal. In examining the effects of shame on misogyny we might be able to break down systems of oppression for women and transwomen and ultimately push for a less violence, sexist existence.

494 10:30 am

Realizing Consciousness Through the Metaphysical Model of Physiophenomenalism

Brian Archibald, Philosophy (M)

One of the most stubborn epistemic challenges we face is the explanation of how we are conscious at all: viz, the "hard problem" of consciousness. Some metaphysical models seeking to bridge this explanatory gap argue that phenomenality is an ontologically fundamental condition of existence, and that consciousness is not simply a contingent, psychological state of certain physical beings. Rather, consciousness is naturally "realized" by the actions of specific types of physically instantiated psychophysical systems, such as human brains.

In such models, consciousness and phenomenality simply exist, much the same as space and time exist, and beings participate in them by realizing their specific qualities. In accepting this

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basic premise, the pivotal question therefore becomes: "How are consciousness and phenomenality realized?" In direct response to this question, I argue that the physical instantiation of any concrete being thereby instantiates the "maximal unity" of that being, which necessarily realizes the fundamental conditions of phenomenality. This natural, concrete unity of "haecceity" instantiates the maximal "thisness" of that being, which fuses, focuses, realizes, and expresses its relational, "physiophenomenal" qualities in whatever unified form they may take.

This fundamental action unifies the objectively physical totality of "what that being is," thereby realizing and expressing the externally phenomenal condition of "what that being is like" as its naturally unified, objectively physiophenomenal qualities. If that being is a sufficiently complex system of maximally integrated psychophysical information, such as the human brain, then its unity of haecceity realizes and expresses the internal, subjectively phenomenal condition of "what it is like to be that being."

With a viable metaphysical mechanism by which consciousness and phenomenality are both unified and realized, the remaining challenge of validating their fundamental grounding within the hypokeimenon of existence requires that we delve into the metaphysical foundations of quantum physics. To that end, I offer a plausible explanans of those foundations that, when combined with the proffered haecceity thesis, provides a cohesive explanans of the manifestation and realization of phenomenality and consciousness as fundamental conditions of all that exists.

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495 10:45 am

Believing and Acting Responsibly

Brandon Walton, Philosophy (M)

Doxastic responsibility—or more colloquially, "the ethics of belief"—is simultaneously a modest and an ambitious project. Its modest analysandum is not the prized epistemological notions of justification or knowledge. Belief, however, is largely viewed as being entailed by knowledge. Its ambitious aim begins with the observation that not all beliefs satisfy the conditions of knowledge. Though we often fail to know what we knowingly believe, what we believe is believed to be true. It is from this cognitive condition of belief that our choices and decisions, our desires and goals, our actions and omissions, are guided.

Doxastic responsibility involves much more than what we know to be true; it also involves mistaken beliefs and our frequent failures to have formed any belief whatsoever towards an important proposition. Moreover, it involves one's entitlement to true beliefs. Belief's influence on our lives, and the lives of others, requires an ambitious project of not only epistemic responsibility, but also of prudential and moral responsibility. In many cases, whether or not an agent acted responsibly or culpably rests on whether or not he believed responsibly or culpably.

Is belief something for which one can be responsible? While many philosophers argue that it is wrong to separate the notions of responsibility and control, and thus, that it is wrong to separate the notions of doxastic responsibility and doxastic control, I will argue against this latter position. There is reason to believe that no such doxastic control is required for doxastic responsibility. Nevertheless, control somewhere seems to be required.

Being doxastically responsible, I will argue, is intimately linked to acting responsibly. Beliefs are tied to action in a surprising way. It is what we do, or fail to do, that ends up making the difference to what we believe. The reliance on belief-influencing actions, however, is complicated by skeptical worries of causal determinism. Does our acting responsibly entail the possibility to do otherwise? Does believing responsibly entail the ability to believe otherwise? In a sense to be explained, I will argue that the answer to both of these questions is a resounding yes.

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496 11:00 am

Edna and Lois: A Look at the Lives, Times, and Writings of a Mother and Daughter in National City

Albert Contreras Jr., History (M)

This paper examines changing gender roles in San Diego from 1916-1942 through the writings of a mother and daughter named Edna and Lois. Both women grew up in National City in the same house, went to the same high school, and wrote detailed accounts of their daily lives: Edna in her unpublished memoir Growing Up in National City, 1916-22, and Lois in Lois Seeman's Diaries 1939-42. Despite the many similarities between the two, however, Edna and Lois lived very different lives. The war economy of World War I only changed the social fabric of San Diego enough that Edna could recognize the imbalance in gender roles, but she could not change them. A generation later, World War II gave Lois the opportunity to break free from some of those gender roles and work to change her family's circumstances.

The historical scholarship of San Diego has generally been formulated around research questions that attempt to explain the city's rise to prominence in the 20th century. Previous historians have made the city itself their subject, and in doing so have often ignored the lived experiences of the city's people. While this paper traces the broader history of the San Diego region in the first half of the 20th century, it explores this history through the lives of two young women, thus greatly expanding the historical lens through which we view southern California during World War I and World War II. Through the stories of Edna and Lois, this research examines how the different wartime economies impacted social and cultural concerns such as gender norms, motherhood, and the dynamics of work, school, and family. This project will not only, in the words of historian Charles Joyner, ask "large questions in small spaces," it will also allow the women who lived during these times to answer those questions directly.

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Session H-2

Oral Engineering & Computer Sciences 10
Saturday, February 29, 2020, 10:00 am
Location: Park Boulevard

497 10:00 am

The Effects of Gravity on the Combustion of Thermally-Thin PMMA in a Narrow Channel

Lucas Massey, Mechanical Engineering (U)

Various spacecraft-related accidents have occurred as a result of uncontrolled fire. Spacecraft, and all the money invested into them, have been destroyed. Several lives have been lost. Investigating fire in microgravity environments is crucial in a time of increasing space exploration. Using computer simulations allows for the total customization of input and output data for a more complete analysis than experimental data alone.

Computational modeling of thermally-thin fuel samples of polymethyl methacrylate (PMMA) undergoing ignition and sustained combustion inside of a Narrow Channel Apparatus was performed. The narrow channel is used to simulate a small gap in a hollow-double wall or between circuit cards in a computer, for instance. The channel aims to mitigate the effects of buoyancy near the fuel sample, simulating a microgravity environment. PMMA is chosen as the fuel as its combustion properties are well understood.

Fire Dynamics Simulator (FDS) was used to simulate the Narrow Channel Apparatus. The thickness of the burning fuel sample was 75 micrometers. A gap height of 5 millimeters was used between the fuel sample and wall. An opposed-flow inlet with parabolic velocity profile was used to force flow through the channel. Both the ambient air and the inlet flow were set to atmospheric conditions, with 23% oxygen mass concentration.

Various simulations were performed. Altered parameters among each of the simulations included the inlet flow's velocity and domain boundary conditions. Simulations of both vertical and horizontal channel orientations were performed. Frame-by-frame tracking of the flame front was used to calculate flame spread rate. Overall qualitative and quantitative analyses of the simulations were conducted to further understand the overall effects of gravitational-buoyancy on flame spread.

When simulating a horizontally-oriented channel, it was found that a flow vortex formed in front of the flame on the downward-facing half of the fuel sample. This finding leads to explain several phenomena regarding the differences in the two flames, including the flames' shapes, heat release rates, and standoff distances.

498 10:15 am

Infrared Examinations of Preheating in Simulated Microgravity Flamespread

Michael Berry, Mechanical Engineering (M)

Fires aboard spacecraft are potentially catastrophic events for both craft and crew. Due to spacecraft conditions, even a small fire can quickly become uncontrollable. For this reason, it is necessary to study how materials burn and fires spread in spacecraft operating conditions. As part of ongoing spacecraft fire safety research, a series of tests are performed to examine the forward conduction of heat or "preheating" ahead of the flame front in a thermally intermediate fuel to better understand flame spread mechanics.

Tests are performed in the Narrow Channel Apparatus (NCA), a combustion wind tunnel designed for material flammability testing in a simulated spacecraft environment. One way the NCA achieves this environment is through an extremely narrow gap between the fuel and lid of the device. This narrow gap limits the effects of buoyancy, one of the key differences between earth based and microgravity flame spread. During testing a 5 mm gap was used along with an opposed flow velocity of 15 cm/s air (assumed 21% oxygen and 1 atmosphere pressure) for solid poly methyl methacrylate (PMMA) fuel thicknesses of 3, 5, and 10 mm.

PMMA is selected as the fuel due to repeatability of test results, relative ease of computational modeling, and known combustion mechanics. An infrared (IR) camera is used to measure the surface temperature of the fuel. PMMA is a semitransparent material in much of the IR spectrum making it difficult to get accurate surface temperature measurements. However, accurate measurements of surface temperature can be achieved through restricting the camera's spectral sensitivity with a bandpass filter and knowledge of the fuel emissivity. For testing, a bandpass filter for the spectral region of 3.25 to 3.75 microns was used to render the surface of the PMMA opaque for all fuel thicknesses.

Surface temperature measurements with the IR camera are compared to results obtained with thermocouples embedded in the surface of the fuel samples. Results from both the IR camera and embedded thermocouples show that nontrivial forward conduction occurs during tests, particularly in 3 mm fuels, and therefore must be included in computational models of the process.

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499 10:30 am

Implementation of SpraySyn, a standardized spray flame nanoparticle synthesis system

Helena Rodriguez Fernandez, Mechanical Engineering (M)

Flame spray synthesis has grown significantly over the last decade as a technique for efficient production of tailored nanoparticles. Flame-based processes are a scalable synthesis approach that has been shown to produce nanoparticles efficiently without extra wet-chemistry steps. Spray flames carry advantages over other flame synthesis techniques in that a wider range of liquid precursors could be used and nanoparticles could be produced at higher rates. Although spray flame synthesis is a common method for large-scale fabrication of nano-materials, there is a lack of deep understanding of the process. In addition, the results from research on this topic are difficult to validate, given the absence of a consistent and reproducible experimental database. In order to overcome these challenges, a new standardized and easy to use burner named SpraySyn was designed by leading flame synthesis researchers at the University of Duisburg-Essen in Germany. The Flames, Aerosols and NanoScience lab in the Mechanical Engineering Department was among the first in the United States to procure this new standardized system and this presentation describes the implementation of this system at SDSU. Several sub-systems were designed, fabricated and assembled to house and operate this standardized SpraySyn burner. The objective is to establish an experimental setup that agrees with the standard operating conditions presented by the SpraySyn's developers. The experimental spray flame is compared to the provided reference flames by using image-based characterization. Combining a DSLR consumer camera and a Matlab image post-processing algorithm, elements of the flame such as height, diameter, tilt and color are analyzed. The standard protocol to synthesize iron oxide nanoparticles will be shown. If the flame elements studied are within the given tolerances, the validation of the results as well as the standardization of the setup will be ensured. In addition, TEM and X-Ray Diffraction techniques will be utilized for the study of the nanoparticles.

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500 10:45 am

Synthesis of Manganese Oxide Nanoparticles in Flames

Shruthi Dasappa, Engineering Sciences (D)

Synthesis of manganese oxide nanoparticles was carried out in premixed stagnation flames. The deposition surface was stationary to enable rigorous comparison to flame structure computations using pseudo one-dimensional and full two-dimensional calculations. The pseudo one-dimensional assumption taken by OPPDIF to calculate the flame structure performs reasonably well for the narrow aspect ratio stagnation flow currently studied. Agreement between the measured flame position and both computational methods was within 0.25 cm. The variation in manganese oxidation state in the products observed here is shown to be caused by competing oxidation and particle nucleation processes. Complimentary experimental and modeling studies of flame synthesis were carried out under well-defined boundary conditions to examine this competition. Manganese oxide products having II, II,III, III and IV valence were observed depending on the flame conditions. Unlike iron oxide and titanium oxide systems, complete oxidation to MnO2 is only observed for the most oxidizing growth conditions. The first observation of phase pure MnO by flame synthesis is reported here. Manipulation of the balance between manganese oxidation and particle nucleation through control of the time-temperature-oxygen history may enable selective synthesis of manganese oxide nanoparticles with tailored morphology and oxidation state.

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501 11:00 am

High Quality Video Compression and Reconstruction

Patrick Perrine, Computer Science (U)

As the multimedia industry is transitioning from High-Definition (720p, 1080p) resolutions for standard video storage to Ultra-High Definition (4K, 8K) resolutions, new green techniques must be explored to help accommodate for this significant change in video resolution transmission. Our team decided to explore a new technique utilizing the also soon-to-be standard video codec, H.265, as well as current applications of machine learning. The open-source encoder, HandBrake, was the tool by which H.265 compression was performed, in which resolutions and bit rates were altered from an uncompressed, 4K video to form multiple compressed derivatives. We then simulated a transmission of said compressed videos, and then ran machine learning based software to restore the downscaled videos back to 4K. Our core goals were to create a functional pipeline for video transmission, determine its efficiency for greener a transmission, and observe the effects on perceived visual quality of the videos.

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502 11:15 am

BRIC: Locality-based Encoding for Energy-Efficient Brain-Inspired Hyperdimensional Computing

Justin Morris, Computer Engineering (D)

Brain-inspired Hyperdimensional(HD) computing is a new computing paradigm emulating the neuron's activity in high-dimensional space. The first step in HD computing is to map each data point into high-dimensional space(e.g., 10,000), which requires the computation of thousands of operations for each element of data in the original domain. Encoding alone takes about 80% of the execution time of training. In this paper, we propose BRIC, a fully binary Brain-Inspired Classifier based on HD computing for energy-efficient and high-accuracy

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classification. BRIC introduces a novel encoding module based on random projection with a predictable memory access pattern which can efficiently be implemented in hardware. BRIC is the first HD-based approach which provides data projection with a 1:1 ratio to the original data and enables all training/inference computation to be performed using binary hypervectors. To further improve BRIC efficiency, we develop an online dimension reduction approach which removes insignificant hypervector dimensions during training. Additionally, we designed a fully pipelined FPGA implementation which accelerates BRIC in both training and inference phases. Our evaluation of BRIC on a wide range of classification applications shows that BRIC can achieve 64.1x and 9.8x(43.8x and 6.1x) energy efficiency and speed up as compared to baseline HD computing during training(inference) while providing the same classification accuracy.

Session H-3

Oral Interdisciplinary 9
Saturday, February 29, 2020, 10:00 am
Location: Tehuanco

503 10:00 am

A Qualitative Understanding of the Migration Experience in Mexico

Martin Ibarra, Health Promotion & Behavioral Science/ Latin American Studies (M)

Unprecedented media attention on recent migrant caravans arriving to the U.S./Mexico border has spurred strong and contradictory public opinions on how the government should handle the supposed “crisis”. News cycles focus on the sheer number of the caravans and the multitude of refugees. The potential dangers that some of migrants may bring with them are highlighted and exaggerated. However, very few media sources focus on the stories behind the individuals who, often, had no choice but to leave everything behind flee to the US. In response to this gap, I conducted preliminary qualitative research over the course of 6 weeks, funded by the Tinker Grant, in Mexico City and Oaxaca, Mexico. I conducted semi-formal interviews with people who had migrated to the US and returned back to Mexico. I also discussed the migrant caravan with locals of the area in Mexico City and Oaxaca city, to get their take on the issue. I also conducted research in migrant shelters in Mexico City and Oaxaca City. I interviewed the people who ran these shelters to get a better understanding of how they run their shelters. Through the use of semi-structured interviews and taking extensive fieldnotes, that I later coded and organized the information according to themes that arose. I documented several stories of folks who had been migrated to the US but had been deported back to Mexico. Some of the themes that arose from those interviews were abuse at the hand of CBP/ICE, guilt, and family separation. Opinions on the migrant caravan varied whether the person I talked to was a local on the outskirts of Mexico City/ Oaxaca City, or if it was a tourist in a the city. My research also revealed that, despite the urgent need of shelters throughout Mexico for greater resources, these shelters form a crucial network of humanitarian and social support for migrants on their journey and upon deportation.

504 10:15 am

Dungeons & Dragons Player Differences

Nathaniel Rogers, Communication (M)

Tabletop roleplaying games (TRPGs) have waxed and waned in their popularity but are presently in a state of unprecedented unpopularity. Uses & gratifications theory argues that individuals use different media in order to satisfy different means and achieve different gratification. However, little to no work has been done to identify if and what differences might exist between players of different TRPGs. Utilizing a cross-sectional survey design, D&D players from around the world answered a survey about their player motivations. These responses were then correlated with participant age in order to determine if there is an age-related component to D&D player motivations.

505 10:30 am

The Effect of Traumatic Brain Injury Prevention Laws on Youth Sports Participation

Oren Rosenberg, Economics (M)

Traumatic Brain Injury (TBI) is among the most prevalent and least-understood injuries affecting athletes at all levels. A growing body of literature on the effects of TBI spurred 49 states and the District of Columbia to pass some type of law attempting to address pre-collegiate athlete TBI, and in particular multiple successive TBI. This study is the first attempting to estimate the causal effects of this set of TBI laws on high school sports participation. Using data from the National Federation of High Schools, I examine the effects of several effective components of these laws on a wide range of sports with different levels of physical contact. My results fail to find any effect of these laws on sports participation that are statistically distinguishable from zero among the most high-risk sports when grouped, but does find some significant effects of these laws on individual sports as well as positive participation effects on sports with an intermediate level of TBI risk, suggesting possible substitution effects of intermediate risk sports participation for high risk sports.

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506 10:45 am

Praying the Hurt Away: The Impact of Evangelical Values on Seeking Mental Health Support

Kara Sutton, Communication (M)

The purpose of this study was to investigate the relationship between evangelical Christian identification and mental health seeking behavior among first-year university students. Research reveals that first-year students attending universities experience increased stress levels. Additionally, the stigmatization of seeking mental health support can be exacerbated by particular environments, such as the university setting, which increases the chances of mental health struggles, or membership in evangelical Christian organizations, which can function as barriers to students accessing the resources they need. Positioning theory situates this investigation in the context of how organizations impact social and moral behaviors. It is hypothesized that the stronger the identification a first-year student has with an evangelical Christian organization, the lesser their likelihood to seek a licensed mental health professional. To assess levels of evangelical identification and likelihood to seek mental health support, we surveyed 313 undergraduate students at a four-year liberal arts university and ran a Pearson's r correlation test. While data did not support the hypothesis, important implications regarding a shift in how evangelical Christian organizations perceive mental health support are discussed. Specifically, we speculate that a progressive shift within these religious environments is occurring given how students report their utilization of professional mental health resources. Limitations and directions for future research regarding the impact of evangelical identification and mental health support seeking behavior are also discussed. Further, we review the importance of this shift within evangelicalism at large, as well as the continued need for research to cover a broadened scope of the populations identifying with evangelical values.

507 11:00 am

Distributor agreements and the location and branding of unhealthy products within food stores

Petrona Gregorio-Pascual, Public Health/Health Behavior (D)

Energy-dense, nutrient-poor foods and beverages (i.e., unhealthy products) are often placed at the front of stores to encourage purchasing. Branding products also impacts purchasing. Yet, how product location and branding are related to the types of agreements stores have with product distributors is less well understood. This study examined product in-store location and branding of five unhealthy product categories as a function of distributor agreement type.

This cross-sectional study involved 72 small stores located in four US cities: Baltimore, MD; Durham, NC; Minneapolis/St. Paul, MN; and San Diego, CA. Store audits assessed product locations [front/back endcaps, cash register(s), other displays (e.g. coolers)], and branding of five unhealthy product categories (sweet snacks, savory snacks, confectionary, frozen treats, and sugary beverages). Managers self-reported distributor agreement type for each product category: formal (i.e., written contract) versus informal (i.e., verbal agreement or handshake). Independent sample t-tests were conducted to compare the mean percent of products present/branded in each in-store location by agreement type.

Results revealed that a higher percent of stores had savory snacks available at front endcaps when the stores had formal ($M = 66.9\%$, $SD = 32.8\%$) versus informal agreements ($M = 48.2\%$, $SD = 30.9\%$, $p < .04$). Moreover, a higher percent of stores had sugary beverages available at cash registers when the stores had informal ($M = 42.4\%$, $SD = 45.9\%$) versus formal agreements ($M = 18.2\%$, $SD = 39.2\%$; $p = .049$). Also, there was a higher percent of stores had sugary beverages available at other displays when the stores had informal ($M = 65.4\%$, $SD = 20.6\%$) versus formal ($M = 52.8\%$, $SD = 23.1\%$) agreements ($p < .04$). No other relationships were statistically significant by distributor agreement type ($p > .05$).

Distributor agreements exist in small food stores and these agreements appear to play a role in the presence, placement and the branding of some but not all unhealthy foods and beverages. Understanding how agreements influence presence, placement and branding throughout the store is important due to the ubiquity of small food stores in low income communities, and their importance as a source of food and beverages.

508 11:15 am

Investigating the mechanism of a bacterial protein that induces animal metamorphoses

Milagros Esmerode, Cellular and Molecular Biology (U)

Many marine organisms undergo a dramatic change from their free-swimming larval stage to their sessile juvenile stage. This dramatic metamorphosis is often mediated by a bacterial stimulatory cue, and provides a prominent example of bacteria stimulating animal development. Although many marine animals require these beneficial bacterial cues for normal development, the molecular context in which these interactions take place, is not well understood. Hydroides elegans undergoes metamorphosis in response to the marine bacterium Pseudoalteromonas luteoviolacea. This genetically tractable bacterium is capable of producing a phage tail-like injection system named, Metamorphosis Associated Contractile structures (MACs), which are filled with an effector protein Metamorphosis inducing factor 1 (Mif1). Understanding the role of Mif1 can lead to new insights into how bacteria can directly manipulate animal development. Our data show that the Mif1 protein is injected into the tubeworm larvae and stimulates tubeworm metamorphosis. Metabolomics of larvae exposed to MACs revealed the upregulation of lipid second

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messengers during metamorphosis. The Mif1 protein shares a GxSxG motif with a homologous class of secreted effector lipases and exhibits general lipase activity when injected across the phospholipid bilayer of H. elegans' cell membranes. By creating functional mutants of the Mif1 protein, we aim to show that the lipase activity is required for metamorphosis and the lipid second messengers produced are sufficient to induce metamorphosis. Since so little is known about how microbes interact with their eukaryotic hosts, our one bacterium-one animal model system provides us with the opportunity to illuminate the molecular mechanisms that occur during bacteria-stimulated animal development.

Session H-4

Oral Behavioral & Social Sciences 20
Saturday, February 29, 2020, 10:00 am
Location: Aztlan

509 10:00 am

An Inbred Strain Comparison of Alcohol Consumption in Neonatal Mice

Kiley Borchard, Psychology (U)

The current study examined alcohol (ethanol) intake during the early postnatal period in 3 different inbred mouse strains: DBA/2J, C57BL/6J, and FVB/NJ. Based on prior research, it was hypothesized that the DBA/2J strain would consume the most alcohol while the C57BL/6J strain would consume the least.

Experimental subjects were neonatal C57BL/6J (n=11), FVB/NJ (n=14), and DBA/2J (n=5) mice bred and maintained at SDSU. Testing began on postnatal day (PND) 4, with each individual pup being randomly assigned exposure to either autoclaved water or 25% ethanol using a previously established protocol: Consume Off the Floor (COF). COF exposure occurred during the light cycle twice per day for 6 days. The COF exposure apparatus included 8 ceramic ramekins placed on a heating pad and covered with plexiglass. Each ramekin contained a Kim wipe soaked in 5 mL of either water or ethanol. Individual pups were voided, weighed, and placed in a designated ramekin for 10 minutes. After the access period, the pups were removed, dried, weighed, and returned to their home cage with their mother. The process was then repeated 2 hours later. Alcohol intake was determined based on change in body weight during the COF exposure. A preliminary analysis was conducted using strain as the independent variable and average alcohol intake across the 6 exposure days as the dependent variable in a between-subjects analysis of variance (ANOVA).

Results showed a significant main effect of mouse strain ($F(2,27)=4.3$, $p=.02$). Tukey post-hoc tests revealed that C57BL/6J mice consumed less alcohol (M = 4.6) than both the DBA/2J (M = 7.1; p=.02) and FVB mice (M = 6.3; p=.03). The alcohol intake between the DBA/2J and FVB/NJ mice was not significantly different (p=.38).

Numerous studies have shown that adolescent and adult C57BL/6J mice are the inbred mouse strain that consumes the greatest amount of alcohol, while adolescent and adult DBA/2J mice consume the least. Our results indicate that strain-typical patterns of alcohol consumption may differ during the neonatal period.

510 10:15 am

The Effects of Prenatal Alcohol and THC Vapor Exposure on Anxiety

Jaclyn Hanson, Psychology (M)

It is established that prenatal alcohol exposure (PAE) can lead to a variety of physical and behavioral alterations known as fetal alcohol spectrum disorders. However, with the increasing availability of cannabis products, cannabis use among pregnant women has also risen. Importantly, co-use of alcohol and cannabis is also common, and over half of pregnant women who use cannabis also consume alcohol, but little is known of how this combination affects fetal development. Since electronic cigarettes are a common form of consumption, the present study investigated the effects of prenatal delta-9-tetrahydrocannabinol (THC), the primary psychoactive constituent of cannabis, via e-cigarette, as well as prenatal alcohol, on anxiety-like behaviors using an animal model. Pregnant Sprague-Dawley rat dams were exposed to ethanol (68 mL/hour), THC (100 mg/mL), or the combination daily from gestational days 5-20 through vapor inhalation. Anxiety-related behaviors were recorded in the offspring of the exposed dams during adolescence (postnatal day 40) using an elevated plus maze. The elevated plus maze is a raised plus-shaped apparatus with two closed and two open (exposed) arms, and the rodents' natural tendency to avoid open spaces is used to indicate anxiety level. The time spent and frequency of different arm-related behaviors and other exploratory behaviors were recorded. Female subjects exposed to prenatal alcohol increased the frequency entries and the time spent in the open arms, suggesting either a decrease in anxiety or an increase in risk-taking behavior. This effect remained even when taking into account that prenatal alcohol exposure increased activity levels. THC exposure did not alter the effects of prenatal alcohol. However, subjects exposed to prenatal THC alone increased time spent in stretched-attend posture within open arms, an exploratory behavior in which subjects approach the open arms with the upper part of the body but do not fully enter. This suggests that prenatal THC exposure may increase risk-assessment behavior. These results suggest that prenatal alcohol and THC exposure may lead to separate alterations in anxiety-related behaviors, although further investigation is needed. Supported by ASession A-25425.

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511 10:30 am

Psychometric Properties and Validation of the Self-Reported Offending Measure among Justice-Involved Youths

Sarah Chavez, Interdisciplinary Research on Substance Use (D)

Investigating and interrupting illegal activities among youth is critical as their behaviors affect both themselves and their communities. Researchers need to utilize appropriate measures that capture engagement of illegal activities. The Self-Reported Offending (SRO) scale aids researchers in identifying youths who engaged in illegal activities. Researchers demonstrated the functional and scalar equivalence of the SRO scale on justice-involved youths; the dimensionality, concurrent, and predictive validity of the SRO scale have not been explored. The present study examined these psychometric properties of the SRO scale. The 22-item SRO scale was administered to assess illegal activities among justice-involved youths. Questions such as have you "used checks or credit cards illegally" or "sold marijuana" were asked. Justice-involved youths (N = 1,351) were 16.01 ± 1.14 years old, primarily male (86.4%), Black (41.4%), Hispanic (33.5%), and White (20.2%). Youths were incarcerated at baseline and answered a series of self-report measures. An exploratory factor analysis helped determine the dimensionality of the scale. Non-parametric item response models were used to explore the item response options for each item; multiple linear models helped determine the concurrent and predictive validity. The factor analytic model supported a single dimension of the scale that accounted for 58% of the variance (a = .88). The non-parametric response model showed that all items had item response separation; two items had extreme response non-variability (Paid Sex & Fighting). Items that did not perform well based off of mokken scale, factor loading, and communality criterion were removed. A 19-item SRO scale was created. Individual linear models indicated that the 19-item scale was positively and significantly associated with moral disengagement but negatively and significantly associated with impulse control, suppression of aggression, consideration of others, and temperance at the $p < .001$ level. The 19-item scale at baseline positively and significantly predicted alcohol, marijuana, and cigarette use at both 6- and 24-months follow-up; predictivity maintained at 84-month follow-up for marijuana and cigarette use. The 19-item scale has excellent psychometric properties among justice-involved youths. A 19-item scale should be used moving forward in justice-involved youth research as some items, in the 22-item scale, may be geared towards adults.

512 10:45 am

Effects of changes in binge drinking on attention, learning and memory

Nafisa Ferdous, Interdisciplinary Research on Substance Use (D)

Background: Heavy alcohol use among adolescents is associated with cognitive deficits such as reduced attention, spatial and working memory, and learning abilities. Our aim was to investigate whether changes in binge drinking patterns over ~6 years affect general cognitive capabilities.

Methods: Data were collected from a 16 year-long project on adolescent development (12-13 years old at baseline). Participants were included in the analysis if they reported past-year binge drinking (4+ drinks for females/5+ drinks for males on any occasion) at study year 7 (20-22 years) and/or year 13 (26-28 years) and provided usable data during these years (n=30). Neurocognitive outcomes included: general intelligence (WAIS-IV Block Design), verbal learning (California Verbal Learning Test-CVLT) and memory (CVLT, WAIS-IV Digit Sequencing). Using a linear regression model, we examined the association between changes in binge drinking from year 7 to year 13 and the neurocognitive outcomes at years 13,14 or 15, while controlling for age and gender.

Results: We did not observe any significant main or interactive associations between changes in binge drinking over the ~6 years and neurocognitive outcomes: learning (CVLT auditory attention skill, b=.006;p=.56; CVLT global verbal learning ability, b=.074;p=.24), memory (CVLT short delay free recall, b=.019;p=.24; CVLT long delay free recall, b=.015;p=.27; Digit sequencing backwards, b=.008;p=.49), and general intelligence (block design, b=.028;p=.65) while controlling for age and gender.

Conclusion: Given the small estimates and lack of significance, changes in binge drinking over the ~6 years' time span do not appear to have any recovery or detrimental effect on general intelligence, attention, learning, or memory in this sample. This suggests that any alcohol-related cognitive damage may have already occurred and additional changes in drinking are not impacting these cognitive outcomes. Further validation of this interpretation should be conducted within a larger sample.

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513 11:00 am

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

Melanie Nicholls, Interdisciplinary Research on Substance Use (D)

Introduction: People who are experiencing homelessness face a plethora of obstacles and barriers when it comes to getting help for their substance use. Recently, there has been an increase in substance use and opioid overdoses at public libraries, which are easily accessible public places for those struggling with homelessness. This study aimed to explore the barriers unstably housed people who use substances face in getting help and what innovative solutions the library and its community and research partners might offer.

Methods: From January-June 2019, researchers surveyed 49 library patrons experiencing homelessness and 14 library staff at a large Southern California library. Participants were also interviewed in-depth and/or participated in one of four focus groups. Patrons were recruited through fliers via a university-library partnership and consensus organizing methods. Sociodemographic data were collected via self-administered surveys. Data were coded and analyzed using a thematic analysis. Coders independently coded text files for data analysis and discussed codes until agreement and inter-coder reliability was reached.

Results: Library patrons were a mean age of 44, (range: 18-75). Approximately half were Caucasian (47%) and male (51%). 63% of participants reported housing instability; 22% lived in shelters. About half reported a current or prior substance use history and were polysubstance users with heroin, meth, and cannabis being the most used. Participants reported substance use and mental illness being the top reasons why people were experiencing homelessness and why it was so difficult for them to get out of it. Participants reported that lack of medically assisted detox and treatment accessibility kept them from successfully quitting their use. Patrons suggested having a social worker at the library who could help connect them to resources for treatment, access to Narcan, and peer advocates.

Conclusion: People experiencing homelessness are a hard to reach population and using substance use poses even more vulnerabilities for them. Many patrons attribute their circumstances to their use and not having the appropriate resources and support to quit. Further research needs to be conducted on best practices for this population and how to better coordinate care.

Session H-5

Oral Behavioral & Social Sciences 21

Saturday, February 29, 2020, 10:00 am

Location: Metztli

514 10:00 am

Sex differences in tobacco use among Mexican-origin young adults

Gabriella Corralejo, Public Health (U)

Purpose: To examine the relationship between sex and tobacco use among low-income Mexican-origin adults in urban and rural communities.

Research Question: Are female Mexican-origin adults more likely to have smoked in their life than male Mexican-origin adults?

Methods: Mexican-origin young adults between the ages of 21 and 40 were recruited from northern San Diego County (SD) and Imperial County (IC), and a diverse and balanced sample of both men and women were enrolled. Participants (n=72) were interviewed and surveyed in either English or Spanish between August and November 2018 as a part of a larger qualitative study. Surveys included questions about health system access, hygiene behaviors, self-reported oral health, dental fear/anxiety, tobacco use, demographics, income, employment, and education. This analysis focused on four questions about tobacco use which asked if a participant had ever smoked, what age he or she had started smoking, if he or she had smoked over 100 cigarettes, and if he or she is a current smoker still. Univariate descriptive statistics and bivariate statistics (chi-square test and odds ratio) were calculated to examine the association between tobacco use and sex.

Results: Of the 72 participants, 33 were female and 39 were male. More female than male participants (70% vs. 31% respectively) reported having smoked cigarettes at all in their lives. About a quarter (26.1%) of female ever-smokers reported smoking currently, whether it be some days or daily, but none of the male ever-smokers reported smoking currently. In the bivariate association model, female participants were estimated to be 1.64 times more likely to have ever smoked cigarettes in their lifetime.

Conclusion: In this sample, females were more likely than males to have smoked at all in their lifetime. The sample size was too small there were too few current smokers to support additional subgroup analysis, but future studies could provide more insight on the patterns of tobacco use by Mexican-origin young adults.

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515 10:15 am

Establishing a Qualitative Understanding of the Drinking Water and Sanitation Infrastructure in Rural Oaxaca, Mexico

Alexandra Fox, Latin American Studies/ Environmental Health (M)

Poor water quality endangers public health, especially to those in marginalized communities that experience greater risk to transmittable water illnesses such as cholera and diarrhea. According to the World Health Organization, diarrhea is the second leading cause of death in children under 5 years of age. About 8.9 million people living in Mexico, many who are socioeconomically disadvantaged experience acute shortages of accessible and safe drinking water. While Northern Mexico has better water accessibility, Southern Mexico lacks a strong municipal water infrastructure. For example, in the southern state of Oaxaca, Mexico, 40% of the population remain without access to a municipal water source. With Tinker Grant funding for preliminary research, I conducted qualitative research to gain a better understanding of Mexico's drinking water and sanitation infrastructure through a Mexican city in the state of Oaxaca, Ixpantepec Nieves. Informal interviews on water infrastructure, pollution and water-related illnesses such as diarrhea were conducted with various community members. Concerns over an increase in sewage runoff and plastic thrown into nearby rivers that are used for agricultural purposes were recurring themes in the interviews. Results from this preliminary study have facilitated a better understanding of the potable and sanitation water infrastructure and subsequent concerns in a Mexican city that are guiding further research on the effects of poor water quality on public health indicators.

516 10:30 am

The Right to Health Care: Central American Asylum Seekers in Chiapas, Mexico

Ivette Lorona, Health Promotion and Behavioral Studies/ Latin American Studies (M)

The Guatemala-Mexico border receives a high influx of migrants and refugees seeking asylum in the United States. Of the migrant population, the majority come from the Northern Triangle of Central America: Honduras, Guatemala, and El Salvador. The Mexican southern state of Chiapas has become a primary passing point on the migration route for Central Americans. However, many face multiple challenges in Mexico, including lack of information on asylum procedures, legal rights and health care. Funded through the Tinker Grant, the purpose of my preliminary research was to learn about the political climate at the Guatemala-Mexico border and its effect on the distribution of health services to Central American migrants passing through Chiapas. I conducted unstructured interviews with established non-profit organizations that make part of the Mesa Transfronteriza Migraciones y Género, a committee that builds dialogue about human rights violations, advocates for policy change, and monitors migrant routes. My preliminary findings demonstrate that increased border militarization and fear of deportation from Mexico have led migrants to endanger their lives by taking routes across the jungles and mountains of Guatemala and Mexico. Medical negligence has commonly been reported among Central Americans seeking health care in public hospitals and those detained in detention centers. Many turn to shelters for medical services related to injuries from the journey, respiratory, vector-borne and gastrointestinal diseases; however, lack of government support and funding make it challenging to properly deliver these services to migrants. More research is needed to understand the structure of shelters in Chiapas to better provide them with adequate health resources for the treatment of mental and physical health needs of not only Central Americans, but all asylum seekers.

517 10:45 am

Dental anxiety and dental utilization among Mexican-origin adults on the US-Mexico border

Logan Okawach, Health Promotion and Behavioral Science (M)

Purpose: To examine the relationship between dental anxiety and accessing dental care in the last year among Mexican-origin adults.

Methods: Interview and survey data were collected from Mexican-origin young adults, aged 21-40, recruited from urban northern San Diego County (SD) and rural Imperial County (IC) in 2018 (N=72). Recruitment occurred via in-reach at partner clinics and outreach at community events. The survey included questions about dental utilization, dental anxiety (measured by a validated scale, Modified Dental Anxiety Scale "MDAS") and sociodemographics. The Andersen Behavioral Model of Vulnerable Populations served as the framework guiding quantitative and qualitative analysis. The model posits predisposing factors (sociodemographics, dental anxiety), enabling factors (dental insurance, clinic patient, particular dentist), and need factors (self-reported oral health status) affect likelihood of dental utilization. The outcome of interest was whether or not individuals had a dental visit within the last year. A one-way ANOVA was conducted and calculated mean MDAS scores for the group of adults that had a dental visit within the last year, compared to those that did not.

Qualitative analysis to be conducted (this component is a work in progress) will include a comparative content analysis of participants who scored ≥19 on the MDAS, indicative of having dental anxiety, versus those who do not. The analysis will explore how participants who did or did not have dental anxiety discussed their dental care experiences.

Results: The average participant age was 31 (SD=6.50). The sample was 46% males and 51% clinic patients. Almost half (46%) did not have dental insurance. Most participants did not

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have dental anxiety (84.7%) while only 15.3% were found to be dentally anxious. About half of the dentally anxious participants had been to the dentist in last year (n=6) while the other half had not been to the dentist in the last year (n=5). Mean MDAS scores were not significantly different between the groups based on dental utilization within the last year [F(1,70) = 0.087, p=.769].

Conclusion: The quantitative analysis did not find any relationship between dental anxiety and dental service utilization in the last year.

518 11:00 am

Medical pluralism and factors influencing health care decision making in a rural Paraguayan community

Jennifer Schneider, Health Promotion and Behavioral Studies/Latin American Studies (M)

Background: The integration of traditional medicine, biomedical care, and other sources of healing is prevalent in many nations throughout the world and is increasing as widespread introduction of accessible hospitals brings biomedical care to communities that previously relied solely on traditional remedies for healing. In the rural community of Santa Maria, Misiones, Paraguay, the use of natural home remedies, traditional healers, biomedical healthcare, and pharmaceutical drugs coexist. While it is known that most community members integrate these four sources of care, it is not clear how individuals make decisions about when to choose one over the others. The purpose of this research is to understand what factors play a role in individuals' healthcare decision making, and how they decide which source of care to turn to in different situations.

Methods: I conducted n=23 semi-structured open-ended interviews with community members and health professionals in Santa Maria in July and August 2019. I transcribed, coded and qualitatively analyzed the interviews in Spanish using thematic analysis to identify individuals' care seeking decisions, use of different remedies, and factors that contributed to these behaviors.

Results: Preliminary themes found in analysis include 1) Severity of illness ("Your typical Paraguayan goes to the doctor only when at the point of death"); 2) Nature of illness ("you can't go to the hospital for kambyryrujere because the doctors don't know that illness and could kill you"); 3) Accessibility of care (wait time, cost, available medication); and 4) Characteristics of medical professionals ("in that hospital they make a lot of mistakes").

Conclusion: Results suggest that the factors determining what kind of healthcare individuals decide to seek are diverse, including cultural knowledge and beliefs as well as systemic and contextual factors. To increase adequate use of proper treatment channels and optimize community health, this understanding of individuals' behavior should be integrated with the increasing research on the efficacy of different alternative medicines. Together, this information can help guide healthcare professionals, lawmakers, and other health promotion experts in developing programs and policies that best encourage use of proper healing sources and facilitate the health of the community.

519 11:15 am

Perceptions and Attitudes on the Increase of Caesarean Section Within Oaxaca

Amelia Torres, Public Health/Latin American Studies (M)

Background: The global trend of a steady increase in caesarean sections at birth posit concern that exceeding the optimal rate of caesarean sections will increase unnecessary risk to mother and child. In response, the WHO published non-clinical recommendations to reduce unnecessary caesarean sections in 2018. The WHO stated that common factors attributed to this increase were: cultural shifts in family and work responsibilities, changes in population characteristics, and other socio-economic and organizational factors. Mexico is also seeing this upward trend in caesarean sections and has surpassed the optimal rate. Mexico experiences within-country disparities that allow for it to experience both over and underutilization of caesarean section. Tinker grant funding allowed for preliminary research to establish the factors in peri-urban townships in the state of Oaxaca that are perceived to be associated with the increase of caesarean sections.

Purpose: This exploratory research aimed to establish factors experienced in peri-urban townships of Oaxaca that affected birthing practices in the ongoing trend of increasing caesarian births throughout Mexico and Latin America. The focus of this research was to better understand what women in these communities perceived as factors for the increase in caesarian births.

Methods: Unstructured interviews were conducted with women in various roles of community life: leaders, midwives, nurses, and medicine women. Observations were detailed in daily fieldnotes with a focus on access to specialized medical care for mothers. Interviews and observations were conducted in townships throughout different regions in the state of Oaxaca.

Primary Findings: Recurring themes identified by participants as the factors they attributed to the upward trend were: inconsistent care, distrust in medical providers, and loss and changes in traditional midwifery. Additionally, informal pre- and post-natal care were identified as a community-based system of care that often existed outside of formal medical treatment. Future research could have clinical and public health implications in peri-urban communities in Mexico.

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Session H-6

Oral Engineering and Computer Sciences 13
Saturday, February 29, 2020, 10:00 am
Location: Templo Mayor

520 10:00 am

IoT-Based Remote Data Collection and Monitoring System for Organic Solar Cells

liam Slimmon, Electrical and Mechanical Engineering (U)

This Project investigates the remote data collection and monitoring system for Organic Solar Cells. Organic solar cells (OSC) are made of thin films of organic semiconductor material used to convert solar energy into electrical energy. OSC are an emerging technology in the renewables market and is beginning to be a competitor to your conventional un-organic silicon-based cells. Although these conventional cells are becoming more efficient and lower costs, they have some drawbacks that an OSC can provide a solution for. For example, the main appeal of an OSC is they are flexible, transparent and lightweight, these advantages make them easier to install and can be more versatile. OSC may also provide a cheaper alternative to a conventional cell due to silicon being a great semi-conductor, it is in high demand; this can increase the price of a conventional silicon based solar cell.

This project involved building a system to monitor the performance of a standard monocrystalline solar panel and comparing this data against an OSC. To achieve this a 'Internet of things' (IoT) device is used to remotely monitor solar panel performance, an IoT is a device which can connect to the internet and send and receive data. The IoT used is an ESP8266 device, this is a microcontroller which contains a Wi-Fi module which enables connectivity as well as data processing and it is programmed using C.

The ESP8266 is connected to an INA169 sensor and together are used to monitor the voltage, current and power of the standard monocrystalline solar panel. Once the ESP8266 receives the data from the solar panel it is sent to an application called Blynk. Using this application, the data is recorded and stored and can be accessed via mobile phone anywhere with an internet connection. This system is implemented onto the solar panel and allows real time monitoring of the solar panels performance. The system will be set up in the SDSU Imperial Valley Campus. Here the standard monocrystalline solar panel will be set up next to our organic solar cells. Using the data received, research will go into comparing the efficiency of the two types of panels and to see how the OSC degrades compared to the standard panel.

521 10:15 am

Graphene Quantum Dots

Arantxa Gomez Ferrer, Aerospace Engineering (U)

Graphene is a single atomic layer of carbon atoms which has exceptional electron mobility properties that could mark a turning point in the semiconductor industry. However, it is very difficult to control its semiconductor properties, that's why methods such as doping or controlling of size/shape have been developed. Quantum dots are artificial nanoparticles of semiconductors with special optoelectronic properties such as strong light absorption and size- tunable bandgap. Graphene quantum dots have become a new fascinating material due to its exceptional properties including their stability and their eco-friendly feature. Their applications include photodetectors, photo-luminescent materials or medical utilization. In this project, we are stacking multiple layers of graphene with quantum dots without altering the properties of the material, complementing the strong light absorption of quantum dots with the high mobility of graphene. Quantum dots serve as light absorbers generating photocarriers, which are then transferred to graphene for efficient current collection, generating a photocurrent in graphene upon illumination. In this project, we explore the use of intercalated graphene/quantum dot layers to improve light detection response. Different methods are discussed such as the addition of gold electrodes or a pyramid style structure which allows graphene layers to connect to each other. At SDSU we are investigating applications of quantum dots and graphene quantum dots as structured and converter ionizing radiation detectors for high resolution x-ray radiography and nuclear medicine.

522 10:30 am

Power Point

Omar Nunez Cuacuas, Mechanical Engineering (M)

Improved energy storage technologies have received intense attention since there is a fast-growing market for portable electronic devices such as the internet of things. Micro-supercapacitors possess a remarkable feature of high electrochemical performance and relatively small volume in which they can reach high power density and fast charge-discharge rates. In contrast to batteries, these next-generation energy storage devices are fast, efficient and environmentally friendly with longer life cycles without losing performance. We developed a novel integrated, flexible glassy carbon micro-supercapacitor technology with 30 interdigitated fingers as seen in figure 1. We compacted the complete electrical routing path and contact pads within the device´s area, utilizing through-via bottom electrodes. The glassy carbon electrode achieved a surface area of 0.1655 cm2 and mass of 0.278 mg. The device showed a specific capacitance of 13.32 F/g, a gravimetric energy density of 1.932 mWh/g and specific power of 1.342 mW/g. Figure SEQ Figure * ARABIC 1:Interdigitated glassy carbon electrodes with 30 fingers.

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523 10:45 am

Heliostat Field Design Study for the Small Particle Heat Exchange Receiver

Steven Webb, Mechanical Engineer (M)

As studies are conducted on the effects that fossil fuels have on our environment and coastal located human communities, there has been a focus from developed nations on obtaining energy from low carbon emission sources. One of the options that is available to areas that have an arid climate is the concentrating solar power (CSP) plant. This type of plant collects solar energy using an array of mirrors which is then concentrated onto a relatively small receiver area located either directly in front of the collectors or on a central tower. One focus of study currently at San Diego State University has been a different type of CSP plant called the Small Particle Heat Exchange Receiver (SPHER). This plant uses a median of air filled with nanoscale carbon particles in order to absorb thermal radiation directly into a purely gaseous working fluid.

The SPHER design uses individual quartz windows for receiving the thermal radiation into a central chamber to be absorbed by the carbon/air fluid. The facts that this process benefits from both high concentration of solar radiation and that having very large quartz windows would be economically nonviable, has made the use of a secondary concentrators located directly in front of the window beneficial. The secondary concentrator has the advantage of increasing the effective aperture diameter of the window at the expense of a reduced angle of acceptance for any incoming radiation. The focus of the done study was to generate the optimal heliostat arrangements for towers utilizing the secondary concentrator for both small scale single window plants and larger scale multi-window arrangements. This optimizing was done using computational tools utilizing the Monte Carlo Ray Tracing methodology.

It has been shown that a staggered heliostat field configuration using multiple circular inlet truncated compound parabolic concentrators (CPC) provides around 189 MW of solar energy into the SPHER when using 494,390 m2 of mirror area. When utilizing several large scale CPCs the projected combined heliostat efficiency for the finalized field is around 22% of solar direct normal irradiance when analyzed for an 12 hour period on the spring Equinox.

524 11:00 am

Optical Design of a Solar Flux Uniformity Corrector for a Combined PV-T Receiver

Raymond Smith, Mechanical Engineering/Energy & Thermofluids (M)

Combined photovoltaic-thermal (PV-T) solar receivers are being developed to increase conversion efficiency of solar energy to useable electricity in concentrating solar power (CSP) systems. Typical solar power systems consist of either photovoltaic cells, directly converting photons into electricity, or thermal concentrators, which heat a fluid medium to produce high-pressure steam to spin a turbine-driven electrical generator. Using semi-transparent solar cells in series with a solar thermal collector, a broader range of the solar spectrum is converted to electricity compared to either traditional system working alone.

San Diego State University (SDSU) is part of a team led by Tulane University, along with the University of San Diego (USD) and Boeing Spectrolab that has designed and built a hybrid PV-T solar receiver embedded in a dual axis-tracking parabolic concentrator. The PV cell array, located in front of the parabolic focal plane, has a solar intensity distribution that represents that of a Gaussian distribution. This non-uniform intensity profile distributed across the solar cell array decreases the full potential for these cells to convert solar radiation into electricity. In addition to the Gaussian profile, local stress at the parabolic reflector mounting pads imparts additional solar intensity non-uniformities, thereby reducing PV cell performance.

This presentation will cover the optical design of a uniformity corrector to homogenize the solar intensity profile at the receiver PV plane using Zemax OpticStudio. In order to design the corrector, a sun source model was be developed in Zemax with correlation to standard solar receiver modeling software and empirical data. Structural and optical analysis was conducted using ANSYS finite element analysis (FEA) software and SigFit integrated opto-mechanical analysis software to show the impact of mounting deformation on the intensity distribution. The uniformity corrector was shown to increase the concentrated solar power along the solar cell area by 40%.

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525 11:15 am

Techno-Economic Analysis for Wave Energy Conversion Devices Designed for the United States West Coast

Omri Paran, Engineering (M)

In this work, a cost-based technical design analysis is performed for a point absorber (PA) wave energy converter (WEC) devices for five potential locations along the United States West Coast. Publicly available wave scatter data of 2018 from the National Buoy Data Center (NBDC) are used to find optimal device dimensions that minimize the levelized cost of energy (LCOE) at each of the locations; Los Angeles, San Luis Obisbo, San Francisco, Eureka, and Newport city in Oregon. The PA WEC device considered in this work is a three degrees of freedom (3-DOF) fully submerged ellipsoid point absorber. A genetic algorithm-based optimization process is employed in which the device dimensions and the power take off (PTO) unit's forces are systematically varied and the energy output for a particular wave and device configuration is calculated by an in-house Cummins equation based Simulink code. The irregular wave theory-based Simulink code is validated against fully-resolved wave-structure interaction (WSI) simulations performed using the open-source IBAMR library. The obtained LCOE results enable competitive comparison of the points absorbers optimized for each site to one another, as well as of these point absorbers to competing renewable technologies. In this region, the ocean current causes wave energy to dissipate in the southern direction. Thus, the WECs installed in northern cities were larger and more costly to manufacture and install. However, the increase in annual energy production (AEP) in the northern sites dominates, and LCOE was decreased. The simulation results presented in this paper are consistent with this observation. The optimized PAs for the five sites realize LCOE that range from just under 0.09 to nearly 0.83 $/kWh. The range of the optimized PA dimensions identified for each site was far smaller; spanning the four to six-meter range. The results showed that the influence of the selected site's wave energy potential had a stronger influence on the viability and return on investment of a WEC project than the device geometry and PTO force optimization. Therefore, of the five selected locations, the most cost-effective location to select for utility-scale deployment of PA WECs is San Francisco CA.

SRS

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SAN DIEGO STATE UNIVERSITY

13th Annual Student Research Symposium

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