

38th Annual Central California Research Symposium



Proceedings of the 2017 Symposium

Convened

April 18-19, 2017

University Business Center

California State University, Fresno

Sponsoring Institutions



Discovery. Diversity. Distinction.

California State University, Fresno



University of California, San Francisco
Fresno Medical Education Program



American Chemical Society
San Joaquin Valley Section

American Chemical Society
San Joaquin Valley Section



Educational Employees Credit Union

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PREFACE

Welcome to the 38th Annual Central California Research Symposium.

From its inception, this symposium has brought together investigators, students, and faculty from a variety of disciplines to share the results of their scholarly work. The continuation of these scholarly activities in the Central Valley is encouraged by this opportunity to share knowledge with our colleagues and the community. We hope that all participants will gain new insights from this experience and that learning about the interests of other scholars will enrich their academic journey.

Abstracts for this year's event were reviewed and selected for presentation by the Symposium Coordinating Committee. During their review, the committee looked for well-written abstracts on topics of scholarly merit.

This year, numerous institutions and colleges have provided cash awards to exemplary presenters. *UCSF Fresno* has provided two endowed cash awards for best undergraduate and graduate symposium presentations. The *American Chemical Society, San Joaquin Valley Section* has sponsored a cash award for best chemistry presentation. The *Office of the Provost at California State University, Fresno* has provided a cash award for the best undergraduate poster and best undergraduate oral presentation. The *Craig School of Business* has provided two cash awards for best poster presentation and best business presentation. The *College of Social Sciences* has provided two cash awards for best presentations in the social sciences. The *College of Science and Mathematics* has provided two cash awards for outstanding science presentations. The *Lyles College of Engineering* has provided two cash awards for best oral and poster presentations. The *Educational Employees Credit Union* has sponsored an award for best presentation in Mathematical Sciences.

The Davin Youngclarke Memorial Award, inaugurated in 2008 and sponsored by the *Division of Research and Graduate Studies at California State University, Fresno*, is awarded to the presenter who best addresses a community issue with use of sophisticated and sound research methods. The Siobhan O'Toole Award, inaugurated in 2017 and sponsored by the *Division of Research and Graduate Studies at California State University, Fresno*, is awarded to a student whose research represents innovative scholarship and has the potential for long-term impact. In addition to providing three cash awards, the *Division of Research and Graduate Studies at California State University, Fresno* has planned and administered the symposium in cooperation with *UCSF Fresno*.

Presenters and guests are invited to a social hour following the concluding address and student awards ceremony, which will be held in the Alice Peters Auditorium in the University Business Center.

These proceedings are published as a permanent record of the work presented. We hope they will stimulate ideas for future work and subsequent symposia.

38th ANNUAL RESEARCH SYMPOSIUM
Coordinating Committee

California State University, Fresno

Jason Bush, PhD
Department of Biology

Alejandro Calderon-Urrea, PhD
Department of Biology

Brian Tsukimura, PhD
Department of Biology

Saeed Attar, PhD
Department of Chemistry

Alam Hasson, PhD
Department of Chemistry

Beng Ong, PhD
Department of Marketing

Steve Chung, PhD
Department of Mathematics

Tamas Forgacs, PhD
Department of Mathematics

Adnan Sabuwala, PhD
Department of Mathematics

Sharon Benes, PhD
Department of Plant Science

Karl Oswald, PhD
Department of Psychology

Doug Carey, MA
Division of Research and Graduate Studies

Maral Kismetian, CRA
Division of Research and Graduate Studies

James Marshall, PhD
Division of Research and Graduate Studies

Ramakrishna Nunna, PhD
Lyles College of Engineering

UCSF Fresno Medical Education Program

Loren Alving, MD
Department of Neurology

Donna Hudson, PhD
Academic Research and Technology

Lisa Husak, MPH, CCRP
Department of Orthopaedic Surgery

Paul Mills, PhD
Professor

Michael Peterson, MD
Department of Internal Medicine

Kent Yamaguchi, MD
Department of Surgery

California State University, Monterey Bay

Justin L. Matthews, PhD
Department of Psychology

Fresno City College

Amanda Henry, MS
Department of Chemistry

Carl Johansson, MS
Department of Life Science

Rick Stewart, MS
Department of Biology



CALIFORNIA
STATE
UNIVERSITY,
FRESNO

MESSAGE TO ALL RESEARCH SYMPOSIUM PARTICIPANTS

California State University, Fresno is pleased to serve as the host campus for the 38th Annual Central California Research Symposium.

This symposium continues to provide a unique forum for the presentation and discussion of scholarly activities of interest to researchers throughout the Fresno region. The program for the symposium reflects our commitment to promoting interdisciplinary research, encouraging scholarly exchange on theoretical and pragmatic topics, and providing an opportunity for both students and research scholars to share common interests. Cooperative efforts such as these benefit the individual institutions involved and ultimately the public that we all serve.

We appreciate your participation in this symposium, and it is my pleasure to extend my warmest welcome to our campus.

Sincerely,

A handwritten signature in blue ink, which appears to read "Joe I. Castro".

Joseph I. Castro, Ph.D., M.P.P.
President

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Harold H. Haak Administrative Center
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University of California
San Francisco

Fresno Medical Education Program

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WELCOME

38th Annual Central California Research Symposium

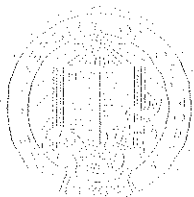
It is my pleasure to welcome each of you to the 38th Annual Central California Research Symposium. UCSF Fresno is very committed to conducting and supporting research, and this Symposium offers a wonderful venue to be able to review some exemplary local research projects. Every year I am impressed anew by the diversity and quality of the research that is ongoing in the Central Valley and it is exciting to witness the richness of academic activity that is evidenced here today. The studies represented here will lead to an improved quality of life for our communities, something we all care deeply about.

Whether you are attending today as a participant or a visitor, I believe you will feel challenged and energized as you explore the research projects on display.

Sincerely,

A handwritten signature in black ink, reading "Michael Peterson, MD". The signature is written in a cursive, flowing style.

Michael Peterson, MD
Associate Dean
UCSF Fresno



38th Annual Central California Research Symposium



Program

Tuesday, April 18, 2017

Wednesday, April 19, 2017

University Business Center

California State University, Fresno

Judges for Undergraduate and Graduate Oral and Poster Presentations

Dr. Jason Bush	California State University, Fresno
Dr. Alejandro Calderon-Urrea	California State University, Fresno
Dr. Carmen Caprau	California State University, Fresno
Mr. Doug Carey	California State University, Fresno
Dr. Steve Chung	California State University, Fresno
Dr. Collin Closek	Stanford's Center for Ocean Solutions
Dr. Paul Crosbie	California State University, Fresno
Dr. Kathleen Dyer	California State University, Fresno
Dr. Qin Fan	California State University, Fresno
Ms. Marie Fisk	California State University, Fresno
Dr. Tamas Forgacs	California State University, Fresno
Dr. Joseph Gandler	California State University, Fresno
Dr. Joy Goto	California State University, Fresno
Dr. Raymond Hall	California State University, Fresno
Dr. Howard Hendrix	California State University, Fresno
Dr. Alam Hasson	California State University, Fresno
Dr. Donna Hudson	University of California, San Francisco
Ms. Susan Hughes	University of California, San Francisco
Ms. Lisa Husak	University of California, San Francisco
Dr. Marat Markin	California State University, Fresno
Dr. Justin Matthews	California State University, Monterey Bay
Dr. Hubert Muchalski	California State University, Fresno
Dr. Beng Ong	California State University, Fresno
Dr. Melissa Rhea	WestCare Foundation
Dr. Elvia Rodriguez	California State University, Fresno
Dr. Tricia Van Laar	California State University, Fresno
Dr. Oscar Vega	California State University, Fresno
Dr. Kent Yamaguchi	University of California, San Francisco

Moderators for Oral Presentations

Mr. Doug Carey	California State University, Fresno
Ms. Becky Etheridge	California State University, Fresno
Mr. Rodrigo Gomez	California State University, Fresno
Mr. Chuck Radke	California State University, Fresno
Mrs. Melissa Rowe	California State University, Fresno

Event and Proceedings Coordinators

Millie C. Byers, Maral Kismetian & Gayle Sherwood

California State University, Fresno



April 18, 2017

Oral Presentations

Oral Presentations – Tuesday, April 18, 2017

Concurrent Session A

University Business Center

Auditorium 191

9:00 AM **FUNCTIONAL SURFACE TARGET AS CONTROL AND VALIDATION OF 3-D LASER
SCANNER POINT CLOUD**

Ayad Ahmed, Scott Peterson

9:15 AM **DEVELOPING A TRANSIT DAILY DEMAND PROFILE FOR FRESNO: IMPACTS OF
GEOGRAPHY, TIME AND TRANSPORTATION MODES**

David Johnson, Aly Tawfik

9:30 AM ***Simulating groundwater flow at Fresno's Leaky Acres recharge facility***

Jeet Basa, Bijay K C

9:45 AM ***Kalman Filter Based Z-source Inverters in Photovoltaic(PV) applications***

Abhishek Gubbi Basavaraj, Woonki Na

Oral Presentations – Tuesday, April 18, 2017

Concurrent Session B

University Business Center

UBC192

- 9:00 AM ***A Categorical Model of Virtual Singular Braids***
Sarah McGahan
- 9:15 AM ***Symmetry of the power sum polynomials***
Nicholas Newsome, Maria Nogin and Adnan Sabuwala
- 9:30 AM ***On Contractive and Expansive Mappings in Compact Metric Spaces***
Edward Sichel
- 9:45 AM ***Modeling Conditional Variance in Financial Times Series using Bayesian Methods***
Jalen Harris
- 10:00 AM ***A Grim Presentation***
Samuel Barretto, Matthew Miyake
- 10:15 AM ***On a Spectral Gap Characterization for Scalar Type Spectral Operators***
Marat Markin

Oral Presentations – Tuesday, April 18, 2017

Concurrent Session C

University Business Center

UBC 194

- 9:00 AM **REDESIGNING A PHYSICAL SCIENCE COURSE FOR ENHANCED PRE-SERVICE TEACHER UNDERSTANDING**
Anthony Hinde, Dermot Donnelly
- 9:15 AM ***The Atmospheric Chemistry of Thirdhand Smoke***
Divine Yang, Alam Hasson, Krish Krishnan, Jason Bush, Erik Rangel, Justin Vang, and Tanner Melton
- 9:30 AM ***Dielectric Constant of a Solvent Mixture: A Major Determinant of the Keto-Enol Tautomerization Equilibrium in Acetylacetone***
Candice Cortney, Krish Krishnan
- 9:45 AM ***Diarylpentadienones as chemotherapeutics for prostate cancer: Structure-activity relationship***
Manee Patanapongpibul, Xiaojie Zhang, Guanglin Chen, German Ruiz Peres, and Qiao-Hong Chen
- 10:00 AM ***Measurements of Organics in Ambient PM 2.5 in Fresno California***
James Baroi, Alam Hasson
- 11:45 AM ***Shooters: Psychological Characteristics in Shoot/No-Shoot Decisions***
Matthew Sharps, Schuyler Liao, Jana L. Price-Sharps

Oral Presentations – Tuesday, April 18, 2017

Concurrent Session D

University Business Center

Auditorium 191

- 10:30 AM ***Understanding Travel Behavior Using Data Fusion Methods***
Swapnil Kendale
- 10:45 AM ***Automatic Indoor Lighting System.***
Sagnik Mitra
- 11:00 AM ***Search for signatures of Littlest Higgs with T-parity in dijet final states with ATLAS detector***
Marijus Brazickas, Dr. Harinder Singh Bawa
- 11:15 AM ***Metaprogramming In A Functional-Programming Based Web Framework***
Jeevjyot Singh Chhabda
- 11:30 AM ***Schwinger Effect for Non-Abelian Gauge Bosons***
Michael Ragsdale

Oral Presentations – Tuesday, April 18, 2017

Concurrent Session E

University Business Center

UBC 192

- 10:30 AM ***Analysis of Thermal Properties of Nd-doped PrOs₄Sb₁₂ via Measurements of Specific Heat***
Shoji Hishida, Jesus Velasquez, Taylor McCullough-Hunter, Pei-Chun Ho, Tatsuya Yanagisawa, Brian Maple
- 10:45 AM ***Web Based Machine Learning Tool and Interface***
Gregory Dzhezyan, Ming Li
- 11:00 AM ***SUBSIDENCE DETERMINATION ALONG NORTH-SOUTH CROSS-SECTION LINE IN CENTRAL VALLEY, CALIFORNIA***
Marcelo Romero, Mike Mustafa Berber
- 11:15 AM ***An Efficient Deterministic Edge Traffic Distribution Network-on-chip Routing Algorithm Design***
Eric Muller, Nan Wang
- 11:30 AM ***Developing A Functioning Tabletop Model of Traffic-Actuated Signalized Intersection***
Tranice' Warner, Aly Tawfik
- 11:45 AM ***TRANSPORTATION ART: FROM AESTHETIC VALUES TO OPERATIONAL FUNCTIONS***
Tahrima Alam, Tahrima Alam, Aly M. Tawfik

Oral Presentations – Tuesday, April 18, 2017

Concurrent Session F

University Business Center

UBC 194

- 10:30 AM ***Do perceptions change when the police are to blame? Examining perceptions of monetary compensation for exonerees***
Samantha Luna, Jenna Kieckhafer, Daphne Brito, Jessica Cameron, Alyssa Diaz, Kelly George, Ryan Juan, Vanessa Lopez, Yarelli Mercado-Gonzalez, Mutsumi Ogaki, Jessica Sanchez De La Cruz
- 10:45 AM ***Pornography and Public Acceptance: A Step Toward Effective Regulation***
Mutsumi Ogaki
- 11:15 AM ***How do police build rapport? Examining officer stated verbal techniques and their effectiveness***
Ryan Juan
- 11:30 AM ***PAHs and Black carbons emitted from cooking activities***
Jimmy Hou, Simrat Aulakh

Oral Presentations – Tuesday, April 18, 2017

Plenary Session

University Business Center

Auditorium 191

12:15 PM **Opening Remarks and Welcome**

Dr. James E. Marshall, California State University, Fresno
Dr. Donna Hudson, UCSF - Fresno

12:25 PM **Public Perceptions of Exonerees from the Criminal Justice System**

Shelby Elia, Jenna Kieckhaefer

12:40 PM **The Effects of Water Use on Economic Growth: Investigating California's Surface and Ground Water Use**

Christopher Andresen

12:55 PM **Are All Cities Created Equal? The Truth is Not Self-Evident**

Chris Hensley, Jennie MacFarland, Rachel Morrow, Madhusudan Katti

Oral Presentations – Tuesday, April 18, 2017

Concurrent Session G

University Business Center

Auditorium 191

- 1:30 PM **EVALUATIONS OF "THICK" WOMEN MODEL WHEN CONSUMERS ARE (NOT) EXPOSED TO IMAGE OF THIN MODEL OR PLUS-SIZE MODEL**
Ashley Contreras, Beng Soo Ong
- 1:45 PM **The Influence of Differing Work Schedules Among Cohabiting and Dual Earning Couples on Relationship, Job, and Life Satisfaction**
Kristina Hollenbeck
- 2:00 PM **Donor Perceptions on Terminology Used for the Sector and Its Effects on the Resulting Interactions between Individuals and CBOs**
Navmit Dhesi
- 2:15 PM **The Impact of Product Attributes, Purchase Involvement, and Delivery Time on the Concept of "Transaction Gratification" in Online Purchases**
Caden Jones , Beng Ong
- 2:30 PM **School Finance Reform, Student Success, and Educational Equity: School District-Level Analysis of California's New School Funding Formula**
Brandon Sepulveda
- 2:45 PM **The Effects of Motivation on Financial Literacy of College Students**
Amy Tang, Janice Peterson
- 3:00 PM **The Economic Value of a Degree: Measuring Rates of Return by Major at California State University, Fresno**
William Trickett

Oral Presentations – Tuesday, April 18, 2017

Concurrent Session H

University Business Center

UBC 192

- 1:30 PM ***The Americanization of Fresno, California 1914-1930***
Savonna Greer
- 1:45 PM ***You Gotta Have Faith: Communication Privacy Management in Exclusivist Christian Families Regarding a Significant Change in Religious Belief***
Braedon Worman
- 2:00 PM ***Taking Responsibility: How White Student Affairs Professionals Engage with Students on Whiteness and White Privilege***
Jessica Adams
- 2:15 PM ***RELATIVE RECRUITMENT OF THE VASTUS LATERALIS AND GLUTEUS MAXIMUS DURING FRONT SQUATS IN OLYMPIC WEIGHTLIFTERS***
John Sheeter, Jacobo Morales
- 2:30 PM ***Using Mental Skills Training to Help Cadets Prepare for the Army Physical Fitness Test***
Miguel Vera, Jenelle N. Gilbert, Boyce R. Buckner
- 2:45 PM ***Bigger, Faster, Stronger... Safer? The Use of Self-Talk Interventions on Barbell Back Squat Kinematics***
Ivan Macias, Luke Pryor, Mark Baldis

Oral Presentations – Tuesday, April 18, 2017

Concurrent Session I

University Business Center

UBC 194

- 1:30 PM ***Protein Expression and Structural Characterization of Lunasin: An Anti-Cancer Peptide***
Jaideep Singh, Cory L. Brooks
- 1:45 PM ***Fluorescence Microscopy Demonstrates Neutralization of *Listeria monocytogenes* by Camelid Variable Domain Heavy Chain Antibodies (VHH)***
Moeko Toride, Cory L. Brooks
- 2:00 PM ***Investigating the Nature of Science Understanding of Pre-Service Elementary Teachers in an Integrated Science Course***
Ryan Umar, Dermot Donnelly
- 2:15 PM ***Spatial Variation in the Carrying Capacity of Juvenile Chinook Salmon Among Sites along the San Joaquin River***
Karen Boortz, Steve Blumenshine
- 2:30 PM ***Genetic analysis of Persister cell formation in respiratory pathogen; *Pseudomonas aeruginosa****
Saika Esani, Erik Arteaga
- 2:45 PM ***Evaluation of Naturally Occurring and Inoculated Microorganisms on Stone Fruit Sizer Carriers***
Kelli Williamson, Steven Pao, Erin Dormedy

Oral Presentations – Tuesday, April 18, 2017

Concurrent Session J

University Business Center

Auditorium 191

- 3:30 PM **Characterizing the fecal microbiome and resistome of American Crows in Fresno, CA and Davis, CA.**
Rachel Nelson, Michael Castro, Jonathan Eisen, Madhusudan Katti, Tricia Van Laar
- 3:45 PM **Effects of thermal stress on vitellogenin levels in the hemolymph of the anomuran crab *Petrolisthes cinctipes*.**
Hailey Salas, Nathan Sayavong, Alex Gunderson, Jonathon Stillman, Brian Tsukimura
- 4:00 PM **Synergistic effect of Organic Chalcones on *C. elegans* and *M. incognita***
Shantanu Shinde, Sosse Kendoyan, Alejandro Calderón-Urrea
- 4:15 PM **Gastrointestinal Endoparasite Prevalence in the San Joaquin Kit Fox (*Vulpes macrotis mutica*)**
Jessica Wilson, Paul R. Crosbie, Brian Cypher, Alyssa Anrig, Jessi Doshier, Marissa Montez, Antonio Guerra
- 4:30 PM **THE IMPACT OF DIFFERENT INSTRUCTIONAL STRATEGIES ON STUDENTS' UNDERSTANDING ABOUT THE CELL CYCLE IN A GENERAL EDUCATION BIOLOGY COURSE**
Sanjana Krishnamurthy, Emily Walter
- 4:45 PM **Monitoring Soil Salinity in Alfalfa and 'Jose' tall wheatgrass fields using EM-38 soil Surveys and Developing Input Data for a Transient Hydro-salinity Computer Model**
Aminder Singh, Sharon E. Benes, Nigel Quinn, Florence Cassel Sharma

Oral Presentations – Tuesday, April 18, 2017

Concurrent Session K

University Business Center

UBC 192

- 3:30 PM ***New Silibinin Derivatives Exhibit Potential in Suppressing Prostate Cancer Cell Proliferation***
Andre Vignau, Bao Vue, Guanglin Chen, and Qiao-Hong Chen
- 3:45 PM ***Synthesis towards 7-O-substituted-3,3',4'-O-trimethylfisetins for the exploration of their Anti-cancer potential***
Kevin Muthima
- 4:00 PM ***3-O-Aminoalkyl-3',4',5'-Trimethoxyflavonols as Anti-Prostate Cancer Agents***
Maizie Lee, Xiang Li, Guanglin Chen, and Qiao-Hong Chen
- 4:15 PM ***Towards Understanding of Peroxidation of Mammalian Sterols: Microwave-Assisted Synthesis of 7-Dehydrocholesterol Isomers***
Amanda Olvera, Juan Ramos Flores, and Hubert Muchalski
- 4:30 PM ***Looking Beyond a 'Lack of Resources': Exploring the influence of institutional environments and structures on individual teaching practices in STEM***
Ivan Ceballos Madrigal, Emily Walter
- 4:45 PM ***Is What They Say What They Do?: Comparing Observed and Self-Reported Teaching Practices of Faculty in STEM***
Mireya Lemus, Evelin Munoz

Oral Presentations – Tuesday, April 18, 2017

Concurrent Session L

University Business Center

UBC 194

- 3:30 PM ***Yo No Cruze La Frontera, La Frontera Me Cruzo***
Heriberto Zavala
- 3:45 PM ***From Caution to College: The Effects on Veterans with Self-Reported Trauma Symptoms and Sharing their Experiences with The Campus Community***
Jemerson Diaz, Dr. Elena Klaw
- 4:00 PM ***When Trust is a Must: Priming Attachment Security Increases Trust in Doctors***
Vianey Vazquez-Guerrero, Nicole Jones
- 4:15 PM ***Particulate matters emitted from different cooking methods***
Simrat Aulakh, Jaymin Kwon
- 4:30 PM ***The use of B-flow imaging versus current standard techniques to detect severe fetal anemia***
Tara Brah, Heather Vasquez
- 4:45 PM ***A Comparison of TUNEL and Sperm Chromatin Dispersion for Testing for Sperm DNA Fragmentation in Infertile Males***
Mai Tran, Mo, Lihong M.D; Flores, Cassiana M.Sc.; Kelly, Eduardo M.D; Sueldo, Carlos M.D

Oral Presentations – Tuesday, April 18, 2017

Concluding Remarks

University Business Center

Auditorium 191

5:15 PM

Concluding Address

Provost Lynnette Zelezny, California State University, Fresno

Breaking Bad in California and Its Impact on Health Care

Manjit Singh

5:45 PM

Award Ceremony and Reception



April 18, 2017 Poster Presentations

Poster Presentations – Tuesday, April 18, 2017

Poster Session I

University Business Center

9:00 AM until 10:30 AM

Gottschalks Gallery

Authors will be available for questions from 9:00 AM until 10:30 AM.

- 1 *Understanding the mechanism by which organic chalcones kill *Caenorhabditis elegans* nematodes***
Jessica Aguilar, Alejandro Calderon-Urrea
- 2 *Kinetics and Thermodynamics of Polar Aprotic Solvent-Driven Thiol Oxidation Reactions by Nuclear Magnetic Resonance Spectroscopy.***
Angham Ahmed, Jaideep Singh
- 3 *Development of *Pichia pastoris* as a Model System for Myosin x-induced Filopodia Formation***
Pablo Guaman Tipan, Karine Gousset
- 4 *Improving cognitive decline associated with Alzheimer's disease in a *Drosophila melanogaster* Tau model using dietary caffeine***
Ashley Her, Haley Chapman, April Booth, Baylee Dias, and David D Lent
- 5 *Alzheimer's Disease: Measuring Amyloid Beta Formation Induced by Exposure to Environmental Neurotoxin β -methylamino-L-alanine (BMAA)***
Jazmin Arias, Celina Ortega-Gonzalez, Ellen Douglass
- 6 *Examining Biomarkers in Aggressive Tumor Types of Thyroid Cancer***
Jazmin Cheatham
- 7 *Comparing the suction flow of bladderwort across species to explore the effect of trap morphology***
Fatima Hidalgo, Otto Berg, Ulrike Müller

Poster Presentations – Tuesday, April 18, 2017

Poster Session I

University Business Center

9:00 AM until 10:30 AM

Gottschalks Gallery

8 *Study of the structure-function relationship of Bax using a conformation-specific ELISA*

Jorje Beserra, Laurent Dejean, J.B Urtecho, Jordan Friedlein

9 *C. briggsae hybrid developmental delay is caused by mitochondrial-nuclear mismatch*

Morgan Montelongo, Emeline Pano, Joel Rodriguez, Christopher Jorgensen

10 *Interaction of Human Serum Albumin(HSA) and its specific nanobody*

Shuchi Kakkad, Moeko Toride

11 *Investigating the genetic basis of glyphosate resistance in the San Joaquin Valley agricultural weed hairy fleabane (Erigeron bonariensis)*

Rigoberto Molina, Ankit Pathak, Katherine Waselkov

12 *The Debilitating Effects from Environmental Neurotoxins on a Fruit Fly Model of ALS-PDC*

Richard Moua, Catherine Mueller, Harmala Singh

13 *The Nematicidal Activity of CED-4 Peptides on Caenorhabditis elegans*

Shoghig Stanbouljian, Alejandro Calderon-Urrea

14 *The Effect of Chalcone 17, Chalcone 25 and mix on different soil and non-soil microorganisms*

Sosse Kendoyan, Shantanu Shinde

15 *Comparative analysis of five CRP-like protein homologs*

Alisa Manzula, Dongkuk An, Joel Curiel, and Hwan Youn

Poster Presentations – Tuesday, April 18, 2017

Poster Session I

University Business Center

9:00 AM until 10:30 AM

Gottschalks Gallery

16 *Field imaging reveals perceptual and navigational strategies of wood ants in naturalistic environments*

Erik Arevalo, Reina Warnert, Austin Mendoza, David D Lent

17 *Variation in Juvenile Chinook Salmon Diets Across Populations*

Akusha Kaur, Steve Blumenshine

18 *Developing a Nanobody Based ELISA for the Detection of *Listeria monocytogenes*.*

Akhilesh Shenai, Cory Brooks

19 *The Interactions of Myosin-X with mRNP complexes*

Puneet Sran

20 *Assessing Mitochondrial Function in Experimental *Caenorhabditis briggsae* Hybrids*

Emma Johnson

21 *Establishing absorption of organic chalcones in *Caenorhabditis elegans* by monitoring the absorption of DAPI and Hoechst Dyes*

Sieham Nassrallah, Tamar Melkonian

22 *Screening of transgenic *Dunaliella primolecta* for wastewater treatment and accumulation of neural fatty acid*

Kristie Major, Yadira Andrade, Chirag Vazirani

23 *The metabolite profile of human neural progenitor cells post-irradiation*

Maria Mendoza, Jason Bush

Poster Presentations – Tuesday, April 18, 2017

Poster Session I

University Business Center

9:00 AM until 10:30 AM

Gottschalks Gallery

24 *Fitness cost of glyphosate resistance in hairy fleabane (Erigeron bonariensis) under drought conditions*

Ankit Pathak, Rigoberto Molina, and Katherine Waselkov

25 *Chloropicrin and methyl iodide degradation facilitated by Rhodanobacter and Bacillus species - Identifying the mihA gene and its sequence*

Gary Smalz

26 *Evaluation of miRNAs regulating stem cell markers in Gemcitabine-resistant pancreatic cancer cells.*

Karamjot Kaur Vander, Karla Jimenez

27 *Are bladderwort near the lower size limit for capturing prey with suction feeding?*

Mohammed Shaik, Otto Berg, Ulrike Muller

Poster Presentations – Tuesday, April 18, 2017

Poster Session II

University Business Center

11:00 AM until 12:30 PM

Gottschalks Gallery

Authors will be available for questions from 11:00 AM until 12:30 PM.

1 *Does subspecific variation correspond to cytotypic variation in the widespread taxon *Phlox speciosa* (Polemoniaceae)?*

Estefania Aguilar-Gutierrez, Katherine Waselkov

2 *Generating Classical Multiplier Sequences*

Summer Al-Hamdani, Alexandra Leon

3 *Characterization of zinc effect on YdeH, a diguanylate cyclase, and its zinc-site mutant*

Christian Montiel, Yue Zhou, Shristi Chand, Giancarlo Sulca and Hwan Youn

4 *Active-metal mediated cluster growth of Au₂₅PET₁₈ nanoclusters*

Randy Espinoza, Jai-Pil Choi

5 *Glutathione affects virulence potential of *Pseudomonas aeruginosa**

Tyler Birges, Saika Esani, Jason Thomas, Bethany Hazen, Amorette Guzman, Justin Okonkwo, Mamta Rawat

6 *EFFECT OF Tn GLYCOSYLATION ON THE BIOACTIVE EPITOPE CONFORMATION OF MUC1*

Naveen Gokanapudi, Jaideep Singh, Cheenou Her, Krish Krishnan, Cory L. Brooks

7 *Effects of divalent metal ions on BMAA and its carbamate adducts*

Pedro Diaz-parga, Joy Goto, V.V. Krishnan

Poster Presentations – Tuesday, April 18, 2017

Poster Session II

University Business Center

11:00 AM until 12:30 PM

Gottschalks Gallery

- 8 *Digital Elevation Modeling of Agricultural Fields for Irrigation Management***
Huy Le, Balaji Sethuramasamyraja
- 9 *Flying Above Limitations: Measuring the Effects of BMAA on Fruit Fly Activity***
Lemuel Vince Rivera, Joy J. Goto
- 10 *Synthesis of Solution Stable Sulfenic Acids***
Quang Le, Hubert Muchalski, Ryan Watters
- 11 *5-O-Substituted-2,3-Dehydrosilibininins Exhibit Greater Anti-Proliferative Potency Than Silibinin in Three Prostate Cancer Cell Models***
Timmy Lee, Xiaojie Zhang, Bao Vue, Guanglin Chen, Qiao-Hong Chen
- 12 *Study of the Effect of Bcl-2 Overexpression on Oxamate-induced cytotoxicity in Prolymphocytes***
Lucineh Kasnakjian, Rebecca Alves
- 13 *Quantifying and characterizing the Criegee Intermediates formed in Alkene Ozonolysis by using a Scavenger***
Vinay Kumar, David Flores, Alam Hasson
- 14 *The Practical Synthetic Approach to 3-O-alkylamino-5,7,20-O-trimethyl-2,3-dehydrosilibininins***
William Diaz, Bao Vue, Vignau, Qiao-Hong Chen
- 15 *Synthesis towards Hydnocarpin and Its Analogs as Anti-Prostate Cancer Agents***
Leyla Farshidpour

Poster Presentations – Tuesday, April 18, 2017

Poster Session II

University Business Center

11:00 AM until 12:30 PM

Gottschalks Gallery

16 *The Effects of Logging and Prescribed Fire on Seed Production of Sierran Conifers*

Cynthia Vang, Gurjap Dhaliwal and Tom Lor

17 *The Role of Disturbance on San Joaquin River Macroinvertebrate Assemblages; Implications for Chinook Salmon Survival and Growth*

Emily Ramirez, Steve Blumenshine

18 *Cloning Strategies for the Expression of Myosin-X in Yeast*

Rekha Rangan, Karine Gousset

19 *Hand-held Laser-based Chemical Sensors for Absorption and Fluorescence Spectrometry: Application in Chlorophyll Measurements*

Jackson Wagner, Nelson Ayala, Kin Ng

20 *Analysis of Water Samples for Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid by LC-MS in the Clovis Metropolitan Area*

Jameson Krauthammer, Jaskiran Ghuman, Brenna Flynn, Demi Fujino

21 *Simulation of scene perception, navigation and information storage in wood ants*

Austin Mendoza, Austin Mendoza, David D Lent

22 *Impact of Atmospheric Oxidation on the Cellular Toxicity of Cigarette Smoke*

Tanner Melton, Alam Hasson, Jason Bush, Arjun Mann, Robyn Verhalen,

23 *Electronic Cigarette Solution and Vapor Analysis with GC-MS and LC-MS*

Michael Lazernik, Martin Jones, Preston Cole

Poster Presentations – Tuesday, April 18, 2017

Poster Session II

University Business Center

11:00 AM until 12:30 PM

Gottschalks Gallery

24 *Investigating Hydrogen Peroxide Production In Particulate Matter*

Ryan Brost

25 *Three dimensional structure of antifreeze glycoproteins (AFGP) in dimethyl sulfoxide (DMSO) by high-resolution nuclear magnetic resonance (NMR) spectroscopy*

Cheenu Her, Yin Yeh and Krish Krishnan

26 *Determination of the Effects of Particulate Matter Aerosols on ROS Production in Alveolar Macrophage Cells*

Joel Castillo, Anthony Waterston, Micah Olivas

27 *Characterization of the Interloop Disulfide Bond in High Affinity Binding of Camel VHH to *Listeria monocytogenes**

Matthew Mendoza, Moeko Toride, Teresa Brooks, Cory L. Brooks

Poster Presentations – Tuesday, April 18, 2017

Poster Session III

University Business Center

1:30 PM until 3:00 PM

Gottschalks Gallery

Authors will be available for questions from 1:30 PM until 3:00 PM.

- 1 *The Effects of Peer Leadership Participation on Student Veterans' Ideas about Self and Others***
Sophia Alcala-Cabrera

- 2 *U.S. Participation in Global Climate Change Resolutions: Analysis of the Kyoto Protocol***
Rashmeen Kaur

- 3 *Effects of Secondary Trauma in Military Families***
Soultana Mpoulkoura

- 4 *The Effects of Anger and Happiness on Opposite Valence Racial Stereotypes***
Diego Gomez

- 5 *Patient Satisfaction with Ketamine for Pain Management in the Emergency Department***
Iris Price, Karen Pelham, Chathurika Goonawardena, Akashdeep Dhillon,
Jaspreet Nakai, Boris Pavic, Brian Anders, Matthew Hendrickson, David Claypool

- 6 *Reducing Stigma-Driven Health Disparities in People Living with HIV (PLWH): A Literature Review***
Stephanie Dizon, Constance Hill, William Armaline

- 7 *PESTICIDE EVALUATION OF MITOCHONDRIAL DYSFUNCTION IN HUMAN NEURAL STEM CELLS***
Jose Vera

Poster Presentations – Tuesday, April 18, 2017

Poster Session III

University Business Center

1:30 PM until 3:00 PM

Gottschalks Gallery

- 8 *Elimination of Sliding Scale Insulin In a Nursing Home Setting***
Paulette Ginier, Lisa Adams, Odarius Pouncil, Jerk San Mateo, Thuhai Phamle
- 9 *Comparison of HbA1c as a screening tool for GDM in first trimester pregnant women***
Zev Tovian, Erica Delsman, Todd McCauley, Susan Hughes, Ivan Gomez
- 10 *Intracranial Vascular Steal as a Mechanism for Symptoms Ipsilateral to a High-Grade Carotid Stenosis***
Sameer Sundrani, Philippe Vanderschelden, Amir Khan, Armen Choulakian
- 11 *Examining Team Cultures of Success in High Performance Field Hockey Through Self- Determination Theory***
Jeffrey Ruser, Jenelle Gilbert, Jamie Robbins, Wade Gilbert
- 12 *THE 'YIPS' IN DIVISION I COLLEGIATE SPORTS: PREVALENCE, CONDITIONS, AND FACTORS***
Kei Sato
- 13 *The Effect of Hydration on Landing Error Scoring System Scores in Dehydrated, Hyperthermic, and Fatigued Males***
Alexandria Gregory
- 14 *Electronic Conduction of Solid State Thick Films of Alkanethiolate Capped Ag Nanoparticles***
Logan Wood, Xiong, Der

Poster Presentations – Tuesday, April 18, 2017

Poster Session III

University Business Center

1:30 PM until 3:00 PM

Gottschalks Gallery

- 15 *Study of Invertase Catalyzed Sucrose Hydrolysis in the presence of Sucralose by Blood Glucometer and Nuclear Magnetic Resonance Spectroscopy***
Justin Vang, Cheenou her, Jaideep Singh
- 16 *Analysis of Prey Variation of Juvenile Chinook Salmon by Stable Isotope Analysis***
Daniel Whittington, Michael Bravo
- 17 *ANALYSIS OF COLOR OF “CRIMSON SEEDLESS” GRAPES TREATED WITH ORO151***
Diep Le, Geoffrey Dervishian, Eric Person, Sonet van Zyl
- 18 *ZnO-Epoxy-Graphene Electro-active Composites***
Sanjeev Kumar, Walker Tuff
- 19 *HIV-1 protease inhibitors from marine brown algae derived compounds: a literature review***
Eric Nunez Aguilar
- 20 *Optimal sensitivity of x-ray fluorescence detection of arsenic in skin phantoms using an x-ray optics system***
Benjamin Avila, Mihai Gherase
- 21 *A Primer on Life Cycle Analysis of Cementious Composites with a Focus on Embodied Energy and Emissions***
Roshanak Farshidpour, Lamia Tahsin

Poster Presentations – Tuesday, April 18, 2017

Poster Session III

University Business Center

1:30 PM until 3:00 PM

Gottschalks Gallery

22 *Water purification using plasma micro-discharge towards development a hybrid water treatment system*

Daniel Apuan, Nicholas James Marshall, Adithya Keshav Mohan, Emma J Van Fossen, Bagrad Oganyan

23 *ZnO-Epoxy-Graphene Electro-active Composites*

Diego Ruggiero, Walker Tuff

24 *Chemical Recycling of Si PV Panels*

Nikesh Pradhan, Garrett Bader

25 *A Sustainable Approach to Assess the Resilience of Perforated Wood Shear Walls*

Elizabeth Berry, B. Shadravan, and F.M. Tehrani

26 *Force applied by any surface*

Daniel Hooker

Poster Presentations – Tuesday, April 18, 2017

Poster Session IV

University Business Center

3:30 PM until 5:00 PM

Gottschalks Gallery

Authors will be available for questions from 1:30 PM until 3:00 PM.

1 *Stochastic Simulation for the Future of California Blueberry Production*

Madeline Loftus, Serhat Asci

2 *Analytics for SmartFarming (Soil Library for Sensors)*

Arthish Bhaskar, Balaji Sethuramasamyraja, Chandra Krintz, Rich Wolski and Bo Liu

3 *The Effects of Various Levels of Protein, Lysine, Fat, and Fiber on Swine Growth and Pork Quality*

Hannah Price, Amanda McKeith

4 *Family-Based Workshops Associated with an Increase in Vegetable Consumption*

Sara Rima, Maribel Barragan

6 *COMPARING THE EFFICACY OF PICTURE CARD STIMULI TO STORYBOOK STIMULI IN TEACHING MORPHOLOGIC STRUCTURES TO CHILDREN WITH EXPRESSIVE LANGUAGE DISORDERS*

Samantha Ramirez, Christine Maul

7 *“IT’S OUR NORMAL” – A FOLLOW-UP STUDY ON ADAPTATIONS FAMILIES MAKE FOR OLDER CHILDREN WITH DEVELOPMENTAL DISABILITIES*

Jennifer Ortiz, Christine A. Maul

8 *A Multidimensional Rehabilitation Program for a 69 Year-Old Male with a Fear of Falls: A Case Report*

Nicholas Oifoh

Poster Presentations – Tuesday, April 18, 2017

Poster Session IV

University Business Center

3:30 PM until 5:00 PM

Gottschalks Gallery

- 9 *Identification of potential oomycete plant pathogens from natural waterways in Fresno County to irrigation reservoirs at the University Agricultural Laboratory***
Jessie Brazil, Holly Deniston-Sheets, John T. Bushoven, and Margaret L. Ellis
- 10 *OPTIMIZING NUTRIENT MEDIUM ION CONCENTRATION FOR LABORATORY-CULTURED AQUATIC UTRICULARIA PLANTS***
Eshan Bhardwaj, Benjamin Arax, Otto Berg, Ulrike K. Müller, John T. Bushoven
- 11 *Effect of Walnut and Pistachio Sap on Spore Germination and Mycelial Growth of : Neofusicoccum mediterraneum, Neofusicoccum parvum, Phomopsis (Nomelini spp.), and Diaporthe neothicola (Phomopsis neotheicola)***
Alexis Jackson, Themis Michailides
- 12 *The Effect of a Six-Week Family-Based Healthy Eating program for Latino Children on their Consumption of Sugar-Sweetened Beverages, Fast Foods, and Sweets***
William Evans, William Evans, Alma Garcia, Amber Hammons
- 13 *EVALUATING THE EFFECTS OF HIGH-PROBABILITY/LOW-PROBABILITY SEQUENCES ON A MEASURE OF INTERROGATIVE SUGGESTIBILITY***
Grecia Mendoza, Marianne Jackson
- 14 *Thesis***
Catherine Nakato, Peter English
- 15 *Changing Reduction Sequences of Obsidian from the Grandad Site, Central Sierra***
Felicia Avendano, Mika Woods, Shay Perryman

Poster Presentations – Tuesday, April 18, 2017

Poster Session IV

University Business Center

3:30 PM until 5:00 PM

Gottschalks Gallery

- 16 *Mobile application implementation of biologically inspired visual scene perception***
Deepti Shashidharaiah, Deepti Shashidharaiah, Sri Ramya Nimmagadda, Jeevjyot Chhabda, David D Lent
- 17 *Testing and Testable Design of Digital System using Industry-Verified Electronics Design Automation Tools***
Vidya sagar reddy Gopala, Reza Raeisi
- 18 *Fabrication and Characterization of Barium Titanate based Flexible Two-Phase Lead-Free Piezoelectric Composites***
Walker Tuff, Jalen Harris, Jaspreet Badhesha, Yerli Cervantes
- 19 *Improving lead detectability in plaster-of-Paris bone phantoms using a grazing-angle geometry x-ray fluorescence measurement***
Danielle Tanielian, Summer Al-Hamdani
- 20 *Subsidence in the Central Valley***
Andy Magdaleno, Lalita Oka
- 21 *ZnS thin films grown by pulsed electrodeposition method to be used in solar cells***
Gustavo Silva Hernandez, Adithya Mohan
- 22 *Fabrication of novel lead free methyl ammonium-iodide based perovskite solar cells***
David Martinez, Randy Martinez, Fahad Al Sadhaan, Luis Nava, Zachary White-Steele

Poster Presentations – Tuesday, April 18, 2017

Poster Session IV

University Business Center

3:30 PM until 5:00 PM

Gottschalks Gallery

24 *Modeling and control of the prosthetic leg*

Xinli Wang

25 *Micro-plasma based surface modification of flexible ZnO-Epoxy-Carbon nanotube composites*

Sandeep Mohan, Adithya Katakam, Walker Tuff, Emma J Van Fossen

26 *Hands-on Learning with Mechanically Stabilized Earth Sandbox*

Eric Gudiño, Adrian Velazquez



April 19, 2017
Oral Presentations

Oral Presentations – Wednesday, April 19, 2017

Concurrent Session A

University Business Center

Auditorium 191

- 9:00 AM** ***RESILIENT DOCTORAL STUDENTS IN CALIFORNIA: A REFLECTIVE STUDY OF THE RELATION BETWEEN CHILDHOOD CHALLENGES AND ACADEMIC SUCCESS***
Randy Bessey
- 9:15 AM** ***The Effects of Linked Learning on Teacher Motivation, Deficit Thinking and Teacher Burnout Across Low, Mid, and High Poverty Linked Learning School Settings***
Chantel Cox, Susan Tracz, Ken Magdaleno, Jared Stallones
- 9:30 AM** ***PERCEIVED SELF EFFICACY OF PRINCIPALS IN OVER AND UNDERACHIEVING SCHOOLS***
Scott Dille
- 9:45 AM** ***TESTING AN ONLINE INTERVENTION TO DEVELOP PURPOSE AND HOPE IN FIRST YEAR COLLEGE STUDENTS AT A MINORITY SERVING INSTITUTION***
Rosie Hernandez, Christian A. Wandeler
- 10:00 AM** ***A QUALITATIVE STUDY OF AFRICAN AMERICAN MALE PRINCIPALS IN CENTRAL CALIFORNIA: UNDERSTANDING THE FACTORS IMPACTING THEIR PROFESSIONAL DEVELOPMENT AND SUCCESS***
Daren Miller

Oral Presentations – Wednesday, April 19, 2017

Concurrent Session B

University Business Center

UBC 192

9:00 AM ***Fresno Solar Cell: The proposed low-cost high efficient solar cell from non-toxic and earth abundant semiconductors***

Ajith Weerasinghe, Gustavo Silva, Luis Nava

9:30 AM ***Seismic Performance of Unbonded Post-Tensioned Rocking Walls: Shaking Table Experiments***

Maryam Nazari, Sri Sritharan

Oral Presentations – Wednesday, April 19, 2017

Concurrent Session C

University Business Center

UBC 194

9:00 AM *FORMULATION AND EVALUATION OF POLYMERIC MIXED MICELLES FOR DELIVERY OF QUERCETIN TO BREAST CANCER*

Arjun Patra, Swaha Satpathy, Anitha K. Shenoy, Jason A. Bush, Muhammad Delwar Hussain

9:15 AM *Structure-Activity Relationship Studies of Silibinin as Anti-Prostate Cancer Agents*

Bao Vue, Sheng Zhang, Xiaojie Zhang, Andre Vignau, Michael Huang, Timmy Lee, Guanglin Chen, Qiao-Hong Chen

9:30 AM *Chemical-kinetic rate laws applied to predator-prey population dynamics*

Otto Berg, Rayhan Kabir, Ulrike K. Müller

Oral Presentations – Wednesday, April 19, 2017

Concurrent Session D

University Business Center

Auditorium 191

10:45 AM *Effects of Mental Illness Stigma Dimensions on Treatment Attitudes*

Shauna Dauderman, Christine Edmondson

11:00 AM *Care of persons aging with Autism and Intellectual Disability*

Funmilola Alli

11:15 AM *The Relationship among CBCL (Child Behavior Checklist), EQ-C (Empathy Quotient), SQ-C (Systemizing Quotient), and AQ-C (Autism Quotient)*

Janet Saenz, Gerianne M. Alexander

Oral Presentations – Wednesday, April 19, 2017

Concurrent Session E

University Business Center

UBC 192

- 10:30 AM** ***Aligning Leadership Qualities of Special Education Teachers with Teacher/Paraeducator Collaboration***
Jennifer Rivera
- 10:45 AM** ***AI: The Effects of Using Appreciative Inquiry as a Professional Learning Change Agent and California Community Colleges***
Sara Couch
- 11:00 AM** ***Leadership Practices In A Linked Learning Environment Focused On Equitable Practices Of Language Minority Students***
Diane Lira
- 11:15 AM** ***DOES A SHAME RESILIENT WISE INTERVENTION (SWRI) PROMOTE A SENSE OF BELONGING AND ADDITIONAL NON COGNITIVE SKILLS SUCH AS GRIT, MINDSET, AND HOPE IN FIRST GENERATION STUDENTS NEWLY ADMITTED TO HIGHER EDUCATION?***
Felipe Mercado
- 11:30 AM** ***THE IMPACT of service-learning on engagement and degree completion for undergraduate students***
Kathleen Schock

Oral Presentations – Wednesday, April 19, 2017

Concurrent Session F

University Business Center

UBC 194

- 10:30 AM *Wokou in the 16th & 17th Century***
Cameron Scott
- 10:45 AM *Una mosca vivaracha: Los límites de la ciencia ante lo fantástico / A lively fly: the limits of science to the fantastic***
Jorge Ceballos Madrigal
- 11:00 AM *Student SELF-EFFICACY (PERSONAL AGENCY) AND MOTIVATION IN LOW, MID, AND HIGH POVERTY LINKED LEARNING SCHOOL SETTINGS***
Cherie Solian
- 11:15 AM *A Narrative Research Study of Cultural Capital, Social Identity, and Self-Efficacy Impact on the Academic Achievement of Professional Hmong Women***
Mai Soua Lee-Cha



April 19, 2017
Poster Presentations

Poster Presentations – Wednesday, April 19, 2017

Poster Session I

University Business Center

8:30 AM until 10:00 AM

Gottschalks Gallery

Authors will be available for questions from 8:30 AM until 10:00 AM.

- 1 *How trap morphology changes with trap size for the carnivorous plant bladderwort***
Andrea Aparicio Ramirez, Ronnie I. Odia, Otto Berg, Ulrike K. Muller
- 2 *Exploring Evolution Acceptance Profiles Among Non-Science Majors***
Ephiram Bosse, Emily Walter
- 3 *Family Mealtimes: Clearing the Path to the Prevention of Childhood Obesity in Hispanic Children***
Danae Dubberke, Sara Rima, Maribel Barragan, Amber Hammons
- 4 *How Conditions Play a Role in the Adoption of Voter ID Laws in State Legislatures***
Alexandra Gallo
- 5 *The Effects of High School Involvement on Levels of Servant Leadership of Fresno State Agriculture Students***
Taylor Helton, Steven Rocca, Avery Culbertson
- 6 *Identifying protein expression changes in zoledronic acid-treated metastatic breast cancer cell spheroids***
Megan Kalomiris, William Whalen, Jason Bush
- 7 *Reactive Oxygen Species and Developmental Delay in *Caenorhabditis briggsae****
Marisol Lauri, Joseph Ross

Poster Presentations – Wednesday, April 19, 2017

Poster Session I

University Business Center

8:30 AM until 10:00 AM

Gottschalks Gallery

- 8 *Optimization of silicon nanocrystal synthesis via plasma-enhanced chemical vapor deposition***
Matthew Metcalf, Daqing Zhang
- 9 *Experimental Evaluation of Dynamic Characteristics of Structural Systems***
Zachary Peacock, Maryam Nazari
- 10 *MRF cone type knee brake***
Kyle Renberg, Henry Rigdon, Noe Hernandez, Victor Arevalo
- 11 *Determination of Imidacloprid in Central California Honey and the Decline of the Bee Population***
Emmanuelle Issa, Marie Barr-Ramsey, Elia Manzo, Dominic Smith, Megan Tjuanta, Ivan Cisneros-Rodriguez, Josh Comes, Nathaniel Whitaker
- 12 *Analysis of the effects of Bcl-2 family proteins on carbohydrate metabolism of prolymphocytes***
Ali Abed, Catalina Olea, Bushra Mahmood, Rhaul Llanos, Nawras Samaan, Preet Kaur, Krish Krishnan
- 13 *Implementing Image Compression Technique using TSIHT algorithm***
Jyotsna Yallapragada, Sravya Bolla
- 14 *Vibration Energy Harvesting and Biomedical Application***
Abbie Sandquist, Sreekanth Varma Rudraraju
- 15 *Type II Diabetes Education for the Indian Population***
Puvandeep Sran

Poster Presentations – Wednesday, April 19, 2017

Poster Session I

University Business Center

8:30 AM until 10:00 AM

Gottschalks Gallery

16 *The Critical Role of Glycine at Position 184 in the Transcriptional Activation Function of the cAMP Receptor Protein*

Pegah Mosharaf, Navjot Sangha , Carlos Flores

17 *Development of a Content Valid Interview Questionnaire for Hard of Hearing Adults and Their Communication Partners*

Stephen Roberts, Nancy A. Delich, Cydney Danisi

18 *APIGENIN-LOADED PLURONIC MIXED MICELLES FOR BREAST CANCER THERAPY*

Swaha Satpathy, Arjun Patra, Anitha K. Shenoy, Jason A. Bush,

Bharti Ahirwar, Muhammad Delwar Hussain

Poster Presentations – Wednesday, April 19, 2017

Poster Session II

University Business Center

10:30 AM until 12:00 PM

Gottschalks Gallery

Authors will be available for questions from 10:30 AM until 12:00 PM.

1 *Acute-Care Physical Therapy Proves Beneficial for a 73 y.o. male S/P CABG with Medical Complexity*

Kris Haycock

2 *Case Report – Conservative Management of Nerve Traction for a Construction Worker who had a Wrist Injury due to a Fall on an Outstretched Hand.*

Suneth Attygalle

3 *Computerized Dynamic Posturography Comparing the Bertec Balance AdvantageTM and Neurocom^R Equitest in Assessing Postural Stability in Healthy Adults*

Carolyn Bentley, Monica Rivera, Nancy Wubenhorst

4 *Effects of a Multidimensional Program to Address the Fall Risks in a Community Dwelling Older Adult: A Case Report*

Kayla Brass

5 *A Multi-Faceted Physical Therapy Intervention for a Chronic Stroke in a Middle Aged Male: A Case Report*

Steven Cabrales

6 *Physical Therapy Interventions for an Elderly Male with a Chronic Multifactorial Balance Problem: A Case Report*

John Cardinale, Toni Tyner

7 *The Effects of Therapeutic and Vestibular Exercises on Cervicogenic Dizziness and Pain: A Case Report.*

Katelyn Cartwright

Poster Presentations – Wednesday, April 19, 2017

Poster Session II

University Business Center

10:30 AM until 12:00 PM

Gottschalks Gallery

- 8 *A COMPREHENSIVE PHYSICAL THERAPY APPROACH IN A YOUNG ADULT WITH SEVERE MUSCLE WEAKNESS FOLLOWING ORIF OF AN INTERTROCHANTERIC HIP FRACTURE***
Ashley Christiansen, Jennifer Adame-Walker
- 9 *PHYSICAL THERAPY TRAINING S/P SPINAL FUSION AND PARIETAL MENINGIOMA EXCISION: A CASE REPORT***
Carolyn Collins
- 10 *Acute Physical Therapy Interventions Improves Functional Endurance for an Elderly Male with COPD: A Case Report***
Megan Comparan, Jennifer Roos
- 11 *Conservative Treatment for a Torn Medial Meniscus Using the Movement System Impairment Approach: A Case Report***
Jacqueline Cortez
- 12 *PHYSICAL THERAPY STATUS POST TOTAL HIP ARTHROPLASTY SECONDARY TO FEMORAL NECK FRACTURE IN AN ELDERLY PATIENT WITH DEMENTIA: A CASE REPORT***
Amy DeBorba
- 13 *A Conservative Intervention Program for an Obese 83-Year-Old Female with Severe Ankle Osteoarthritis: A Case Report***
Sean Goetzl
- 14 *The Effectiveness of Multi-Dimensional Interventions to Improve Mobility for a 59 y.o. female with Multiple Sclerosis: A Case Report***
Stephanie Gomez, Jennifer Roos

Poster Presentations – Wednesday, April 19, 2017

Poster Session II

University Business Center

10:30 AM until 12:00 PM

Gottschalks Gallery

- 15 *A Comprehensive Physical Therapy Approach to Treating a Non-Compliant Patient Following Subacromial Decompression Surgery: A Case Report***
Ryan Hastie
- 16 *Physical Therapy Intervention for AMBRI Shoulder Instability Prior to Surgical Intervention: A Case Report***
Kelly Hosey
- 17 *Acute Care Physical Therapy Management for a Multi-System Elderly Female with Osteoarthritis: A Case Report***
Melissa Hu, Jennifer Roos
- 18 *A Cupping Intervention For a Patient with Upper Extremity Neuropraxia: A Case Report***
Mike Lopes
- 19 *Sub-Acute Physical Therapy Intervention for a 92-year-old Female Following a C2 Posteriolateral Fusion: A Case Report***
Robbie Martin
- 20 *Improving Mobility in an Orthopedic Trauma Patient with Pulmonary and Cardiac Complications in an Acute Setting: A Case Report***
Yalda Mendoza
- 21 *Return to Weight Loss: Successful Interventions for an Overweight Patient with Low Back Pain - A Case Report***
Theodore Oliver

Poster Presentations – Wednesday, April 19, 2017

Poster Session II

University Business Center

10:30 AM until 12:00 PM

Gottschalks Gallery

- 22 *Physical Therapy Interventions for an Elderly Female S/P LE ORIF: A Case Report***
Punam Patel
- 23 *Interventions Associated With Recovery of Strength and Function Following ATL Surgery in an Adult Male with Muscular Dystrophy: A Case Report***
Jennifer Ray
- 24 *Acute Care Physical Therapy Management for a Medically Frail Elderly Female S/P AKA: A Case Report***
Maranda Smith
- 25 *Physical Therapy Interventions for Functional Mobility Recovery of a Deconditioned 47 y.o Female Diagnosed with Lupus Nephritis: A Case Report***
Jacklyn Taylor
- 26 *Acute Rehabilitation of a 27-y.o. Male with Failure to Thrive - A Case Report***
Joseph Terrill
- 27 *Utilizing Diaphragmatic Breathing in a 71-year-old Female Suffering Chronic Low Back Pain: a case report***
Cole Thornton

Poster Presentations – Wednesday, April 19, 2017

Poster Session II

University Business Center

10:30 AM until 12:00 PM

Gottschalks Gallery

28 *Physical Therapy Intervention Develops Locus of Control During Prosthetic Training Post Unilateral Below Knee Amputation: A Case Report*

Kelley Urionaguena

29 *Physical Therapy Intervention Program for a 67-Year-Old Female Status Post Total Hip Replacement with Peripheral Vascular Disease: A Case Report*

Nicholas Ward

30 *Multi-Systems Approach to Therapeutic Treatment and Interventions Post Distal Tibia Fracture Reduction and Distal Fibula Fracture in the Acute Care Setting: A Case Report Poster*

Taryn Yamagami, Toni Tyner



April 18, 2017

Oral Presentation Abstracts

Jessica Adams | Susana Hernández

jeadams@csufresno.edu

California State University, Fresno

Educational Leadership

Taking Responsibility: How White Student Affairs Professionals Engage with Students on Whiteness and White Privilege

The purpose of this phenomenological study is to explore how White student affairs professionals engage in conversations about Whiteness and White privilege with students. While research on Whiteness continues to evolve at the same time that research on student affairs professionals grows, the intersection of research at those two points is limited. As student affairs professionals are now expected to engage in social justice work, it is imperative that professionals of color are not continuously shouldering an extra burden of work regarding racism and privilege. To reach national standards surrounding social justice, student affairs professionals must be educated and comfortable with their own race and ethnicity, as well as being comfortable engaging in conversations focusing on them. This study aims to shed light on the current state of these conversations, as well as gain insight into concerns or resistance that current professionals may be experiencing.

Using purposive sampling, thirteen White student affairs professionals completed a survey and participated in a phone interview with the researcher. These professionals represent a variety of institutions across the country and vary in age, gender, experience, and professional roles. Using a priori and in-vivo codes, the software NVivo was used to perform line by line coding of transcripts from all interviews and to aid in data analysis.

Results indicate a lack of preparation in degree programs which is one factor leading to student affairs professionals feeling unprepared to engage in dialogue. Perceived lack of support from supervisors and administrators also hindered participant's feelings of job security to engage in challenging conversations about Whiteness with students. It is also critical to question the impact that White fragility may be having in the resistance of White professionals to engage in work around race and racism.

Ayad Ahmed | Scott Peterson

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Civil and Geomatics Engineering

FUNCTIONAL SURFACE TARGET AS CONTROL AND VALIDATION OF 3-D LASER SCANNER POINT CLOUD

With the potential of millions of data points collected by laser scanners, it's imperative to be able to justify that the final 3-D point cloud is accurate to the required specifications. Control targets, 2-D and 3-D, are used to constrain the orientation of the 3-D point cloud data. Regularly, terrestrial and mobile scanning 3-D point clouds are controlled through the use of 2-D targets (planar targets) and image matching. The targets help to constrain or validate the relative and absolute accuracy of the point cloud data. With laser scanning, there are 4 properties collected from each measured data point: X, Y, Z, and intensity (the amount of return energy from the laser pulse). Intensity acts as another dimension of information that when combined with the use of a planar targets, creates an overall 3 dimensional target that can be used to as accuracy constraints in 3-D points cloud. Image matching of 2-D control targets require a higher density of measured data. 3-D targets require less data, but good geometric spacing. A 6" diameter circular planar target was created to test the theory of using intensity as a controlling 3rd dimensional component. The required information to solve for the center of a circular planar surface is the radius of the circle, and the X, Y coordinates. Scanner data points are randomly distributed about the center of the target with only an XY components defining its position in relation to the unknown center of the target. With a radial gradient on the circular target, the intensity is used to determine the radius of each individual observed data point. With 3 or more well distributed points, the controlling center of the target can be calculated and used to properly constrain 3-D point clouds. It's a variant of a functional surface target utilizing another measured dimension, thus having 3 dimensions to control 3 dimensions of point cloud data.

Tahrima Alam | Aly Tawfik, PhD

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California State University, Fresno

Department of Civil and Geomatics Engineering

TRANSPORTATION ART: FROM AESTHETIC VALUES TO OPERATIONAL FUNCTIONS

Travel demand management, TDM, is one of several tools utilized by transportation engineers to tackle transportation challenges such as congestion, energy demand and emissions. TDM involves the application of policies and strategies to influence individual travel behavior; resulting in reduced travel demand, shifting demand timing, or switching to more efficient transportation modes.

There are numerous examples of art being integrated in different transportation projects; primarily serving only aesthetic values. Art; however, may be utilized to deter people from using private cars for commutes and instead increase modal shares of public transportation, walking and biking. The objective of this research project is to understand the current extent, value, and challenges of transportation art, and explore potential benefits of using transportation art as a tool that extends beyond aesthetic values.

In this work, an extensive literature review was conducted to identify transportation art cases that have succeeded in achieving operational functions– along with its artistic purpose. Additionally, a survey was designed and conducted to assess the extent to which transportation artists, researchers and practitioners from various agencies have considered such operation potentials of transportation art. Six types of agencies (federal, state, local, private, non-profit and transit operators) with different missions and from different regions across the nation were identified and surveyed. Topics like advantages, barriers, and funding were covered in the survey questions.

Overall, nine interviews have been conducted and several more are scheduled. A preliminary assessment of the results indicates that art can serve a functional purpose. The project is anticipated to shed light on the lack of funds designated for transportation art, recent legislation that pertains to public art, various benefits of incorporating art into transportation projects, and the varying opinions of the interviewed agencies. Results of this work should prove valuable in developing new, cost effective methods for TDM.

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Economics

The Effects of Water Use on Economic Growth: Investigating California's Surface and Ground Water Use

The struggle to maintain water resources has been the forefront of Californian politics. California was challenged to maintain water resources after the cuts in the Colorado River Compact, and now after 5 years of severe drought, water resources are again strained. Research in the topic of water has been based on consumption models, and possible methods to affect consumption to conserve water. The research discussed in this paper however, examines the effects of water use by sector on economic growth in California taking in account ground and surface water use.

It is hypothesized that water use in agriculture has greater positive effects on regional economic growth for California's agricultural counties. Further, I believe that the source of water will play a role in economic growth. While use of surface water as a replenishable resources may have positive impacts on economic growth, yet overuse of ground water may potentially cause ground water depletion thus negatively affecting regional economic growth.

Empirical economic model is used to regress employment growth on water used by sector end-user sources of water, along with control variables such as human capital variable, share of college graduates, and social capital including business associations, professional organizations, and labor organizations. Results suggest positive significant effects of water use in agriculture on growth in employment rate in California. In addition, surface water withdrawal for irrigation has significant impacts on economic growth, while the effects of ground water use remain uncertain and statistically insignificant.

This research will hopefully help policy decisions concerning efficient use and allocation of water considering the regional comparative advantage and ground water management.

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Public Health

Particulate matters emitted from different cooking methods

There are many factors contributing to the poor air quality in the valley including: the geographical location, the agricultural industry, and the growing population. However, one factor that is overlooked is the conventional methods of cooking that produce air pollutants. It is estimated that 60 percent of homes in California in which cooking is done at least once a week will produce pollutant levels that would be considered illegal if found outdoors. The methods that are being used to cook are not necessarily approved and they include: open fires and simple stoves to burn fuel. This can further reduce lung function; cause asthma, nonfatal heart attacks, and can cause cancer. Simple stoves and open fires produce particulate matter also known as PM_{2.5} and PM₁₀. Its size allows for passageway into the lungs, which than can potentially cause hazardous health problems. For that reason this research has been done to have a better understanding on the effects of PM_{2.5} on indoor air quality and outdoor air quality.

The collection method for sampling of PM_{2.5} for this research includes different cooking techniques such as: Barbeque, steaming, and boiling. Using three different particulate matter devices at separate times, the average barbeque exposure was 24.5µg/m³. The average amount collected for this study was two times higher than the EPA maximum standards. For comparison, the average exposure level was 14.8µg/m³ in outdoor air samples with the same devices on multiple locations in Fresno Clovis area, which implies Barbeque can elevate personal exposure to PM than walking around. Panini grilling and electric grilling of meat had concentration levels of 333µg/m³ and 176µg/m³ both tremendously exceeding the standard values. The average boiling and steaming of ramen emitted 7µg/m³ of PM_{2.5}, which is relatively low and can be considered safe.

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Chemistry

Measurements of Organics in Ambient PM 2.5 in Fresno California

Exposure to fine particles (PM_{2.5}) in the atmosphere has been associated with health effects such as lung disease, heart disease, and cancer. While an area of active research, particle toxicity is not well understood. The contribution to potential health effects from specific components or classes of compounds in ambient particles has yet to be determined. Quinones are a class of organic compounds typically found in ambient PM_{2.5} that have been suggested to significantly contribute to the ability of particles to generate reactive oxygen species (ROS) such as hydrogen peroxide (H₂O₂) and hydroxyl (\bullet OH) radicals causing oxidative stress and leading to inflammation and cell damage in the lungs. One proposed mechanism of ROS generation is by catalytic conversion of molecular oxygen (O₂) by quinone redox cycling. In this project ambient PM_{2.5} samples were collected in Fresno for two weeks in January 2013 using a Tisch Environmental Hi-Vol PM_{2.5} sampler onto Teflon glass filters. Organics were extracted using a surrogate lung fluid (SLF) to mimic lung like conditions and residual filters were extracted with dichloromethane (DCM) and quantified using Gas Chromatography Mass Spectrometry (GCMS). Measurements of select quinones were made including 9,10-Phenanthraquinone, 9,10-Anthraquinone, 1,4-Naphthoquinone, and 1,2-Naphthoquinone. Ambient concentrations of select organics as well as correlation to simultaneous measurements of ROS and transition metals, made by collaborators at the University of California Los Angeles (UCLA) and Davis (UCD) respectively, will be presented. Diurnal and spatial variation of particles and organics will also be explored.

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Mathematics

A Grim Presentation

Grim is a two-player game created by Fresno State Students, in which players take turns destroying a pre-determined network by deleting nodes; the player who makes the last move is the winner.

In this presentation we will describe winning strategies that emerge when Grim is played in a particular family of networks. In order to do this, we have used techniques in combinatorial game theory and graph theory. Our results have revealed an interesting pattern that seems to determine which player wins when Grim is played in any of the networks we are considering. This pattern has an unexpected connection to mathematical objects in Number Theory known as “number partitions”.

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Civil and Geomatics Engineering

Simulating groundwater flow at Fresno's Leaky Acres recharge facility

Leaky Acres of Fresno is spread across an area of 225 acres of land located near Yosemite International Airport, Fresno. It consists of 26 ponds out of which 22 are currently functional with average water depth of 5.5 ft. Leaky acres were established in 1970 to address the challenge of rapidly depleting of groundwater due to population growth and agricultural needs of the area. Since its construction, Leaky Acres has helped recharge the groundwater table to a great extent. However, the efficiency of its recharge has declined due to clogging of void spaces. In order to regain the recharge capability, 9 gravity drains consisting of 3 ft diameter and variable depth of 20 ft and 60 ft were installed in 2012. This study was undertaken to model the functioning of gravity drains and quantify the efficiency of the recharge. The index properties and the hydraulic conductivity of various soil layers were measured in the laboratory. A finite difference ground water simulation model was developed using the software MODFLOW (Modular Finite Difference Flow Model) to simulate the movement of ground water before and after the installation of the gravity drain wells in the pond. The results showed significant increase in the ground water flow rate and velocity of the flow due to the introduction of the gravity drains. The rate of ground water recharge before the construction of gravity drains was 0.22 ft/day. After installation of gravity drains, the rate of recharge was found to be 38.2 ft/day at the center of the pond just above one of the drain. It was found that 60 ft deep drains had the highest impact on recharge when compared to 20 ft deep drains. Thus, gravity drains were proven to be very efficient way of recharging.

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Electrical and Computer Engineering

Kalman Filter Based Z-source Inverters in Photovoltaic(PV) applications

Conventional power converters have switching losses due to the high frequency switching. In order to overcome this problem, an impedance matching method can be used such as Z-source inverter. However, a Z-source inverter has some control issue regarding the capacitor voltage that is fed to the final stage of the inverter to the grid. In this research, a Kalman filter based Z-source inverter is proposed with an enhanced control algorithm for Maximum Power Point Tracking(MPPT) and this capacitor voltage stabilization. By implementing Unified Linear Kalman Filter Algorithm with Capacitor voltage control (CVC) algorithm for the Z-source inverter, the Kalman Filter can track Maximum Power Point (MPP) faster than traditional algorithms such as Perturb and Observation (P&O) algorithm, that has minimum impact on rapidly changing atmospheric conditions. Thus, by using the Kalman Filter and CVC algorithm we can achieve faster, effective and capacitor voltage regulation at the same time. The effectiveness of this proposed Unified Kalman Filter with CVC Algorithm for Z-source inverter is implemented in Matlab/Simulink environment and will be verified by the computer simulation results

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Biology

Spatial Variation in the Carrying Capacity of Juvenile Chinook Salmon Among Sites along the San Joaquin River

A critical part of the San Joaquin River Restoration Project is estimating the carrying capacity or production of early life history stages of Chinook Salmon. Invertebrate prey for juvenile salmon typically set the basis for carrying capacity and production. However, the spatial and temporal variation in invertebrate prey and thus carrying capacity (habitat quality) in the river is currently unknown. In cooperation with Cramer Fish Sciences, juvenile Chinook Salmon net pens were installed at Scout Island (SI), Gravelly Ford (GF), and the Mendota Wildlife Refuge (MWR) to test whether juvenile salmon survival and growth varied among these locations. Four pens were placed at each site with two positioned in a main stem area of the river and two in flood plain areas. Macroinvertebrate samples were taken every two weeks from February-April 2016 from the water column and river bottom both outside and inside each net pen. Invertebrate abundances varied through an interaction between sites and sample location (in or out of the net pen). Invertebrate abundances from the downriver MWR sites were ca. 2-10x greater than SI and GF respectively. Samples taken inside and outside of net pens could be indicative of the effects of JCS predation on invertebrates. However, we only observed differences in these sample types at GF, where prey abundances were relatively low and fish growth was correspondingly slow. The three main sites also varied greatly in invertebrate taxonomic assemblages, which is also affects the growth potential of JCS rearing in various reaches of the restoration area. Overall, prey abundance and composition can be coupled with information on water velocity and temperature as well as disturbance to help to guide project management in establishing realistic goals for the potential production of juvenile Chinook Salmon cohorts.

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Obstetrics and Gynecology

The use of B-flow imaging versus current standard techniques to detect severe fetal anemia

Maternal alloimmunization is an immunologic complication of pregnancy in which a fetus can become severely anemic, potentially causing high-cardiac output failure and subsequent stillbirth. Research has demonstrated that in the severely anemic fetus the systolic velocity of blood flow through the fetal middle cerebral artery increases significantly. Recent advances in prenatal diagnosis have established non-invasive ultrasound methods to assess the peak systolic velocity of the middle cerebral artery (MCA-PSV). This method has become the standard of care and replaced the need for amniocentesis, an invasive procedure that carries a risk of fetal loss.

Accurate diagnosis of the MCA-PSV relies heavily on several factors including sonographer experience, fetal head position, fetal activity, and fetal breathing. In the assessment of the MCA-PSV, it is important to obtain a zero degree angle of insonation between the ultrasound beam and direction of blood flow. An inaccurate MCA-PSV assessment may increase fetal risk either by unnecessarily subjecting the fetus to highly invasive procedures, or conversely, not performing a procedure that could increase chance of fetal survival.

The recent introduction of an ultrasound technology called B-flow imaging may remove some of the obstacles in obtaining accurate MCA-PSV assessments. B-flow imaging allows for direct measurement of blood flow that is completely angle independent. This may not only provide a more accurate MCA-PSV but also reduce the time necessary to obtain this measurement.

Our study aims to compare B-flow technology to the traditional ultrasound MCA-PSV assessment using color Doppler at various times during gestation. Our variables of interest will include a comparison of the time necessary to complete the MCA-PSV measurement and of the measurements obtained between the two methods. The ultimate goal of our study is to assess whether in selected fetuses, B-flow imaging may allow for both a more accurate and efficient diagnosis of severe fetal anemia.

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Physics

Search for signatures of Littlest Higgs with T-parity in dijet final states with ATLAS detector

The Littlest Higgs model with T-parity (LHT) is an extension of the Standard Model (SM) at TeV scale. LHT model offers a solution to the naturalness problem of the SM by introducing a set of new TeV-scale particles: T-odd heavy gauge bosons and T-odd heavy quarks that can be produced only in pairs. Under the new symmetry of LHT, due to the implemented parity, all SM fermions and gauge bosons are T-even, while their new heavy partners are T-odd. Besides the heavy T-odd fermion sector LHT introduces a T-even heavy top quark, a partner of T-odd heavy quark, which can mix with a SM top quark.

In addition, LHT model predicts a colorless, lightest T-odd stable particle (LTP), a heavy photon (A_H), which is a potential candidate for cold dark matter.

We are performing a search for effects from the LHT in dijet final states. The analysis involves performing simulations of Higgs events within the ATLAS framework. We are generating Littlest Higgs events with p-p collisions at 14 TeV CM energy using a CalcHep event generator. Validations of generated event samples have been done by analyzing the kinematics of jets in the final states. Following simulation and reconstruction of these validated samples with the ATLAS detector, I will present the expected sensitivity.

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Biology

Looking Beyond a 'Lack of Resources': Exploring the influence of institutional environments and structures on individual teaching practices in STEM

Most faculty have knowledge of evidence-based instructional practices and access to the resources to carry them out. Despite this, efforts to transform postsecondary instruction have had only modest success (e.g. AAAS, 2012). The underlying reasons for modest employment of evidence-based practices may be related to institutional environments and structures (Beach, Henderson, & Finkelstein, 2012; Henderson, Beach, & Finkelstein, 2011). The purpose of this project is to examine how one measure of institutional environment -- climate -- intersects with faculty teaching practices. The overarching research question guiding this study is: How do features of the academic workplace (organizational climate) influence individual teaching practices in STEM? To answer this question, we have gathered data from 889 instructors from 8 different institutions of higher education in the United States. We have gathered data using two published surveys: the Postsecondary Instructional Practice Survey (PIPS, Walter et al., 2016) and the Survey of Climate for Instructional Improvement (SCII, Walter et al., 2017). Analysis for this project is currently underway. We plan to conduct k-means cluster analysis to find patterns in faculty teaching practices and their perceptions of organizational climate. This process will reveal potential cluster 'profiles' membership for each faculty member in the study. We are determining the cluster profiles using 7 variables: including five SCII category scores (1) leadership, (2) collegiality, (3) resources, (4) respect for teaching, (5) organizational support and two PIPS category scores: (a) instructor-centered practice and (b) student-centered practice. Once we determine the right number of clusters, we will do inferential statistics to compare the clusters (profiles) for significant differences across demographic groups of interest. We expect our study to provide insight into the common barriers and levers to instructional innovation, including unpacking relationships between how the organization works and individual teaching practice.

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Computer Science

Metaprogramming In A Functional-Programming Based Web Framework

The world wide web has evolved gradually from a document-delivery platform to an architecture for distributed programming. This evolution is apparent in the set of interconnected languages and protocols that many web applications must take care of. In order to make web development faster and more dynamic, we need better languages. Ur/web is an example. Ur/Web is domain specific, statically typed functional programming language with a much simpler model for programming modern web applications. Ur/Web model is unified, modular and possess simple concurrency. In addition, Ur/Web has many advantages such as that code written in it does not

- suffer from any kinds of code injection attacks,
- return invalid HTML,
- attempt invalid SQL queries, etc.

The Ur/Web system was developed by Prof. Adam Chlipala at Massachusetts Institute of Technology. After consulting him regarding the language, we found that that developers don't find it very easy to write the code in the language. In order to solve this problem, and to make sure that developers don't miss out on the power of Ur/web programming language, there are metaprogramming libraries such as the Ur/Web Public Organizer, which is in the initial stages (<http://upo.csail.mit.edu>), and my project aims to add new significant metaprogramming components to the Ur/Web along similar lines and gather data on the usability of these advanced features. The project will also help the open source community with new aspect of the research in Ur/Web. The process is quite challenging as it requires expertise in types and functional programming languages.

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Business Marketing

EVALUATIONS OF "THICK" WOMEN MODEL WHEN CONSUMERS ARE (NOT) EXPOSED TO IMAGE OF THIN MODEL OR PLUS-SIZE MODEL

There has been an increasing presence of female celebrities and social influencers with "thick" body shapes (i.e., "voluptuous" with large breasts, small waist, large hips, thighs and buttocks). Social Judgment Theory, and Assimilation-Contrast Theory would suggest that as consumers are more exposed to thick models and plus-size models in advertisements, media, and culture, consumers would change their anchor positions, expand their latitude of acceptance, or adapt their expectations on a woman's body shape qualified to be a model/celebrity/social influencer. Since scholarly research on voluptuous or plus-size models was very limited, we investigated consumers' evaluations of thick women model's appearance and perceived potential commercial success when (not) exposed to image of idealized-thin or plus-size model.

After some pre-testing of model pictures, we deployed an experiment where a total of 229 college students participated in the online surveys (n=58 for "Thin & Thick Models' pictures shown side-by-side"; n=103 for "Thick Model only" questionnaire version; n=68 for "Plus-Size and Thick Models" survey). Factor Analysis on 18 measures/items yielded five factors, and ANOVA was subsequently performed on the factor scores.

The factor "Model's health, beauty and potential success in media" was significantly different across groups. As hypothesized, respondents exposed to the Thick model only rated the model least favorable on this factor (mean factor score of 0.22) while the group that viewed images of "Plus-Size and Thick Models" rated the Thick Model the most positive (-0.25). We also found that Factor #4 "voluptuous and curvy body" was strongest (-0.28) in the "Thin & Thick Models" experimental group, and weakest in the "Plus-Size & Thick Models" (0.26) group.

We concluded that consumers' evaluations of Thick model (in isolation) was not positive; but when paired with a Thin, or Plus-Size model, perceptions and evaluations of the Thick model's appearance improved significantly.

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Chemistry

Dielectric Constant of a Solvent Mixture: A Major Determinant of the Keto-Enol Tautomerization Equilibrium in Acetylacetone

Keto-enol tautomerism is a concept that examines the migration of protons amongst two conformational isomers, the keto and enol tautomer. β -diketones are a class of ketone compounds that exhibit this type of behavior. Acetylacetone (AcAc) is the simplest β -diketone and its enol tautomer is commonly used in organic, inorganic, and medicinal syntheses. To obtain a high yield of the enol tautomer the polarity of the solvent that AcAc is interacting with is important. This trend, known as Meyer's Rule, has been validated by previous research by studying the tautomerization equilibrium of AcAc in the presence of a single solvent. However, the study of the tautomerization equilibrium of AcAc in the presence of two solvents is not well-known. A part of this study has previously shown AcAc in the presence of two solvents has a correlation between the tautomerization equilibrium as a function of the varying molar ratios that is not always linear. Presently, this study has continued to investigate at other factors that may affect the tautomerization equilibrium. Another factor of interest is the dielectric constant of different binary solvent mixtures. By using proton (^1H) quantitative nuclear magnetic resonance (qNMR) spectroscopy, a novel spectroscopic technique, the relationship of the tautomerization equilibrium as function of the dielectric constant of the binary solvent mixture will be observed. The relative proton populations of each of the tautomers will be measured using both high-resolution (300 MHz) and low-resolution benchtop (82 MHz) NMR spectrometers, for comparison purposes. This study will reveal a linear correlation of the tautomerization equilibrium as a function of the dielectric constant of a binary solvent mixture; thus providing more insight on the dynamics of AcAc in the presence of two solvents.

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Marketing

Donor Perceptions on Terminology Used for the Sector and Its Effects on the Resulting Interactions between Individuals and CBOs

Individuals in the social sector are championing a name change, from 'nonprofit' to 'community benefit organization,' (CBO) in order for the name to be a more direct representation of the work that they do. While there are arguments on both sides, the impact of name change has escaped scholarly research attention. In this study, we looked at the use of the term 'nonprofit' and 'community benefit organization' on three important factors (namely, trust, donation intention, and perceived warmth of the organization) that determine organizational success and relationship with their stakeholders.

We employed two scenario-based surveys that described a well-known organization as either a 'community benefit organization' or a 'nonprofit' and made the term salient through repeated use. The scenario and questions were the same, except for the language that was used to describe the organization. All the questions that measure the constructs use a Likert scale, to measure how the participants feel about the term used. We used a convenience sample and a referral method to get responses to the survey.

As of abstract submission, 58 survey responses have been collected, 29 on each version. Based on independent sample t-tests that were run in the preliminary analysis, it has been shown that there is no significant difference between the use of either term for trust, donation intention, or perceived warmth. Within the classification items, there is a significant difference in how often people have donated in the past year and their donation intention ($F = 3.26$, $p = 0.05$). The sample, as it stands, is too small to give us reliable results. By April, we anticipate having at least 50 complete responses for each survey and will present the results from that analysis at CCRS.

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Psychology

From Caution to College: The Effects on Veterans with Self-Reported Trauma Symptoms and Sharing their Experiences with The Campus Community

Since 2001, 2.1 million U.S. troops have deployed as part of Operation Enduring Freedom (OEF, Afghanistan) and Operation Iraqi Freedom (OIF, Iraq). 3.3 million Global War on Terror (GWOT) veterans are expected in the U.S. by 2020. Currently, over 100,000 veterans are receiving GI benefits (GAO, 2014) to continue their education. GWOT conflicts present unique risk factors for trauma, however, (Hoge, 2010) and 40% of college student veterans have a mental or physical disability (Grossman, 2009). Student veterans are less likely to be engaged in college, are less satisfied, have lower social support, and are at greater risk of drop-out compared to non-military peers (Radford, 2009). Thus, many colleges have developed outreach efforts to meet their needs.

As part of a larger project on the effects of peer education efforts for college student veterans, 5 of 13 student veteran peer educators' transcriptions were assessed as a focus group. The assessment was on student veterans with self-reported trauma symptoms that shared their experiences with campus groups. The themes that were developed within this sub-group of 5 includes the following: 100% reported that sharing their military experiences with the campus community as peer educators helped to Increase Vulnerability in Interpersonal Interactions, enabling them to reach out to campus staff and students. 100% noted that sharing their stories enabled to Increase Support for Coping with Symptoms, allowing for the development of a stronger foundation in the college community. 100% noted that as a result of discussing their experiences with war and returning home, they Increased Motivation for Integration that previously afflicted them, allowing for improved coping with anxiety, stress and trauma. Although this may be a small sample, the findings do suggest that creating an atmosphere where student veterans can lead and serve may result in increased coping effects with symptoms of trauma.

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Computer Science

Web Based Machine Learning Tool and Interface

The objective of this project is to implement a prototype of a web based machine learning tool and interface. The project uses an apache web server to run machine learning jobs and a mySQL database to keep a repository of algorithms and data sets. A web service is deployed that allows for a user to run various machine learning algorithms on the catalog of data sets. Users additionally have the ability to modify and add algorithms or data sets to the repository. The results of a machine learning task are then returned to the user once finished on the web portal. Major challenge is how to keep track of user requests and return results in a timely manner, management and storage of the datasets and algorithms, and development of user interface. Currently, researchers who require use of the various machine learning algorithms must download and install a number of libraries and tools, then attempt to harmoniously mesh the tools, data sets, and algorithms together to run a machine learning task. This system will streamline that process, giving researchers in numerous fields a simple, clean , easy to use, but extremely powerful tool.

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Political Science

Public Perceptions of Exonerees from the Criminal Justice System

Individuals exonerated from the criminal justice system often struggle assimilating back into society and adjusting to the stigmatization associated with their release. This current study seeks to supplement past research by examining perceptions of exonerees through the use of quantitative surveys. Specifically, this study will assess the effect of exoneree race, reason for exoneration, participant gender, participation age, and participant race on perceptions on exonerees. A mock newspaper article and questionnaire were provided to university students after their consent was provided. There were nine different, randomly disseminated articles with adjusted exoneree race and reason for conviction. A total of 523 participants answered questions related to belief in exoneree guilt, estimation of age at the time of the crime, and amount of warranted monetary compensation. They also provided individual demographic information regarding race, gender, and age. Using linear regression modeling, several significant results were shown. Regarding the willingness to award compensation, a negative relationship was found with gender and a positive relationship was found with age. Men and older participants were predicted to award more money to exonerees. Additionally, the results indicated that a stronger belief in exoneree recidivism was predicted by a more dissident relationship of exoneree and participant race. Finally, preliminary results indicated a positive relationship between gender and estimated age at time of crime. Women are predicted to believe the exoneree was convicted at an older age. These results demonstrate an intricate interplay of demographic variables and perceptions of exonerees. Certain ethnicities and genders are more punitive in different scenarios. With the advent of the Innocence Project and other related wrongful-conviction programs increasing the rate of exonerations, it is necessary to understand how the public's perception of exonerees may affect their compensation awards and ability to reenter society.

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Biology

Genetic analysis of Persister cell formation in respiratory pathogen; *Pseudomonas aeruginosa*

Persister cells are a small percentage of the bacterial population (0.01-10%) that survive antibiotic therapy along with other stressors. They do this without undergoing any genetic change, only phenotypic variation. The exact mechanisms of persister cell formation are still not completely understood. We are in the process of identifying genes important for persister cell formation in a highly virulent respiratory pathogen, *Pseudomonas aeruginosa*. This organism is a major health concern, especially since antibiotic resistance is on the rise. We found high levels of differentially gene expression in persister cells through RNA sequencing. Interestingly, we found more genes were actually upregulated compared to downregulated. These results indicate that previously held ideas about persister cell dormancy are debatable. We quantified persister cell formation in selected mutants by directly evaluating the number of colony forming units (CFUs). Selected hits included pyocin synthesis genes, where mutants failed to form any persister cells. This was suggested by our RNA-seq data. We characterized the role of two genes, PA3819 and gshA, as both of these genes were upregulated in persister cells. We assayed physiological and biochemical functions including pyocyanin production, biofilm formation, and motility of both mutants in order to characterize the role of these genes within the cell. The knowledge derived from these studies will help identify better targets for treatment of *P. aeruginosa* acute infections, chronic infections, and post-treatment relapses.

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History

The Americanization of Fresno, California 1914-1930

At the turn of the century, California was home to thousands of immigrants.

In 1912, Simon Lubin dreamt of creating an organization that would aid immigrants in the areas of housing, health, and Americanization. That dream became a reality in 1913, and the Commission on Immigration and Housing of California was born. This was an agency that created a state-wide program that sought to help all of California's many immigrant groups, despite the Nativist sentiments that rose up as WW1 raged on.

Nearly 100 years later, we are again seeing an increased fear of immigrants and even the repetition of old campaign slogans. It is important to understand our past approaches to immigrants, so that we can make informed decisions about our future approaches.

My research looks at how Fresno, California was involved in the California Americanization campaign, from the outset. The story of Fresno's participation gives a fresh perspective to the Americanization story told in current literature, which is saturated by stories of Los Angeles and discrimination against Mexican Americans. While these accounts are important, the narrow focus often leads to misinterpretation of the Americanization initiative promoted by the Commission on Immigration and Housing of California.

Through stories of Fresno's elementary schools, Women's clubs, and typical citizens, I will expand on the Commission on Immigration and Housing of California's Americanization work.

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Department of Mathematics

Modeling Conditional Variance in Financial Times Series using Bayesian Methods

Studying variability in financial market is very important because it directly relates to prediction. In financial econometrics, modeling conditional variance (or volatility) has been one of the most active areas of research. In this study, we examine the conditional variance model under Bayesian methodology and compare it with that of frequentist approach. While frequentist statistics uses only the data at hand to make inference, Bayesian statistics is highly influenced by the use a posterior probability, that is, a conditional probability of a future event drawn from relevant historical evidence. Many empirical studies claim that Bayesian statistics often has an advantage compared to frequentist statistics when analyzing financial and econometric activity. We used several foreign exchange rate datasets to model conditional variance under both Bayesian and frequentist methods. The results show that the Bayesian conditional variance performs better.

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Biology

Are All Cities Created Equal? The Truth is Not Self-Evident

Urbanization is a major driver of biodiversity loss, often favoring only a few native species and excluding others. though mechanisms of this biotic filtering remain unclear. We ask if filtering occurs similarly in the cities of Fresno, California, Tucson, Arizona, and Phoenix, Arizona.

Point count projects have provided species checklists and site-specific bird counts. Preliminary analyses have focused on species lists, using Jaccard's index for similarity, t-tests for continuous traits and Chi-square tests for distributions of nominal traits, such as dietary guild and migratory status.

Jaccard's indices show that species pools are more similar than urban bird communities. Indices are lower between urban communities (Fresno-Phoenix: 0.376, Fresno-Tucson: 0.293, Tucson-Phoenix: 0.581) than between pools (F-P: 0.595, F-T: 0.532, T-P: 0.733) in every pairwise comparison. Fresno harbors the fewest species, and exhibits the strongest trait-based filtering. The urban community differs in dietary traits from the pool in Fresno (Chi-square $p=0.002$, $df=8$), but not Phoenix ($p=0.65$, $df=8$), nor Tucson ($p=0.98$, $df=8$). A similar pattern emerges in migratory status. However, filtering does not appear to be taxonomic, as the phylogenetic signal of urban occurrence is not significant in any of the cities.. Data collection is underway for additional traits, such as reproductive effort, foraging strategy, body size, and brain size, which will be analyzed with similar methods (t-tests and Chi-squared tests).

Similarity between cities and their species pools follows a water use gradient; cities with less water use harbor bird communities more similar to their species pool. We propose that this is due to differences in urban habitat structure, i.e., more mesic vegetation in Fresno contrasting with arid native habitats. Results confirm findings that cities may not homogenize communities as suspected, and point to the potential for large, dense cities to retain native species through careful water use and design of urban habitats.

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Chemistry

REDESIGNING A PHYSICAL SCIENCE COURSE FOR ENHANCED PRE-SERVICE TEACHER UNDERSTANDING

The Next Generation Science Standards (NGSS) and the California Department of Education 2015-2016 Draft Science Framework (DSF) call for a multi-faceted approach to K-12 science instruction and assessment that integrates disciplinary core ideas, crosscutting concepts, and scientific practices. Such an approach has important implications for teacher preparation at the college level. Most college science instruction for pre-service teachers predominantly focuses on conceptual development and provides infrequent opportunities for students to explore crosscutting concepts and to engage in authentic scientific practices. For example, Physical Science courses rarely go beyond disciplinary explanations of scientific phenomena, with many courses divided between Chemistry and Physics. Such approaches alongside disciplinary assessments encourage fragmented understanding of scientific phenomena. In light of the expectations of the NGSS and the DSF, new approaches to college science instruction are needed for pre-service teachers.

This presentation will discuss initial research findings from a mixed method study on the redesign of a Physical Science course that targets 170 pre-service teachers' understanding of scientific phenomena from both disciplinary and integrated perspectives. Six open response assessment items and corresponding rubrics focused on scientific phenomena were created. These six items were split evenly across chemistry, physics, and physical science. Rubrics for these items were developed and scored with assessment practices corresponding to the DSF.

Overall, our findings from these items and rubrics show improvement in student understanding on some phenomena, but generally many incorrect, non-normative ideas remain after a semester of instruction.

This presentation will discuss these findings in light of important implications for how we prepare pre-service teachers for the demands of NGSS and the DSF.

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Physics

Analysis of Thermal Properties of Nd-doped $\text{PrOs}_4\text{Sb}_{12}$ via Measurements of Specific Heat

Superconductors have the potential for a wide range of industrial applications such as power generation, electronics, and transportation. The compounds $\text{PrOs}_4\text{Sb}_{12}$ and $\text{NdOs}_4\text{Sb}_{12}$ have attracted interest due to their exotic low temperature properties. At low temperatures, the Neodymium compound becomes ferromagnetic, while the Praseodymium compound exhibits unconventional heavy-fermion superconductivity. The series of Nd-doped $\text{PrOs}_4\text{Sb}_{12}$ compounds is being studied in order to understand the interaction between these effects. Previous studies have shown that there is competition between the superconducting and ferromagnetic effects in the doped samples and that for particular concentrations of Nd and Pr, the two phenomena are present simultaneously. Understanding the behavior of these materials may help inform the search for new superconducting materials that can tolerate higher magnetic fields. In order to understand this system, it is necessary to characterize the normal-state behavior. The molar specific heat of Nd-doped $\text{PrOs}_4\text{Sb}_{12}$ was measured in the temperature range of approximately 10 - 300 K, and thermodynamic parameters of the sample were extracted from the specific heat data, including the Debye Temperature, Einstein Temperature, and electronic specific heat coefficient. These provide information about the properties of the lattice and conduction electrons, and the evolution of these properties with respect to the Nd concentration can then be determined. The results of molar specific heat measurements and their analysis will be presented.

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Management

The Influence of Differing Work Schedules Among Cohabiting and Dual Earning Couples on Relationship, Job, and Life Satisfaction

Seventy percent of employed adults work something other than the standard 35-40 hours per week, scheduled between 8 a.m.- 5 p.m on weekdays (Presser, 2003). According to the 2009 Bureau of Labor Statistics' population survey, in 67% of couples, both members of the couple were employed. When combined, these two points indicate that the number of couples where each partner works a different schedule is increasing. Given the new trend, the objective of this study is to determine how differing work schedules impact dual-earning, cohabiting couples' relationship, job, and life satisfaction.

We hypothesize that relationship, job, and life satisfaction will be lower for both partners in couples working differing schedules, such that the greater the difference in schedules, the greater the dissatisfaction in all domains. The study is conducted via an online survey distributed to various working professionals. Data collection is currently underway. Responses from couples will be analyzed following data collection. Results and the relevant implications will be discussed.

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Public Health, EOHS

PAHs and Black carbons emitted from cooking activities

There are many human activities that increase air pollution, such as use of internal combustion engine, and combustion like smoking and cooking in or near residences. Combustion from cooking activities can increase the human exposure to different types of air pollutants. About 3 billion people cook and heat their homes with unapproved methods using open fires and simple stoves to burn solid fuels such as wood, animal dung, coal, and crop waste all over the world. As a result over 4 million people die annually from illnesses that are caused from being exposed to the produced air pollution. Using open fires and solid fuels lead to the release of polycyclic aromatic hydrocarbons (PAHs), and black carbon. To examine the levels of indoor and outdoor air quality affected from the different domestic combustion processes, emission from different cooking methods were compared. Methods used for sampling included: Barbecue, Teppanyaki, and steaming/boiling. Using two PAHs measuring devices at different barbecue times, the average exposure during a barbecue was 36.7ng/m³ and 9.6ng/m³. Black carbon average was 1,983ng/m³ for all sessions. Numbers would be much higher if Barbecue was conducted in a closed quarters with no air flow. Steaming/boiling was the method that produced the least amount of particulate matter substances with PAHs averages of 0 and black carbon of 172 ng/m³. Teppanyaki itself would increase human exposure greatly because of the smoke from burning oil is in close proximity to chefs and guests. The highest average of PAHs was about 333 ng/m³ and average of black carbon was 2,448 ng/m³ when bacon was overcooked and burnt on a panini grill. Appropriate operation of hoods and use of ventilation would minimize the exposure.

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DEVELOPING A TRANSIT DAILY DEMAND PROFILE FOR FRESNO: IMPACTS OF GEOGRAPHY, TIME AND TRANSPORTATION MODES

Transit systems represent one particularly promising solution for addressing challenges of urban transportation systems. Designing efficient transportation systems requires robust estimates of hourly passenger demand, known as daily demand profiles. Several factors affect distributions of daily demand profiles, including geography (e.g. climate, ...), time (e.g. month, weekday, weekend, ...) and transportation mode (e.g. walk, bike, bus, car, ...). The objective of this research involves identifying a robust daily demand profile for urban transit ridership in Fresno, CA.

In this work, five different data sources were analyzed to determine a suitable daily demand profile for urban transit ridership in Fresno, CA. These data sources are: 1) National Household Travel Survey (NHTS); 2) American Time Use Survey (ATUS); 3) California Household Travel Survey (CAHTS); 4) local transit ridership; and 5) local traffic counts. Using these data sources, different daily demand profiles were estimated for different: a) geographic regions (US national, California state, and City of Fresno); b) days (weekdays and weekends); and c) transportation modes (all modes, highway traffic, transit, and bus lines). Furthermore, results from these data sources were contrasted against the daily demand profile being currently utilized.

In total, more than 30 different demand profiles were estimated and analyzed. The daily demand profiles were analyzed graphically, as well as statistically using Chi-Square Distribution Tests. The results indicate that: i) the currently utilized daily demand profile does not provide good estimates for local transit ridership, ii) local demand profiles are generally more suitable for estimating weekday transit demand profiles than state and national ones, and iii) national and state weekend demand profiles are similar to local weekend demand profiles. Results of this work provide local planning and transit agencies with valuable information to develop more robust estimates of transit ridership demand profiles, and enable them to design more efficient transit systems.

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Management

The Impact of Product Attributes, Purchase Involvement, and Delivery Time on the Concept of "Transaction Gratification" in Online Purchases

As e-retailing continues to grow, marketers need to understand how consumers derive gratification from online purchases to enhance the customers' shopping experience. Katerattanakul's research suggests that, along with deriving gratification from the consumption of the product, consumers making online purchases derive gratification from enjoyment in the transaction (2002). While there were several studies on consumption gratification (Triantafillidou and Siomkos, 2014; Galak and Loewenstein, 2013), we have found limited literature on the concept of "transaction gratification". Hence, we investigated how perceived novelty and scarcity of the product purchased, level of purchase involvement, and shipping time (or wait time to receive the product) impacted transaction gratification.

Several Fresno State professors helped email online survey invitations to their classes. Participants selected one of four chips offers along with other purchase and product information (Frito-Lay provided the chips gratis); then rated their "transaction experience" (via six measures), perceived novelty and scarcity of the product they selected/"purchased" (via 8 rating items), and gauged their level of purchase involvement (via 7 measures). Actual shipping time was computed in fraction of days by the interval between survey completion and delivery time stated in the questionnaire. Respondents also rated their perceived wait time.

We performed multivariate analysis of covariance (MANCOVA) on 120 responses (more data expected next week), and found that perceived novelty of the product selected and level of "purchase" involvement significantly impacted transaction gratification (Wilks Lambda in each case < 0.05). Specifically, 3 of 5 perceived novelty measures ($p < .05$), and 3 of 7 purchase involvement measures ($p < .05$) had significant impact on overall transaction gratification. For each of these significant novelty or involvement measures, we further examined which of the six transaction gratification items was significantly impacted.

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Criminology

How do police build rapport? Examining officer stated verbal techniques and their effectiveness

Investigative interviewing guidelines recommend building rapport with witnesses and victims of crime, however little to no research has examined how law enforcement build rapport. The objectives of the current study are (1) to examine what verbal techniques they state they use, and (2) the effectiveness of said techniques. We gathered 85 police officers from four California police departments. As part of a larger study, after interviewing a mock witness the officers were given a questionnaire to complete. The questionnaire included a question "How do you typically build rapport during an investigative interview with a witness?" Additionally, for each technique we asked the officers to indicate how effective the technique is at building rapport in their experience (1 = not effective, 7 = very effective).

The open-ended question mentioned above was coded based on categories from previous research and the answers provided. Addressing objectives (1) and (2), the responses reported by the proportion of the officers and with effectiveness in parentheses are as follows: 49% stated discussing common interests (5.5), 38% use self-disclosure (5.8), 33% show concern (5.3), 20% ask about the witness' life (5.2), 15% use empathy (5.9), 12% explain the process of the investigation (5.7), 11% talk about things other than the crime and investigation (5.7), and 8% use humor (5.4). This research is the first step examining how officers state they build rapport and how effective these techniques are. Not surprisingly officers believed the techniques they use are effective. Future research needs to examine what they actually do in interviews, and not just what they say that they do to build rapport.

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Civil Engineering

Understanding Travel Behavior Using Data Fusion Methods

Understanding and modeling of travel behavior is essential for planning and operation of efficient transportation systems. Vehicle miles travelled (VMT) is a widely used measure for analysis of travel behavior trends. Recently, there have been unprecedented changes in VMT trends in the US, where they plateaued then declined. These changes may be due to increased modal shares of carpooling and other non-automobile transportation modes, which could be proven by increasing person miles traveled (PMT) trends. This theory, however, is difficult to prove because PMT estimates are calculated based on periodic surveys conducted only every 5 to 8 years. Accordingly, this research investigates the possibility of developing annual PMT trend estimates using data fusion methods.

Different travel measures were estimated using four different data sources utilized in this work: 1) PMT, VMT, person minutes travelled (PmT), person commute minutes travelled (PcmT), and relationships between these measures estimated from the periodic National Household Travel Survey (NHTS); 2) VMT measures estimated from the annual Highway Performance Monitoring System (HPMS); 3) PmT measures estimated from the annual American Time Use Survey (ATUS); and 4) PcmT measures estimated from the annual American Community Survey (ACS). In addition to basic code, software packages such MS Access and MS SQL Server were utilized in this work. Data fusion algorithms were developed to estimate annual PMT values from these different measures.

Results of this work indicated: 1) estimated measures from the different data sources were highly consistent, with single-digit percentage differences; 2) developed data fusion algorithm proved valuable for estimating annual PMT; and 3) data fusion algorithms are effective in overcoming data limitations of periodic data sources. This work provides a valuable, novel approach that can be utilized in further studies for other travel measures and using other datasets to estimate high priority travel behavior information needs.

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Department of Biology

THE IMPACT OF DIFFERENT INSTRUCTIONAL STRATEGIES ON STUDENTS' UNDERSTANDING ABOUT THE CELL CYCLE IN A GENERAL EDUCATION BIOLOGY COURSE

Several studies have documented gains in students' cell cycle understanding after instruction; however, these studies do not use consistent research methods and often do not use valid and reliable surveys to document exactly what students know. This makes it difficult to compare findings across studies, leaving instructors without clear recommendations for how to effectively teach the cell cycle. The goal of this study was to learn more about college students' misconceptions about the cell cycle and how those ideas change after different learning experiences. Students from six laboratory sections of a general education biology laboratory course were received one of three different instructional strategies (three sections for each of 2 TAs; n=24 students per section; N=144). We surveyed students' knowledge about mitosis and meiosis pre- and post-instruction using a 14-item survey (Sesli & Kara, 2013) to measure their knowledge of the cell cycle. Two lab sections experienced a magnetic bead modeling kit activity. Two lab sections experienced a role-playing game, wherein students went outside and acted as chromatids and chromosomes to enact the sequence of events in the cell cycle. We used colored baseball caps and provided handouts to guide students through the steps of mitosis and meiosis. The final instructional setting was a 5E lesson plan. This setting included distinct phases of Engage, Explore, Explain, Elaborate and Evaluate activities during instruction. This method encouraged students to make concept maps of their prior knowledge about cell cycle and add information as and when they learned new information throughout the lesson. We began data collection for this study in February 2017 and we are currently analyzing results to explore patterns in student understanding. This analysis includes completing descriptive and inferential statistics to understand the impact of instruction on student learning outcomes across the three instructional conditions.

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Chemistry

3-O-Aminoalkyl-3',4',5'-Trimethoxyflavonols as Anti-Prostate Cancer Agents

Flavonoids are known as part of nutraceuticals due to various health and medicinal benefits. The focus of this study is on flavonols, a big subgroup of flavonoids. The anti-cancer activity of several naturally occurring flavonols (e.g. fisetin and quercetin) has been demonstrated in vitro and in vivo. 3',4',5'-Trimethoxyflavonol, a synthetic flavonol, is more potent than fisetin and quercetin in suppressing prostate cancer cell growth. Our earlier study indicates that incorporation of a dibutylamino group to the 3-OH group of 3',4'-dimethoxyflavonol through a three- to five-carbon linker leads to the optimal derivatives with up to 292-fold enhanced potency as compared with the parent flavonol. Encouraged by these promising results, this study aims to further increase the potency 3',4',5'-trimethoxyflavonol via incorporation of an aminoalkyl group to 3-OH. Twelve 3-O-aminoalkyl-3',4',5'-trimethoxyflavonols have been successfully synthesized through aldol condensation followed by Algar-Flynn-Oyamada (AFO) reaction, O-alkylation, and N-alkylation. Their structures were characterized by interpreting the ¹H and ¹³C NMR spectra. Their anti-proliferative activity towards three human prostate cancer cell lines was assessed by WST-1 proliferation assay. Our results indicate that eight out of twelve 3-O-aminoalkyl-3',4',5'-trimethoxyflavonols are significantly more potent than the parent 3',4',5'-trimethoxyflavonol in inhibiting the cell proliferation in three human prostate cancer cell models.

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Biology

Is What They Say What They Do?: Comparing Observed and Self-Reported Teaching Practices of Faculty in STEM

Our study examines the teaching practices of faculty in the College of Science and Mathematics at Fresno State. Since January 2015, the Fresno State Faculty Learning for Outcomes and Knowledge (FLOCK) research group has gathered teaching practice survey data (Postsecondary Instructional Practices Survey, PIPS; Walter et al., 2016) and observational data (Classroom Observation Protocol for Undergraduate STEM, COPUS; Smith et al., 2013) to describe the teaching practices of faculty. The two overarching research questions guiding this study are: (a) What is the nature of STEM faculty teaching practices at Fresno State and (b) how do faculty self-report of teaching practices compare to observed teaching practices? To answer these research questions, we explored the teaching practices of part-and full-time faculty from the College of Science and Mathematics at Fresno State. Faculty were surveyed using the PIPS (n=56) and observed using the COPUS (n=82) to uncover the nature of their teaching practices. We plan to use inferential statistics to answer the research questions as we will be collecting data through the end of Spring 2017. However, we have performed a tentative k-means cluster analysis of the COPUS codes across our classroom observations to identify common teaching practice profiles. Five groups, which we call profiles, emerged from this analysis; they represent the most common types of instructional practices enacted in STEM classrooms observed for this sample. Three of the five profiles can be described as having a lecture-based instructional style, since lecture was observed in around 80% of the 2-min intervals in the class periods of instructors in these profiles (n=45). Unlike work by Lund et al. (2015), we do not have a group of faculty characterized by exclusively lecture.

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Criminology

Do perceptions change when the police are to blame? Examining perceptions of monetary compensation for exonerees

Little is known about the factors that influence perceptions of exonerees receiving compensation. Past research has found that exonerees who falsely confess are stigmatized more than others (Clow & Leach, 2013). Further Mandracchia, Shaw, and Morgan (2013) found that education about public policy issues influenced student attitudes towards criminal justice issues. This literature contributed to the aims of the current study: to assess 1) the impact of the leading causes of wrongful convictions on perceptions of exonerees, and 2) the impact of participants' area of education on these perceptions.

Three hundred and ninety-one university students participated in the study. Participants were randomly assigned to read one of three fictitious news articles. The news article was modified from past research (Savage, 2013; Savage, Clow, Schuller, & Ricciardelli, 2013), and reported the exoneration of a wrongfully convicted man who had been released from prison after serving 14 years for sexual assault. The cause of the exoneree's wrongful conviction (false confession, eyewitness misidentification, police misconduct) was manipulated within the study to produce three versions of the article. After reading the article participants were then asked to fill out a survey containing questions regarding perceptions of assistance for the exoneree as well as a demographic questionnaire.

Results for study aim one indicated that participants who read the police misconduct article awarded the most money to the exoneree compared to the other two reasons for the wrongful conviction. While the police misconduct condition significantly differed from the other conditions, the false confession and eyewitness testimony conditions did not significantly differ from each other. For study aim two results indicated few significant differences between criminology and non-criminology majors which indicates that area of education does not impact perceptions of monetary compensation for exonerees. While past research has found exonerees who falsely confess are stigmatized more than others, results from the current study suggest that stigma may not impact perceptions of monetary compensation.

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Kinesiology

Bigger, Faster, Stronger... Safer? The Use of Self-Talk Interventions on Barbell Back Squat Kinematics

The purpose of this study was to explore the influence of motivational and instructional self-talk on barbell back squat kinematics during fatiguing workouts. Fatiguing workouts (e.g., CrossFit, P90X) are popular amongst individuals who look to become stronger, faster, or just more physically fit (Bergeron et al., 2011). In the interest of finishing the workout quickly, form and technique may be compromised. This can increase the risk of injury and reduce performance output. Self-talk may assist individuals in maintaining proper form when engaging in fatiguing workouts. Experienced resistance trained males (20-34 years old; $M=24.26$, $SD=3.56$) participated in a familiarization session to determine their 1RM. Participants were then randomized into a motivational self-talk, instructional self-talk, or control group; intervention groups completed a brief, self-talk specific intervention, while the control group learned about the benefits of squatting. All participants completed a timed highly fatiguing resistance training workout (Hooper et al., 2014) using 75% of their 1RM. Self-talk or thoughts (control group) were recorded after each set. Because rest times during the protocol were not controlled, total exercise time was entered as a covariate in all subsequent analyses. Separate 3 x 6 (group x time) repeated measures ANCOVAs with Tukey post-hoc evaluated changes in hip and knee angles. An interaction effect for hip angle occurred whereby at the final repetition the control group demonstrated a lower hip flexion angle vs. instructional self-talk (self-talk: $M=71$ $SD=12.68$; control $M=52.92$, $SD= 8.49$, $p=0.05$). The reduced hip flexion angle is consistent with poor squat form. As expected, 86% of all self-talk used by the instructional group included cues related to proper form. Results suggest that the use of instructional self-talk during squatting may help with maintaining proper form, thereby lowering the risk of injury.

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Mathematics

On a Spectral Gap Characterization for Scalar Type Spectral Operators

A characterization of spectral gap at zero, known to hold for bounded scalar type spectral operators, is shown to naturally transfer to the unbounded case. Encompassing normal, in particular, self-adjoint operators in a complex Hilbert space as a special case, the result is of interest for theoretical quantum mechanics.

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Mathematics

A Categorical Model of Virtual Singular Braids

A mathematical braid is a set of strands passing between two parallel planes in space, such that each strand passes through any parallel plane that lies between the two planes exactly once. The set of all braids with n strands has the algebraic structure of a group, called the braid group on n strands. This algebraic structure arises by defining multiplication for braids as stacking one braid on top of another and gluing together their endpoints. In this talk, we expand this structure to include virtual singular braids. The resulting algebraic structure is that of a monoid, called the virtual singular braid monoid on n strands. We provide a new presentation of the resulting monoid using generators and relations. We also show that the virtual singular braid monoid can be described in terms of a tensor category, freely generated by four morphisms and one object. Three of these morphisms are abstract presentations of the generators of the virtual singular braid monoid. The fourth morphism corresponds to a transposition in the symmetric group. We prove that the set of morphisms of this category is isomorphic to the virtual singular braid monoid on n strands.

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Electrical and computer engineering

Automatic Indoor Lighting System.

Automation is no longer the future; it is already present in the time we live in. But it does not mean that the systems that already exist are beyond improvement. Previously, we have seen many successful implementations of automation. However, the problems are they are not in true sense automated. These systems rely on a significant amount of human involvement. Neither are they very cost efficient. Popular offerings like Philips and others have their perks, like controlling from the smartphone, IFTTT (if this then that) integration for some simple tasks, but their price is beyond justification, and also the systems themselves aren't really smart. I have tried to present a scheme that addresses the aforementioned problems.

I have tried to address the issue by attaching an LDR (light dependent resistor) and a PIR (passive infrared sensor) sensor to an Arduino board; they work simultaneously to provide the best automation.

The LDR switches on the lamp when the ambient light is low. The PIR sensor switches on the lamp when there is a human presence in the area of focus. Also, there is a hold-on point, i.e. the lamp stays on for a fixed amount of time even if there is no movement in the room, so as to decrease false switching, and increase the active life of the lamp. I have also employed an algorithm such that it learns how much time the place remains inactive every day, and it modifies the hold on time according to the data collected in previous weeks.

I have employed this scheme only on lighting equipments, but its applications can be extrapolated to devices such as air conditioners and room heaters.

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Electrical and Computer Engineering

An Efficient Deterministic Edge Traffic Distribution Network-on-chip Routing Algorithm Design

1. Introduction

In previous decades, computer systems have advanced from relatively simple single-core CISC and RISC architectures to much more complex multi-core system-on-chip designs with higher communication requirements. Network-on-chip (NOC) architectures emerged as promising solutions. To address the deficiencies of the existing routing algorithms, a new deterministic Edge Traffic Distribution (ETD) routing is proposed.

2. The Proposed ETD Routing

The traffic which involves the edge routers will be directed to move along the edges first instead of entering into the center of the network. Four possible traffic patterns must be taken into consideration: 1. Edge router to edge router; 2. Edge router to internal router; 3. Internal router to edge router; 4. Internal router to internal router. The primary goal is to distribute the traffic from center to the outer edges of the network in order to alleviate the problems of centric congestion and deadlocks.

3. Simulation and Results

The proposed ETD Routing, along with the most popular routing algorithms, XY, OE and DyAD routings are implemented and simulated on a 2D 6X6 mesh topology in Nirgam 2.1 network-on-chip simulator. Compared to the existing XY, OE and DyAD routings, at low network loads, the proposed ETD routing consumes 5.46%, 32.40%, and 4.96% less power while reducing latency by 2.27%, 29.75% and 2.69% respectively. At medium loads, power savings are 3.10%, 13.28%, and 11.79% while reducing latency by 1.86%, 106.49%, and 67.94%, respectively. At high network loads power consumption is reduced by 3.62%, 12.62%, and 11.01% and latency is reduced by 4.81%, 156.73%, and 154.74%, respectively.

4. Conclusion

The proposed ETD routing focuses on the problems current NOC architectures are facing. Simulation results show the proposed algorithm performs better in power consumption and communication latency compared to the existing routings. An IEEE journal paper is prepared based on the simulation results.

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Chemistry

Synthesis towards 7-O-substituted-3,3',4'-O-trimethylfisetins for the exploration of their Anti-cancer potential

Prostate cancer is the most common cancer among men. Early stage prostate cancer is localized and treatable with hormone therapies. So far no effective treatment is available for metastatic, advanced prostate cancer. Fisetin, a naturally occurring plant flavonoid, has been revealed to possess potential in treating prostate cancer according to in vitro and in vivo studies. However, fisetin is known to merely have moderate potency towards prostate cancer cells. Another drawback to fisetin is its low bioavailability. Structurally, fisetin is characteristic of four phenolic hydroxyl groups. Previous studies indicate the chemical modifications on the hydroxyl groups (OH) of flavonoids can overcome, at least partially, the drawback. The overarching goal for this project is to explore the potential of 7-O-substituted-3,3',4'-O-trimethylfisetins as anticancer agents. This study aspires to explore a practical synthetic method for these target products. 7-O-Benzyl-3,3',4'-O-trimethylflavonol, the common intermediate to 7-O-substituted-3,3',4'-O-trimethylfisetins, has been successfully synthesized through aldol condensation followed by Algar-Flynn-Oyamada (AFO) reactions. The one-pot reaction has been identified as the optimal method considering the time efficacy and total yield. The optimal conditions, including reaction time, reaction temperature, and purification procedures, for the one-pot synthesis have been intensively explored. All synthesized compounds have been characterized by ¹H and ¹³C NMR data.

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Biology

Characterizing the fecal microbiome and resistome of American Crows in Fresno, CA and Davis, CA.

The Centers for Disease Control and Prevention (CDC) estimates that over 2 million people per year acquire antibiotic resistant infections, with a mortality of approximately 23,000 annually, and 20 billion dollars in annual health care cost.

In this study we focus on the reservoir *Corvus branchyrynchos*, the American Crow. Crows are well adapted to urban areas and are well known scavengers which increases the opportunity to incorporate drug resistant bacteria into their microbiota. These bacteria can then be deposited into human living areas by defecating birds. The objective of this study is to determine the relative abundance of microorganisms in the fecal matter of the crow, as well as what antibiotic resistance can be found in this population.

We are testing two urban locations: Fresno, CA and Davis, CA. We hypothesize the two crow populations will display significantly different incidents of antibiotic resistance and pathogenic bacteria.

We collect at least five fecal samples from the three locations for two three week periods. We then extract DNA using the PowerSoil DNA Extraction Kit (MoBio). Microbiome sequencing is performed on the Illumina MiSeq and the analysis performed using the open-source bioinformatics pipeline QIIME. The remaining DNA is enzyme digested using *Sau3A*I into the size range of antibiotic cassettes and ligated into vector pZE21. The vector is then transformed into competent *E. coli* and grown on various antibiotics to determine resistance.

We have identified multiple antibiotics in which bacteria from American Crow fecal samples grew readily. These drugs include vancomycin, meropenem, erythromycin and others. Based on 16S rDNA sequencing, we have identified *Enterococcus*, *Staphylococcus*, *Bacillus*, *Klebsiella*, and other species.

All of the organisms found are capable of causing infection in immune deficient patients. From our preliminary findings we conclude American Crows are reservoirs of antibiotic resistant pathogens.

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Mathematics

Symmetry of the power sum polynomials

The problem of finding formulas for sums of powers of natural numbers has been of interest to mathematicians for several centuries. Among these formulas is the well-known Faulhaber's formula, expressing the sums of powers as polynomials whose coefficients involve Bernoulli numbers. In this talk, we present a novel identity involving Bernoulli numbers and use it to prove symmetry of these polynomials. In addition, we make a few conjectures regarding the roots of these polynomials, and speculate on the asymptotic behavior of their graphs.

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Criminology

Pornography and Public Acceptance: A Step Toward Effective Regulation

Is pornography really harmful? Pornography has been the target of censorship for centuries. However, the types and medium of pornography change according to technology development, and so do people's attitude toward such materials. Challenging a popular feminist view of pornography regulation, stating sexually explicit materials encourage violence against women, this research attempt to examine an association between pornography acceptance and gender equality. The author argues that pornography acceptance is not necessarily an indicator of misogyny. This study also aims to reveal what pornography means to individuals, which should be the base of determining the degree of its censorship. The first half is secondary data analysis of two state-by-state datasets. The first is a national survey about whether people see pornography as harmful or not. The second is gender equality achievement index. The association between two datasets is examined. Furthermore, the 50 U.S. states are categorized based on their shared attitude toward pornography and gender equality. The second half is qualitative analysis of survey to 200 randomly chosen college students to investigate people's perceptions toward pornography. The survey contains questions evaluating what variables influence their attitude towards pornography. The statistical analysis found that the residents viewing pornography as less harmful were found to be associated with states achieving higher gender equality in the area of employment and opportunity. Moreover, the categorization of the 50 U.S. states found some states with a gap between governmental and citizens' perception toward pornography. The results of the survey compliment these findings and reveal how they define pornography. The study concludes that pornography acceptance is not associated with anti-feminism views. The significance of this study is highlighted in an investigation of how people define pornography because it can reduce a gap between governmental and citizens' attitudes toward pornography, which leads to more effective regulation.

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Chemistry

Towards Understanding of Peroxidation of Mammalian Sterols: Microwave-Assisted Synthesis of 7-Dehydrocholesterol Isomers

Molecules of biological importance, such as polyunsaturated fatty acids (PUFAs) and sterols are primary targets for the H-atom abstraction by a peroxy radical. This process, is known in biological sciences as lipid peroxidation. There is a growing consensus that products of lipid peroxidation plays a significant role in the pathophysiology of many human disorders. 7-Dehydrocholesterol (7-DHC), the biosynthetic precursor to cholesterol and vitamin D₃, plays a crucial role in the biochemistry of the Smith—Lemli—Opitz Syndrome (SLOS). Characteristic to SLOS patients are; increased levels of 7-DHC and lower than normal levels of cholesterol in the plasma. Correlating to various disabilities. The rate constant of peroxidation of 7-DHC is 200 times higher than that of cholesterol contributing to the evidence that links SLOS to peroxidation of 7-DHC. Pyrocholecalciferol (1) and isopyrocholecalciferol (2) are C-9 and C-10 diastereomers of 7-DHC where the hydrogen atom is attacked by the radical. The goal of our research is to understand the relationship between the structure and oxidation rate in 7-DHC and develop a practical synthesis of 1 and 2 by employing a thermal electrocyclic reaction of cholecalciferol (vitamin D₃). Optimization of reaction conditions, separation, and characterization of the compounds were deployed utilizing a new protocol using microwave reactor that allowed for full conversion of the substrate, significantly decreasing the reaction time (from 12 h to 30 min), and reduced the amount of solvent used by 90%. Additionally, product decomposition, despite high reaction temperature, was at undetectable levels. The structure of the products are similar making their chromatographic separation challenging. However, by using a gradient on column chromatography the compounds were separated.

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Chemistry

Diarylpentadienones as chemotherapeutics for prostate cancer: Structure-activity relationship studies

Curcumin is the major chemical component of *Curcuma longa* that has long been used as food seasoning and traditional medicine. Its anti-prostate cancer potential has been proven by in vitro cell-based experiments and in-vivo animal studies. However, its moderate potency and poor bioavailability make it as a lead compound rather than a FDA-approved therapeutics. Our research group has previously identified 1,5- bis(1-alkyl-1H-imidazol-2-yl)penta-1,4-diene-3-ones as a group of promising curcumin analogs possessing up to 200-fold greater potency than curcumin in prostate cancer cell models. However, one optimal analog only exhibits 2-10 folds increase in mouse plasma concentration.

To pave the avenue for optimization of this group of curcumin analogs as chemotherapeutics for the treatment of prostate cancer, the present research aims to systematically explore their structure-activity relationships on prostate cancer cell models. To achieve this aim, over ten new analogs have been synthesized to investigate the effects of the N1 substituent group of the imidazole rings and of the double bonds of the central linker on anti-proliferative potency. The Horner-Wadsworth-Emmons reaction was employed as the key step reaction for the synthesis of these curcumin analogs. The NMR data were used to characterize their chemical structures and the WST-1 cell proliferation assay was used to assess their potency in three prostate cancer cell lines. Our data showed that i) it is imperative to further improve the bioavailability of 1,5-bis(1-alkyl-1H-imidazol-2-yl)penta-1,4-diene-3-ones by introducing an appropriate metabolic stable group to N1 position because its potential metabolic product is inactive; ii) the double bonds in the central linker are necessary for the potency; and iii) an appropriate size of the N1 substituent of imidazole rings is important for the potency.

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Physics

Schwinger Effect for Non-Abelian Gauge Bosons

The Schwinger effect is the non-perturbative production of particles from vacuum. This effect is traditionally calculated for electron/positron pairs, but the electric field required to see this effect is astronomically huge. This work is a study of the Schwinger effect for the gauge bosons in an unbroken non-Abelian gauge theory (e.g. the gluons of QCD). Both constant "color electric" fields and "color magnetic" fields are considered as backgrounds. As in the Abelian Schwinger effect, it is found that there is production of "gluons" for the color electric field, but no particle production for the color magnetic field case. The exponential suppression of particle production due to the mass of the electron/positron in the Abelian Schwinger effect is not present due to the massless nature of the non-Abelian gauge bosons. Thus, the Schwinger effect for gluons should be physically more important as compared to the standard Schwinger effect for electrons/positrons. However, due to confinement the QCD length scale is significantly smaller than the corresponding QED length scale set by the mass of the electron, causing the magnitude of the critical QCD fields to actually be higher than the critical electromagnetic fields.

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SUBSIDENCE DETERMINATION ALONG NORTH-SOUTH CROSS-SECTION LINE IN CENTRAL VALLEY, CALIFORNIA

24 h monthly GNSS (Global Navigation Satellite System) data spanning 5 years from 8 CORS (Continuously Operating Reference Station) stations in Central Valley, California are processed and vertical velocities of the points are determined. To process GNSS data, online GNSS data processing service APPS (Automatic Precise Positioning Service) is used. GNSS data downloaded from NGS (National Geodetic Survey) CORS are analyzed and subsidence at these points is portrayed with graphics. It is revealed that elevation changes range from 5 mm uplift in the north to 163 mm subsidence in the southern part of the valley.

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Biology

**Effects of thermal stress on vitellogenin levels in the hemolymph of the anomuran crab
Petrolisthes cinctipes.**

Intertidal organisms, such as the porcelain crab, *Petrolisthes cinctipes*, are faced with rising temperature extremes that may interfere with their physiological performances. *P. cinctipes* inhabits the upper-mid intertidal zone and is regularly exposed during low tides. Increased abiotic stressors may interfere with many aspects of this organisms' physiology, including reproduction. Reproductive activity can be measured through the quantification of the yolk protein vitellogenin (Vg), found in hemolymph. Our development of an ELISA for *P. cinctipes* has allowed for quantification of hemolymph levels of Vg. Bi-monthly sampling revealed that *P. cinctipes* up-regulate their Vg production during new moon periods and were depressed during the full moon. In addition, Vg sampling of *P. cinctipes* showed that Vg levels are higher in fall and winter months, and low throughout early spring and summer. This decreased reproductive activity in summer months may be caused by temperature, day lengths, or both. To examine these factors, *P. cinctipes* were collected monthly throughout the summer and winter months. Crabs, collected near Fort Ross, CA, were transported to CSU Fresno where a pre-treatment hemolymph sample was drawn. Individuals were divided into 4 treatment groups to test the effects of day length and temperature. After a two-week exposure, a second hemolymph sample was made. Pre and post treatment hemolymph samples were analyzed for Vg levels by ELISA and compared using 2-way AVOVA. Results from crabs collected in summer months showed that crabs sustained low levels of Vg after exposure to thermal stress. Day length appeared to have a lesser affect on Vg levels.

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School Finance Reform, Student Success, and Educational Equity: School District-Level Analysis of California's New School Funding Formula

In recent years, the issue of school district funding has again risen to the forefront of education policy. New legislation in the state of California has reimagined the way school districts are funded. It is important for citizens to understand how their taxpayer dollars are being spent and ensure they are being spent in the most effective way. The purpose of this thesis is to evaluate how California's new Local Control Funding Formula (LCFF) impacts California school districts based on student achievement and whether it has impacted educational equity. Based on school district-level data from 2009 to 2015, an empirical model is employed to regress percent of graduates meeting UC/CSU requirements on the key variable indicating if LCFF was enacted, along with other control variables such as school district-level socioeconomic and demographic characteristics and funding sources. In addition, two empirical models are run separately to respectively estimate the effects of LCFF on high-poverty and low-poverty school districts. Preliminary results suggest significant and positive effects of LCFF on increasing percent of graduates meeting UC/CSU requirements. Results also show that LCFF has significant and higher impacts on increasing the percent of graduates meeting UC/CSU requirements for high-poverty school districts than low-poverty ones. The policy implications are that the success of the LCFF hinges on whether school districts are able to improve student success, especially those who are high need. Empirical evidence of reducing educational inequality supports LCFF as the promising education funding reforms in California.

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Psychology

Shooters: Psychological Characteristics in Shoot/No-Shoot Decisions

(a.) Shoot/no-shoot decisions are under increasing scrutiny nationwide. The present research addressed the ways in which individual psychological differences influence these decisions. (b.) In this study, images of adult male, adult female, and juvenile assailants presented direct threats to respondents with a pistol, a knife, or a glass bottle. Respondents were asked to indicate whether or not they would shoot in the presence of this threat. Respondents also completed the Carlson Psychological Inventory (CPS), the Interpersonal Reactivity Index (IRI), and the Dissociative Experiences Scale (DES). (c.) Results indicated no significant effect of empathy, as measured by the IRI, or of antisocial tendencies, as measured by the CPS, on the shoot/no-shoot performance of either sex. Tendencies toward dissociation, as measured by the DES, influenced the performance of males who shot; more dissociated men took significantly more time to fire. However, dissociation did not influence the performance of women. Sex and youth of the assailant had no effects on the shoot/no-shoot performance of either men or women, and oddly, weapon type had no effect on women's performance, although men were more likely to fire on an assailant of any age or sex armed with a gun or knife than a bottle. (d.) In this study, there was less influence of individual differences in empathy, antisocial tendencies, and dissociation than would have been anticipated from the literature. Also, women and men were more similar in their shoot/no-shoot responses than would generally have been anticipated. Finally, dissociation, a process generating a sense of unreality, caused men to hesitate in their shooting response. These results indicate the potential importance of assessing dissociation in candidates for law enforcement and armed security employment, and are discussed in terms of relevance for law enforcement training and for juridical proceedings in shoot/no-shoot cases.

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Kinesiology

RELATIVE RECRUITMENT OF THE VASTUS LATERALIS AND GLUTEUS MAXIMUS DURING FRONT SQUATS IN OLYMPIC WEIGHTLIFTERS

The sport of Olympic weightlifting consists of two lifts, the snatch and the clean and jerk. Front squats (FS) are an integral component of Olympic weightlifting programs because the required racking of the bar on the anterior deltoid and clavicle has significant carry-over toward strengthening the receiving position of the clean (Drechsler, 1998*). Twelve male subjects (age = 26.33 ± 4.23 yr; height = 175.84 ± 6.01 cm; body mass = 95.52 ± 11.33 kg) with Olympic weightlifting experience completed a FS one repetition maximum (1RM) test (mean 1RM = 151.58 ± 25.12 kg) in Session 1, then three single repetitions at 70% and 90% 1RM in Session 2. The corresponding EMG data (root mean square) at each load was normalized in relation to that recorded during the FS 1RM to allow for between-subjects comparisons. Repeated measures ANOVA revealed a higher relative recruitment ($p < 0.000$) for the VL (vs. GM) regardless of intensity and a higher relative recruitment at 90% 1RM intensity (vs. 70%) for both muscles ($p = 0.036$). There was no significant muscle by intensity interaction ($p = 0.121$). The results suggest that during FS the VL is always more recruited than the GM at both intensities, and that recruitment increased proportionally between the two percent loads (i.e., 70%, 90% 1RM). Therefore, coaches should always assign more hip than knee extensor auxiliary volume and the volume of both should decrease proportionally as FS training cycles shift from 70% 1RM to 90% 1RM intensities.

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Synergistic effect of Organic Chalcones on *C. elegans* and *M. incognita*

Plant Parasitic Nematodes (PPNs), like *Meloidogyne incognita*, are responsible for large monetary losses in USA agriculture and worldwide. Conventional nematicidal agents, such as methyl bromide, have been banned because of its toxic effects on humans and the environment. To find alternative strategies for a safe and effective nematicide, a series of organic chalcones were tested and our previous research findings have established chalcones (17 & 25) to be 100% effective against the model nematode *C. elegans* at concentrations of 10^{-4} M; chalcones belong to the flavonoid family of organic compounds. However, whether these two chalcones could work simultaneously to control nematodes with lower concentrations of chalcones has not been tested. The purpose of this research, is studying the nature of interactions (if any) between Chalcone 17 and 25 on the *C. elegans* using nematode based bioassays. Thus, work with *C. elegans* serves as a methodological and biological reference for work with *M. incognita*.

Initially, different concentrations of chalcone 17 & 25 were tested individually. Based on the single chalcone test results, we selected three concentrations (1×10^{-5} , 0.9×10^{-5} , and 0.8×10^{-5} M) of each 17 and 25 that caused mortality rate of 30%. To examine the nature of interaction between them, we performed assays where the concentration of Chalcone 17 that caused 30% mortality ($LD_{30}[A]$) was added to chalcone 25 with the same lethal concentration ($LD_{30}[B]$). If the chalcones $[A] + [B]$ have a simple additive effect, a mortality rate of around 60% would be observed, and synergistic if the mortality rate was significantly higher than 60%. Our results support a synergistic effect since the combination of chalcone 17 and chalcone 25 showed a mortality rate of 76%; this is two times higher mortality rate than when tested individual chalcones independently.

The results suggest that, although the cellular or physiological targets of these chalcones in the nematode are yet unknown, these chalcones could interact and destroy cellular or physiological functions more effectively. The present work may help us elucidate the nature of the killing effects of chalcones on nematodes.

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Mathematics

On Contractive and Expansive Mappings in Compact Metric Spaces

We examine the nature of weak contractions and expansions on a compact metric space. Inspired by the celebrated Banach Fixed-Point Theorem, we explore relaxing the contractiveness condition on the mapping to weak contractiveness, while strengthening the completeness condition on the space to compactness. We show, under the new conditions, that the fixed point for the mapping still exists and is unique. We also show that expansive mappings on a compact metric space are limited to isometries.

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Protein Expression and Structural Characterization of Lunasin: An Anti-Cancer Peptide

Lunasin is a unique 43-amino acid peptide naturally derived from seed grains such as amaranth and soybean. Lunasin has been shown to exhibit novel therapeutic properties such as cancer prevention, immunity support, heart health, and the disruption of abnormal inflammatory response. Experiments exploring the physiological effects of Lunasin have been well documented; however little is known concerning how Lunasin functions, and its therapeutic mechanism of action. Evidence suggests Lunasin participates in histone modification and gene regulation, but the lack of information on the structure and dynamics of the protein hinders our understanding of how Lunasin interacts with chromatin. Our research objective is to characterize the secondary structure of Lunasin by circular dichroism (CD) and solve the tertiary structure of the protein via solution state nuclear magnetic resonance (NMR) spectroscopy. We hypothesize that Lunasin has the ability to directly bind to DNA, through a functional binding turn motif, stabilized by an intramolecular disulfide bond. Specifically, we have developed a robust E.Coli (SHuffle) expression system, optimized for the production of isotopically enriched (^{15}N) Lunasin. This approach enables expression of ^{15}N -labeled Lunasin in mg quantities for three-dimensional structural determination. NMR and CD based structural characterization of Lunasin will be presented. We anticipate that the 3D structure of Lunasin can serve as a prototype for designing anticancer drugs in the future and can aid in peptide-based chemotherapeutics.

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Plant Science

Monitoring Soil Salinity in Alfalfa and 'Jose' tall wheatgrass fields using EM-38 soil Surveys and Developing Input Data for a Transient Hydro-salinity Computer Model

Soil salinity is a major factor affecting irrigated agriculture in today's world, especially in arid/ semi-arid regions like the Western San Joaquin Valley of California. In this region, both salinity and drainage can be limiting factors for agriculture. Soil salinity is a very dynamic property both spatially and temporally; thus, mapping at the field scale requires a rapid and reliable means of taking geospatial measurements.

Electromagnetic Induction (EM) survey data and prediction equations relating the apparent electrical conductivity (ECa) measured by the EM-38 to soil salinity (ECe) are important tools to assess the spatial variability of soil salinity in a field. This research is being conducted at the SJRIP (San Joaquin River Improvement Project) facility managed by Panoche Water District (Los Banos, California) where subsurface drainage water is re-used on ~6,000 acres of dedicated cropland, primarily sown to forages such as 'Jose' tall wheatgrass (*Thinopyrum ponticum* var. 'Jose' (TWG) and alfalfa (*Medicago sativa*) to reduce salt loading into the San Joaquin River. EM-38 soil salinity surveys were conducted in two alfalfa and two tall wheatgrass fields to monitor soil salinity in response to the salinity (ECw) and volume of applied drainage water. Soil samples taken to a depth of 120 cm (4 ft.) in 30 cm (1 ft.) increments for calibration of ECa data were analyzed for pH, ECe, gravimetric water content and saturation percentage. The average ECe for spring and fall 2016 samples was 12.5 to 19.5 dS/m for tall wheatgrass fields and 9.2 to 14.4 dS/m for alfalfa fields. GIS maps were developed depicting the spatial variability of salts in the fields. Data will be used for the refinement and validation of a computer model (CSUID-II) developed as a decision support tool to optimize soil leaching fractions for irrigation water of varying salinity levels, with the overall goal of improving the sustainability of forage production using saline waters in the SJRIP.

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Internal Medicine

Breaking Bad in California and Its Impact on Health Care

Introduction: Methamphetamine abuse (MA) is a serious public health issue nationally; however its impact on health care utilization has not been studied. The aim of the study is to document the health related consequences and burden of MA from a single tertiary care center in the Central Valley.

Methods: Data was derived from the Stimulant Associated Disease Database (SADD), a retrospective observational registry study at Community Regional Medical Center of patients with a positive urine drug screen for methamphetamine. Of 14,450 urine drug screens that were ordered in 2013, 2544 were positive (17.6%). A random sample of 1011 individual patient medical records were reviewed. Data was descriptively analyzed.

Results:

61.9% of patients had an inpatient admission over the course of one year. 626 unique patients accounted for 1304 inpatient admissions, with an average length of stay (LOS) of 4.54 days (± 6.34). 66% of patients had cardiac manifestations due to MA and 26% had pulmonary manifestations. Of the 77% of patients who had an ED visit, 522 had two or more ED visits. 238 unique patients accounted for 317 admissions to the ICU with an average LOS of 7.19 days (± 0.79). While a majority (66%) of our cohort abused methamphetamine alone, 29% were simultaneously abusing cannabis. Our cohort had 1107 more admissions/1000 patients when compared to our Institution's benchmark; highlighting an increase in healthcare utilization. Cost of additional hospitalizations/1000 methamphetamine users is over \$9 million/year, or \$9090/methamphetamine user/year.

Conclusions:

1. Stimulant abuse is most predominant in males (56.2%) and in those aged 19-49 (72.2%).
2. Majority of patients with MA lacked health insurance coverage (99.3%).
3. Greater than 50% of patients with a positive urine drug screen required an inpatient admission, with 15.1% requiring two or more inpatient admissions.
4. MA is associated with an increase in healthcare utilization.

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Economics

The Effects of Motivation on Financial Literacy of College Students

Although young adults in the U.S. face increasingly complex financial decisions, existing research suggests their financial literacy is relatively low. According to Expectancy-Value Theory, individuals are motivated by things that can provide favorable outcomes. Therefore, college students may be driven to take a personal finance course because they anticipate a valued outcome of gaining financial management skills. Our research examines the significance of motivation in determining a college student's level of financial literacy, as well as the influence of other factors identified in the literature. This study contributes to the literature through its focus on a diverse sample of college students.

A survey, modeled on the 2008 National Jump\$tart Survey, was administered online (Qualtrics) to students currently enrolled in Personal Financial Planning (FIN 30) at Fresno State. The survey contains 12 questions on financial literacy and 14 questions on demographic information, financial behavior, and motivation. In total, 81 participants completed the survey.

Results show that the average score on the financial literacy questions was 67.10 percent (4.9 percent higher than the national average). The average score among males was 5.27 percent above the average score for females. Caucasian students scored the highest (83.33%), followed by Hispanic-Americans (65.13%), African-Americans (60.42%), and Asian-Americans (59.26%). Among financial concepts, students were most knowledgeable about income and spending. ANOVA results revealed no significance of either father's education ($F = 1.371$; $p = 0.259$) or mother's education ($F = 1.546$; $p = 0.210$). Regarding motivation, 85.7 percent of students with a passing score (70% and above) indicated that they enrolled in FIN 30 primarily to learn about personal financial management. These preliminary findings suggest that motivation to learn is associated with higher levels of financial literacy in college students. While gender and ethnicity also appear to play a role, parents' level of education was not significant.

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Chemistry

Fluorescence Microscopy Demonstrates Neutralization of *Listeria monocytogenes* by Camelid Variable Domain Heavy Chain Antibodies (VHH)

Outbreaks of food-borne illness caused by *Listeria monocytogenes* (*L. monocytogenes*) are potentially fatal due to bacterial invasion of the central nervous system and the fetus during pregnancy. The primary method of combating outbreaks of *L. monocytogenes* is careful monitoring of the food supply. However, nearly annual outbreaks of the disease highlight the need for alternative approaches to dealing with the pathogen. *L. monocytogenes* initiates cell invasion using the cell surface protein, Internalin B (InlB), which mediates bacterial entry by binding a receptor on host cells. Although monoclonal antibodies that target InlB were generated to inhibit the bacterial invasion, conventional antibodies could not penetrate the cell wall and access to InlB due to its large molecular weight. To overcome the dimension limitation of the whole antibody, smaller antibody fragment derived from the variable-domain of camelid heavy-chain antibody (VHH) were used to generate the anti-InlB antibody. VHH can access to cryptic and buried epitopes due to their compact and prolate shape as well as large convex antigen-binding site. We have previously identified several VHH that bind InlB with high affinity. The objective of this research is to determine the effectiveness of VHH in neutralizing *L. monocytogenes* using fluorescence microscopy. The assay demonstrated that some anti-InlB VHH (R303, R326, and R330) were able to inhibit the invasion of *L. monocytogenes* into HeLa cells while other anti-InlB VHH (R419) did not. We conclude that some VHH are highly effective at neutralizing *L. monocytogenes*. The future work includes the co-crystallization of VHH and InlB to study the interaction of the two proteins in molecular level. This study promotes our understanding of the application of VHH as prophylactics or detection methodologies to prevent the infection of *L. monocytogenes*.

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Obstetrics and Gynecology

A Comparison of TUNEL and Sperm Chromatin Dispersion for Testing for Sperm DNA Fragmentation in Infertile Males

OBJECTIVES: Assessing sperm DNA fragmentation has become an important goal in male infertility as it may result in infertility, poor embryo quality, and increased miscarriage rates. The objective of our study is to determine if a simple and fast test – Halosperm – is comparable with a more technically-demanding and time-consuming test – TUNEL for the assessment of sperm DNA fragmentation.

DESIGN: Prospective Analysis.

PATIENTS: Eighty-two infertile males (average age of 31.7 years) provided a fresh semen sample to evaluate for sperm DNA fragmentation. Each sample was divided in half; one half for TUNEL, the other for Halosperm. The same technician performed both tests.

MAIN OUTCOME MEASURE: Correlate the sperm DNA fragmentation results obtained with TUNEL and Halosperm; Determine the advantages and disadvantages of each technique.

RESULTS: TUNEL and Halosperm were normal in 23 cases (28.04%) and abnormal in 22 cases (26.82%). Both tests agreed on the results in 45 cases (54.85%) and disagreed in 37 cases (45.1%). When the results disagreed, TUNEL was more often abnormal and Halosperm normal (33 cases=40.2%); rarely was TUNEL normal and Halosperm abnormal (3 cases=3.65%). The tests correlated weakly (Pearson correlation coefficient = 0.287). On average, TUNEL took 4 hours to perform vs 30 minute for Halosperm. TUNEL is a more accurate test because TUNEL measures the presence of 3'OH-free groups in situ which is a direct product of ruptured single- or double-stranded DNA while Halosperm measures the presence of chromatin dispersion "halo" which is a sign of intact DNA. TUNEL's results are determined more correctly because fluorescence is easier to discern than halo.

CONCLUSIONS: Though Halosperm is a simpler and faster test, it does not correlate strongly with TUNEL. Moreover, when the tests disagreed, Halosperm is often normal when TUNEL is abnormal. Ultimately, TUNEL is more accurate than Halosperm and its results are more correctly determined.

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Economics

The Economic Value of a Degree: Measuring Rates of Return by Major at California State University, Fresno

The traditional consensus that university education provides an economic advantage has recently been questioned as tuition increases, wages decline, and student debt grows at record amounts (La Roche 2015, Greenstone & Looney 2013). Given this scenario the choice of major becomes of utmost importance to current and prospective university students.

The objective of this study is to determine what effect choice of major has on lifetime earnings in the Fresno County region. This is accomplished by calculating the rates of return for 73 unique majors at California State University, Fresno. Utilizing the human capital framework, this research approaches the costs of attending college (tuition, foregone wages, etc.) as an investment, while lifetime career earnings represent its return. Average earnings with a high school diploma are subtracted from wage estimates of college graduates to assess the additional monetary value of a degree. The results provide a rate of return for each degree that is crucial for all stakeholders in an individual's education – students, government, and scholarship donors, among others.

Electrical Engineering shows the highest return (25.4%), while Food and Nutritional Sciences – Culinology Option – exhibits the lowest (-4.5%). Three other majors actually generated negative earnings, meaning that graduates earned less than what a high school diploma holder would typically earn. Lyles College of Engineering students had the highest average rate of return (17.0%), followed closely by the Craig School of Business (16.5%). The lowest average return was for the Jordan College of Agricultural Sciences and Technology (6.5%). Further, STEM majors (11.4%) performed only slightly better than non-STEM majors (10.2%). The overall rate of return for Fresno State was 10.7%. These results demonstrate the extent to which degree choice impacts earnings.

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Chemistry

Investigating the Nature of Science Understanding of Pre-Service Elementary Teachers in an Integrated Science Course

A.) As part of a scientific and technology-oriented society, the public is regularly exposed to scientific knowledge. Scientists relay important information regarding current global issues. Using this information, members of the public are expected to evaluate evidence and arrive at a conclusion; actions closely determined by their views about science. Many of the naïve views maintained by the public are reflected in K-12 schools. Such a lack of understanding is problematic when attempting to bridge the gap between science and science within the context of society. For this reason, the Next Generation Science Standards and major educational reform groups have emphasized the significance of improving teacher and student nature of science views. The present study seeks to investigate pre-service elementary school teachers' understanding of the nature of science throughout an interdisciplinary Physical Science Course.

B.) This mixed method research utilized student cohorts organized by semester and year. In total, 170 students enrolled in a Physical Science Course were surveyed. Data was collected through the use of open-ended formative assessments that were administered pre/post semester. Qualitative data was collected through interviews and observations.

C.) Student responses were analyzed using rubrics and assigned a numerical score. Responses were qualitatively evaluated for the frequency of normative and naïve views. Preliminary data has been analyzed and statistical comparisons were made between cohorts.

D.) Although tentative, preliminary data indicates that students make few gains in their nature of science understanding throughout the course. Current data suggests that students between cohorts begin with and maintain consistently naïve views pertaining to the nature of science.

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Psychology

When Trust is a Must: Priming Attachment Security Increases Trust in Doctors

Patients need a trusting relationship with their physicians. A trusting relationship leads to enhanced disclosure and more positive health behaviors, such as adherence to treatment (Lee & Lin, 2009). A 2014 Cochrane Review found there was insufficient evidence supporting current interventions on patients' trust in doctors. We suggest a solution may be found in the extensive Social Psychological research on attachment priming. Attachment priming involves methods such as having individuals write about a positive relationship from their past or flashing love-related words below a conscious threshold. In non-medical settings, priming attachment security improves interpersonal outcomes, such as trust and disclosure (Mikulincer & Nachshon, 1991). To our knowledge, the potential benefits of attachment priming have not been explored in the patient-doctor relationship. In our study, we tested whether individuals primed with attachment security had higher trust in doctors than individuals primed with a neutral condition. We recruited a diverse sample of individuals from Amazon's Mechanical Turk, an online, paid exchange. They were randomly assigned to priming conditions. In the secure attachment condition, the individuals were asked to write about a secure relationship they experienced. In the neutral condition, the individuals were asked to write about a trip to the grocery store. Individuals in the secure condition ($M = 38.78$, $SD = 7.08$) had significantly higher trust scores than individuals in the neutral condition ($M = 33.46$, $SD = 6.02$), $t(42) = 2.68$, $p = .011$. Individuals that wrote about a warm and comfortable relationship reported feeling more trusting of doctors. Future research should expand on this finding by priming attachment security in a real-world setting (e.g. a primary care clinic or hospital) and by using behavioral measures (e.g. medication adherence, follow-up appointment attendance, actual disclosure).

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Kinesiology

Using Mental Skills Training to Help Cadets Prepare for the Army Physical Fitness Test

Army Reserve Officer Training Corps (AROTC) cadets are required to pass the Army Physical Fitness Test (APFT) each semester. This test includes three timed events: sit-ups, push-ups, and a 2-mile run. The purpose of this case study was to review cadets' performance on the diagnostic and record APFTs, and explore their perceptions regarding an applied mental skills training (MST) intervention. Baseline measures are obtained early each semester and used to tailor the three weekly physical readiness-training sessions. However, deliberate integration of MST can be a viable strategy in enhancing performance in military-specific, physical tasks (Blank, Sylvia, Garza, & Wade, 2014). For this reason, cadets at a 4-year university in Central California identified by their cadre as lacking in mental preparation (N=3) were encouraged to participate in a 12-week MST intervention. Though not statistically significant, two of the three cadets experienced improvement in all three measures. All cadets were individually interviewed following their record APFT in order to contextualize these results. Several Key Themes were identified. To start, participating in the intervention led to Mental Skills Realization, or a greater understanding of MST and how it can help with performance. Effective Prioritization, via creating effective goals and using time management strategies, was also found to be beneficial. The cadets used imagery to enhance their Environmental Familiarization, which is their comfortableness with the testing site, while positive self-talk was instrumental in Confidence Building. The Identification of Mastery Experiences was critical in helping them to see that attaining the APFT benchmarks was possible. Cadets' quotes will be used to support these results. The cadets' observed performance improvement is positive and provides insight into how MST may be used in an AROTC setting. Implications for mental training practitioners will be suggested.

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Chemistry

New Silibinin Derivatives Exhibit Potential in Suppressing Prostate Cancer Cell Proliferation.

As part of our ongoing project to engineer silibinin derivatives with enhanced potency as potential anti-prostate cancer agents, 26 new 3-O-aminoalkyl-5,7,20-O-trimethyl-2,3-dehydrosilibinins have been successfully synthesized from silibin, employing a procedure developed by our research group. The inhibitory ability of these 26 silibinin derivatives in suppressing cell proliferation in androgen-sensitive (LNCaP) and androgen-insensitive (PC-3 and DU145) human prostate cancer cell models has been assessed in-house by WST-1 colorimetric cell proliferation assay. These derivatives are significantly more potent than silibinin, with the optimal IC₅₀ value of 1.99 μ M. Our new findings imply that introduction of an appropriate nitrogen group through a 3-5 carbon spacer to 3-OH of 2,3-dehydrosilibinin can appreciably enhance anti-proliferative potency in three human prostate cancer cell models. The structure-active relationship data concluded from this group of silibinin derivatives indicate i) that the type of nitrogen containing group is the determining factor to the beneficial potency; but ii) that the length of the linker is not closely associated with the enhanced potency.

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Civil & Geomatics Engineering

Developing A Functioning Tabletop Model of Traffic-Actuated Signalized Intersection

Visualization is a significantly valuable tool in research, education, and public outreach. Visualization can take different forms; e.g. graphical, spatial 2D and 3D simulations, or physical models. 3D simulations and physical models, in particular, have been proven effective in improving comprehension of beginner, intermediate, and advanced materials in the field of engineering. They allow for the ability to observe spatially and in real time how elements of a system interact with each other. They also act as prototyping tools, where new processes and systems can be tested on scaled down versions to ensure the design meets all specifications and is safe and efficient for its purpose. In like manner, simulations and models of traffic signal design and operation are significant to engineering research, education, and public outreach. The objective of this research is to develop a functioning tabletop model of a traffic-actuated signalized intersection.

The signalized intersection of East Gettysburg and North Millbrook Avenues in Fresno, CA were selected for this work. A scaled drawing of the intersection was created in AutoCAD Civil3D, displaying lane lines, curbs, and traffic sensors. 3D elements such as traffic signal heads, pedestrian walk/do not walk displays, and signal posts were created in SolidWorks and produced using 3D printing. Signals heads were assembled using red, yellow, and green LED lights. Each electrical component was wired to a terminal and connected to a real traffic control cabinet. Signal timing of the traffic light was programmed in the Catrans 2017 signal controller. Additionally, the model incorporates preemption buttons to accommodate emergency vehicles and reed-relay switches to model traffic sensors.

The produced tabletop model is a highly valuable tool for testing and simulation of traffic actuation algorithms for signalized intersections. Moreover, the model is an effective tool for research, education and public outreach on signal design and operations.

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Department of Food Science and Nutrition

Evaluation of Naturally Occurring and Inoculated Microorganisms on Stone Fruit Sizer Carriers

Sizer carriers are used in stone fruit packinghouses to size and sort fruit before packaging. This study assessed the microbial levels naturally occurring on sizer carriers, the growth potential of *Salmonella enterica* and *Listeria monocytogenes* on sizer carriers, and the use of humidity and temperature combinations as a possible treatment for pathogens on sizer carriers.

Environmental swabs of 192 carriers were taken from eight commercial stone fruit packinghouses. Statistical analysis of the results indicated that routine cleaning significantly reduced total microbial and coliform counts on sizer carrier surfaces.

In the laboratory, new and commercially used (with deposited wax, fuzz, etc.) sizer carriers were inoculated ~ 2 log CFU/cm² with pathogens, *S. enterica* and *L. monocytogenes*, then incubated at different humidity (65, 75, 85 or 95%) and temperature (22, 28, 34 or 40 °C) combinations. There was a decline of both pathogens after one-day exposure to 65% humidity at 40°C, 75% humidity at 34°C, or 85% humidity at 40°C for both used and new carriers.

To examine the effect of humidity and temperature combinations as a possible treatment for pathogens new sizer carriers were inoculated with *S. enterica* and *L. monocytogenes*, respectively, at ~ 6 log CFU/cm². In four hours at 75% humidity at 34 or 40 °C; 85% humidity at 34 or 40 °C; and 65% humidity at 40 °C a ≥ 3 -log reduction was achieved. At 75% humidity and 40 °C in four hours, both pathogens experienced a ≥ 5 -log reduction.

The results of this study indicate sanitation practices decrease the microbial levels. The study promotes the potential of using environmental conditions (humidity and temperature combinations) for the reduction of microbial contamination on sizer carriers and possibly other food contact surfaces.

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Biology

Gastrointestinal Endoparasite Prevalence in the San Joaquin Kit Fox (*Vulpes macrotis mutica*)

The San Joaquin kit fox (*Vulpes macrotis mutica*) is a federally endangered canid native to Central California impacted by severe habitat loss and degradation. The metapopulation of the kit fox has continued to flux but maintain a robust urban presence in Bakersfield, CA and smaller, satellite populations in more rural areas. Conservation of these remaining populations is critical and the identification of stressors on survival rates is essential. Kit foxes that dwell in rural areas experience predation by coyotes, raptors, den collapse and hazardous roadways, while kit foxes that reside in urbanized areas experience more anthropogenic pressures such as pesticide ingestion, net entanglement, domestic dog attacks and automobile impact. Kit foxes are susceptible to many of the same diseases that afflict domestic dogs. Intestinal parasites are among the most common, easy to transmit and often resistant to environmental desiccation. The kit fox characteristic use of dens serves to not only provide protection but may enhance transmission of parasites. An elevated parasite burden may result in anemia, anorexia, malnourishment, intestinal obstruction, resultant intestinal perforation, lowered fecundity and death. We performed a single blind analysis of 124 digestive tracts harvested from kit foxes collected in both rural and urban areas of the Central Valley, and present prevalence rates of selected metazoan and protozoal parasites. We also quantified the burden per tract by volume. We then revealed where these foxes were found and classified the location as either urban or rural based on a geographic continuum. Our understanding of the pressures on kit fox populations is crucial to inform our efforts toward conservation of this enigmatic endangered canid.

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Communication

You Gotta Have Faith: Communication Privacy Management in Exclusivist Christian Families Regarding a Significant Change in Religious Belief

Traumatic effects on the familial relationships of individuals whose religious beliefs differ from their family may result from pressure to conform to the family's religious beliefs, especially for individuals whose families practice exclusivist Christianity that asserts that those who do not believe as they do are damned. This study examines the ways that people who have different religious beliefs than their exclusivist Christian family choose to reveal information to their family regarding their religious beliefs. The study is an attempt to understand what these individuals reveal about their religious belief change, if and when they reveal this information, to which members of their family they reveal it, and how they reveal it.

Sixteen individuals were recruited to participate in semistructured qualitative interviews. These adult individuals self-identified as having adopted religious beliefs that differ significantly from the exclusivist Christian beliefs of their family. Questions about participant demographics, religious history, and rules for revelation of their religious beliefs to family members were posed. Interview audio was recorded and transcribed. A line-by-line analysis of data is currently in process to identify recurring themes in participant stories.

The preliminary results of this study indicate that, after long periods of study and reflection, individuals who adopt religious beliefs other than those of their exclusivist Christian family wait until they are asked to reveal their beliefs, unless some great moral injustice compels them do so earlier. These individuals reveal small aspects of their beliefs over the course of several face-to-face conversations with family members with whom they have a close relationship. They do not establish rules about who else their beliefs can be revealed to. These results illustrate the difficulty of the management of this kind of information and the hesitancy that these individuals have to reveal their beliefs until they are comfortable doing so.

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Chemistry

The Atmospheric Chemistry of Thirdhand Smoke

Thirdhand smoke (THS) is cigarette smoke remnants that persists in indoor environments after smoking ceases that is poorly understood. It contains chemicals present in secondhand smoke such as nicotine, tobacco related alkaloids, and volatile and non-volatile organic chemicals. Through aging and reactions with atmospheric oxidants, THS is known to form additional hazardous chemicals including tobacco specific nitrosamines. However, the chemical composition of THS is not well known and needs to be evaluated to assess health risks from exposure. This study investigates the chemical composition of THS when exposed to atmospheric constituents and atmospheric oxidants. Samples were generated by the Teague-Enterprise 2 smoking machine. Teflon bags were utilized to collect and expose THS samples to various reactants: ozone, OH radical, UV light, and nitrous acid. The changes in THS chemical composition when exposed to these condition were analyzed with gas chromatography-mass spectrometry and proton transfer-reaction mass spectrometry. Data shows that the aging and reactions of THS with atmospheric constituents and pollutants generates carbonyls, alcohols, nitrile, and other oxygen-containing compounds.

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Film and Theatre

Yo No Cruze La Frontera, La Frontera Me Cruzo

The increase of undocumented immigrant Mexican workers began during the Bracero Program in the mid twentieth-century (Gonzales, 226). Moreover, in the late twentieth-century, the undocumented population began to increase even more. The 1970s is a decade of the largest increase of Mexican undocumented workers. Despite, the large numbers of Mexican immigrants coming into the United States of America in search for a better life, these people are thrown into the jobs and labor force that most documented Americans refuse to do. For instance, large corporate agricultural farms has been one of the largest employers for many Mexican and Mexican Americans in the U.S. Like everyone else the undocumented pay taxes, they contribute to the U.S. economy and their work helps to feed the rest of the country. Yet, many in this country do not recognize their hard work. Instead, the Mexican becomes the scapegoat in political rhetoric and are blamed for the problems plaguing society, and are seen as criminals. This essay explores how Los Tigres del Norte's music gives voice to the Mexican people living in the shadows. More importantly their music can be seen as a tool to understand the experiences of many Mexicans in this country, while questioning the unfair injustices and political practices of the U.S. government. The lyrics of Tigres del Norte focus on identity, assimilation, sense of belonging, treason, and as a form to challenge the racial policies and laws that marginalizes the Mexican people.



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Poster Presentation Abstracts

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Biology

Session I

Poster No. 1

Understanding the mechanism by which organic chalcones kill *Caenorhabditis elegans* nematodes

Small microscopic nematodes known as *Caenorhabditis elegans*, or more commonly known as *C. elegans* have a specific gene in their genome that targets cell death. The process of this gene is called apoptosis. Without allowing for this gene to be the cause of death in these nematodes, the focus of the project was to test the morphological and pathological way how these worms are dying with the exposure to chalcones. Chalcones used were chalcones 17 and 25. Such chalcones are used in agriculture for the purpose of getting rid of unwanted pests like *C. elegans*, that play a large role in loss of agriculture. The worms were selectively tested by first placing them individually onto quarter sized agar pads that were set in between a microscope slide and cover slip. The agar pads contained about 3 worms each, with the addition of 100 microliters of either chalcone. While analyzing the worms under the microscope, 30 minute video recordings and pictures were taken. The video recordings consisted the beginning and ending intervals of the life of the worm. With this, the process of how the chalcone affected the worm was seen. Results found were that both chalcone 17 and 25 gave two different kinds of effects on the *C. elegans*. In chalcone 17, the greatest effect was the formation of tiny bubbles along the mouth and inner head. In chalcone 25, the effects were much greater with the formation of dark spots, which spread all over the head. The muscle tissue becomes abnormal, causing a visual interference and deformation of the head's inner structures. In the end, both chalcone 17 and 25 cause distinct effects on the bodies of *C. elegans*. However, our results suggest that these effects are greatly different than the effects of its own genetic gene that targets cell death.

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Chemistry

Session I

Poster No. 2

**Kinetics and Thermodynamics of Polar Aprotic Solvent-Driven Thiol Oxidation Reactions
by Nuclear Magnetic Resonance Spectroscopy.**

Thiols, such as the essential amino acid L-Cysteine, are organosulfur molecules containing a sulfhydryl (SH) group. When dissolved in a polar aprotic solvent such as dimethyl sulfoxide (DMSO), thiols have been shown to undergo a slow oxidation process and form dimers via a disulfide bond (S-S). Previously, kinetic and thermodynamic parameters of oxidation in a series of L-Cysteine derivatives were determined using real-time nuclear magnetic resonance (NMR) spectroscopy. Based on these results, we extend the kinetic and thermodynamic measurements to other biologically relevant molecules such as N-Acetylcysteine (NAC) and Glutathione (GSH), in the presence of another polar aprotic solvent, dimethylformamide (DMF).

Detailed kinetic measurements of L-Cysteine were performed using NMR spectroscopy and thermodynamic parameters (enthalpy and entropy) of the L-Cysteine formation were determined. These measurements suggest that the oxidation reaction of L-Cysteine in DMF is slow and the structural changes are different from the results obtained in DMSO. GSH and NAC are potent antioxidant medications used in the prevention of toxic free-radical damage. Preliminary experiments on GSH and NAC suggest that the kinetics of these molecules are distinctly different from each other, even though all the reactions involve oxidation of the thiol group. NMR-based kinetic and thermodynamic measurements are expected to provide a deeper understanding of the reaction kinetics in these solvent mediated thiol reactions. These results are highly relevant in designing accurate cysteine-based molecular models for pharmaceutically applicable antioxidants.

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Biology

Session I

Poster No. 3

Development of *Pichia pastoris* as a Model System for Myosin x-induced Filopodia Formation

Myosin X (Myo10) is an actin-based motor protein known to have key functions in the formation of filopodia and invadopodia facilitating cell to cell communication and migration in mammalian cells. Recently, we have demonstrated that Myo10 also plays a critical role in the formation and function of tunneling nanotubes (TNTs), a new form of intercellular communication, important in disease spread. However, little is understood about the mechanisms of Myo10 regulation and induction of filopodia. Since mammalian cells already have all of the proteins required for filopodia formation, it is difficult to determine the minimum protein requirements in filopodia formation. Thus, to better characterize Myo10- induced filopodia formation, we propose to use yeast *P. pastoris* as a model system that is easy to manipulate genetically. Furthermore, the lack of Myo10 and naturally occurring filopodia in yeast, despite the presence of a functional actin cytoskeleton, will allow us to test if Myo10 by itself is enough to induce filopodia in yeast cells or if other proteins are required for these cell protrusions to form.

Here we used a pPICZ vector carrying human Myo10 to transform X-33 yeast cells by electroporation. Using western blot analysis, we successfully observed Myo10 expression in the transformed colonies. Further confirmation of the Myo10 expression and its location in yeast cells will be determined by inserting GFP-Myo10 in *P. pastoris* and observing its expression by fluorescence microscopy. Meanwhile, microscopy, using phalloidin-rhodamine staining, shows differences in the organization of the actin cytoskeleton in cells expressing Myo10 compared to wild-type *P. pastoris*. Since no cellular protrusions have been observed, we are currently preparing protoplasts to determine if they might be induced by Myo10 expression. Taken together these results indicate that Myo10 can be successfully expressed into *P. Pastoris* and it, by itself, affects the rearrangement of the actin cytoskeleton.

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Biology

Session I

Poster No. 4

Improving cognitive decline associated with Alzheimer's disease in a *Drosophila melanogaster* Tau model using dietary caffeine

Alzheimer's disease is the sixth leading cause of death in the United States and is the most frequently encountered form of dementia. It is characterized by a variety of cognitive disabilities, such as memory loss, difficulty solving problems, and confusion with time and place. One of the causes of this disease is the hyperphosphorylation of the microtubule associated protein Tau in the brain. This leads to the formation of neuronal filaments, which eventually lead to the cell dysfunction and death that is associated with Alzheimer's dementia. Previous literature indicates that the administration of caffeine to mammalian models expressing Alzheimer's symptoms reduced the deficits in learning, memory, and neuronal damage. However, not much work has been extensively conducted in the simpler model organism, *Drosophila melanogaster*. This model organism could help identify the basic mechanisms behind the effect of caffeine on the diseased brain. In brief, our study is focused on improving the cognitive decline in *Drosophila* expressing Tau in brain regions associated with learning and memory with exposure to caffeine. Deficits between flies expressing Tau pathology that were exposed to caffeine and those who were not exposed to caffeine were compared using a spatial learning and memory assay. We also measured the longevity of flies exposed to caffeine compared to those who were not. Results from the spatial learning experiments demonstrated that daily caffeine intake could significantly reduce and in some cases fully rescue spatial memory and learning deficits. Additionally, it was found that Tau expressing flies lived longer than wild-type, UAS and GAL-4 controls. Daily caffeine intake also seemed to have a negative correlation with lifespan in flies expressing Tau. These results suggest that *Drosophila* could be an effective, high-throughput system to test the neuronal deficits, and resulting behavior, associated with Alzheimer's dementia.

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Chemistry

Session I

Poster No. 5

Alzheimer's Disease: Measuring Amyloid Beta Formation Induced by Exposure to Environmental Neurotoxin β -methylamino-L-alanine (BMAA)

Alzheimer's disease (AD) is a progressive neurodegenerative disease characterized by neuronal cell death. Neurofibrillary tangles and accumulated Amyloid-Beta Peptide ($A\beta$) in the brain are hallmark characteristics in those with AD. $A\beta$, ~4 kDa peptide fragments are thought to play an important role in AD by forming insoluble fibrous proteins causing protein misfolding. Proteolytic cleavage of Amyloid- β Precursor Protein (APP) produces C-terminus fragments labeled C83 and C99 (sAPP α , sAPP β respectively) that are further cleaved by γ -secretase to produce two forms of $A\beta$ ($A\beta$ 40 and $A\beta$ 42). The Mint adaptor-protein family poses as a potential AD therapeutic by having been found to bind APP and control binding in transfected non-neuronal cells. Previous studies have established the YENPTY motif within cytoplasmic APP to bind Mint. It is unclear whether the human Mint protein family is capable of binding and modulating APP in vitro.

The measurement of the C-terminus fragments is an indirect way of measuring $A\beta$ produced. β -methylamino-L-alanine (BMAA), a toxic non-protein amino acid produced by cyanobacteria has been linked to protein misfolding and aggregation by incorporation into neuronal proteins. Furthermore, oxidative stress is associated with neurodegenerative diseases and neurotoxins. Oxidative stress results from alterations of membrane lipids, proteins, and nucleic acids.

The purpose of this study is to investigate the effects of BMAA on $A\beta$ formation on H4 neuroglioma cells overexpressing APP751 and NT2 human embryonal carcinoma-Mint protein transfected cells. From previous work we have confirmed that BMAA increases the C99 fragments which are produced in the amyloidogenic pathway of APP processing. In our studies H4APP and NT2 cells were treated with varying concentrations of BMAA with varying incubation times and utilizing SDS-PAGE, Western Blot, and ELISA techniques we have been able to quantitatively measure APP levels and $A\beta$ 40,42 levels. These results will allow us to further investigate the neurotoxic effects BMAA has on H4APP and NT2 cells.

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Biology

Session I

Poster No. 6

Examining Biomarkers in Aggressive Tumor Types of Thyroid Cancer

Thyroid cancer is the most common endocrine malignancy in the United States with an estimated 56,870 new cases diagnosed in 2017 (American Cancer Society, 2017). Nearly 2,000 Americans die from the disease each year and its incidence is steadily increasing. Incidence of thyroid cancer are higher in the Central Valley than other parts of California. Recent evidence demonstrates that the second most common type of well-differentiated thyroid cancer is the follicular variant of papillary thyroid cancer (FVPTC). One of the most critical issues involves refining the distinguishing criteria for which lesions of FVPTC are benign and which have the potential to metastasize. The purpose of this study is to evaluate whether tumor profiles with high angiogenic activity (blood vessel-forming biomarkers) correlate with invasiveness and metastatic pattern. Uncovering differences in angiogenic activity may provide a clear-cut indicator of tumor aggressiveness. We recruited 20 archival FVPTC tumor tissue specimens and optimized tissue recovery for laser microdissection by deparaffinization and staining. Laser capture microdissection was performed with multiple 2000 μ m diameter cuts to separate tumor tissue from adjacent normal control tissue. From this micro-dissected FVPTC material, DNA and RNA was extracted and quantified for downstream PCR analyses of common angiogenic factor expression. To more precisely build upon this work, we will evaluate the expression levels of specific angiogenic factors using quantitative PCR. Our hope is that results of this study can effectively integrate morphologic findings with function and translate them into distinct signatures of disease behavior for predictive clinical utility.

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Biology

Session I

Poster No. 7

Comparing the suction flow of bladderwort across species to explore the effect of trap morphology

Bladderwort (*Utricularia*) are carnivorous plants that capture prey in submerged bladder-shaped traps by suction feeding. There are terrestrial species, which form underground traps in water-logged soil, and aquatic species, which live floating in water. This study compared the traps of a terrestrial species, *U. praelonga*, and an aquatic species, *U. gibba*, characterizing their trap morphology and the overall pattern of the suction flow, including the speed of the flow entering the trap.

To compare the morphology of the two species, we photographed their traps through a dissection microscope. To compare their suction flows, we used high-speed video cameras recording at up to 28,000 frames per second. Individual traps were excised and mounted inside a glass cuvette. The water was seeded with 10-micron microspheres to visualize the flow. Suction events were initiated by touching the trigger hairs on the trap door with a cat hair. The recordings were analyzed by manually tracking the microspheres to determine flow speed and flow patterns during a suction event.

We found that the two species differed morphologically in the complexity of the structures near the trap doors: the door of the terrestrial species was obscured by a dense set of hairs, which made it difficult for the flow-seeding microspheres to enter the trap; in contrast, the door of the aquatic species was freely accessible. The terrestrial species generated a slow, complex flow into the trap; the aquatic species generated a straight, fast jet. The maximum flow speed of *U. gibba* was 5.5 m/s, that of *U. praelonga* 2.0 m/s.

We concluded that the two species generate qualitatively and quantitatively different flows. We propose that these morphological and flow differences help terrestrial species prevent soil particles from entering the trap, which might reduce their ability to catch prey compared with aquatic species.

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Chemistry

Session I

Poster No. 8

Study of the structure-function relationship of Bax using a conformation-specific ELISA

Apoptosis, or programmed cell death, is the cell's primary response to stress; it is one of the body's most important lines of defense against cancer, and dysregulation of it has been also been implicated in a wide variety of other diseases. This wide-ranging significance means that establishing mechanisms for these regulatory processes would offer insight valuable to many research fields. The process originates upon reception of a stress signal by regulatory proteins known as Bcl-2 family proteins. Reception of this signal triggers activation of Bax, a pro-apoptotic member of this family, which is naturally present in a monomeric form within the cells cytoplasm. This results in the Bax monomers assuming an oligomeric form and transferring to the mitochondrial membrane. These oligomers embed themselves within the membrane and form mitochondrial channels through which pro-death effectors leak into the cytoplasm and initiate the apoptotic mechanisms. These activated Bax oligomers are therefore early markers of apoptosis, and thus their levels may be used as a diagnostic tool for cancers, neurodegenerative disorders and autoimmune disorders, as well as other diseases.

We have recently developed an enzyme-linked immunosorbant assay (ELISA) protocol in order to quantitatively assess activated Bax levels. This ELISA is able to effectively distinguish between the two forms of the protein by employing antibodies against the activated form. As a result, mutations that impact the activation of the protein will affect the results of this assay. We have multiple variants of Bax, including some possessing a substitution mutation that may impact activation of the protein. If these mutations in turn affect the ELISA, it means that our assay demonstrates the potential for insight into structure-function relationships within the protein. Here we show that the differences in activation ability caused by the mutations are indeed reflected in the ELISA.

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Biology

Session I

Poster No. 9

C. briggsae hybrid developmental delay is caused by mitochondrial-nuclear mismatch

Like *Caenorhabditis elegans*, the microscopic nematode *C. briggsae* is a model system for understanding how genetics influences development, because it is easy to observe development in these individuals. Some *C. briggsae* F2 generation hybrids, produced by crossing two wild isolate strains, take longer to reach sexual maturity than their wild-type siblings. This retarded development is referred to as “developmental delay”. Previous research indicates that developmentally delayed F2 hybrids also have reduced mitochondrial function. This finding led me to hypothesize that mitochondrial dysfunction in hybrids elicits developmental delay as a result of genetic interaction between one strain's mitochondrial genome and the other strain's nuclear genome. To test this hypothesis, my goal was to determine whether the development rate of one type of *C. briggsae* hybrid, a cybrid (cytoplasmic-nuclear hybrid, in which the nuclear genome of one strain and the mitochondrial genome of another are artificially combined), is slow compared to the parental strains: AF16 and HK104. To achieve this goal, I acquired micrographs of individual worms throughout development. I then made digital measurements of the lengths of each individual to track development rate. The cybrid strain did differ in development rate compared to the two control strains. Future directions will involve repeating this experiment with replicate cybrids before genotyping the cybrid strains to identify the mitochondrial and nuclear alleles that negatively interact in F2 hybrids to produce developmental delay. My research on this putative genetic conflict seeks to address the broader question of how different versions of genes can negatively interact, when combined in a hybrid individual, to cause biological defects.

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Biology

Session I

Poster No. 10

Interaction of Human Serum Albumin(HSA) and its specific nanobody

Listeriosis is an infection caused by eating food that is contaminated by *Listeria monocytogenes*. This infection is mostly caused in pregnant women and people who have a compromised immune system. There are certain nanobodies that are specific to *Listeria monocytogenes* and can bind to it efficiently. The molecular weight of the nanobodies is approximately 15 KDa. Due to the small size of the nanobody, it gets cleared from the body via the excretory system and hence its half-life is small. One of the ways of addressing this problem is by fusing the *Listeria* specific nanobody with a protein that binds the circulating(in the blood) human serum albumin (HSA). Human protein, albumin is one of the most abundant proteins found in the blood. The half-life of albumin is 19 days which is longer than the half-life of the *Listeria* specific nanobody. The protein that we are using is an HSA specific nanobody, Alb1. Alb1 is a nanobody that is derived from immunized Llama. Alb1 is expressed in BL21 strain of *E.coli*. It was purified using periplasmic purification technique. The aim of the research is to study the interaction of HSA and the HSA specific nanobody and its mechanism. Alb1 and HSA were combined at room temperature in the ratio 2:1.2 to form a complex. The mixture was purified by fast protein size exclusion liquid chromatography (FPLC) using a SEC75 column and 15mM TrisHCl (pH 8.0) 30mM NaCl buffer. The purity of the complex was confirmed by running an SDS/PAGE (Sodium Dodecyl Sulphate Polyacrylamide Gel Electrophoresis). Crystallization screens (Index and PEGRx screens) were set up. Crystals of the Alb1/HSA complex were observed in the Index screen, the contents of which were 0.1 M BIS-TRIS pH 5.5 and 25% w/v Polyethylene glycol 3,350. Optimization of the conditions for formation of the crystals is yet to be done.

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Biology

Session I

Poster No. 11

Investigating the genetic basis of glyphosate resistance in the San Joaquin Valley agricultural weed hairy fleabane (*Erigeron bonariensis*)

The introduced weed *Erigeron bonariensis*, commonly known as hairy fleabane, has accumulated in California's Central Valley since the 1970s. Use of the herbicide glyphosate has increased in frequency simultaneously, and fleabane has evolved resistance to this chemical. The genetic basis of glyphosate resistance in hairy fleabane is currently unknown. We are exploring this question with genetic sequencing of resistant and non-resistant populations of the species for three specific genes: EPSPS-1 and the ABC transporter genes M7 and M10. These candidate genes are integral to pathways which previous research has identified as being involved in glyphosate resistance in the related species *E. canadensis*. Control populations were grown in the Fresno State greenhouse from seeds collected from a field-verified glyphosate resistant (GR) fleabane population and a glyphosate sensitive (GS) population. We also collected leaf tissue from 5 populations of GR and 5 populations of GS fleabane plants from around the Central Valley, for which population sensitivity was previously determined by other researchers. DNA was extracted from all individuals, and PCR and bacterial cloning is currently being performed to amplify selected exons from the three candidate genes for Sanger sequencing.

Preliminary results from the greenhouse populations showed that EPSPS-1 did not have any of the expected target site mutations associated with glyphosate resistance. However, a number of nonsynonymous mutations were observed in the M7 and M10 ABC transporter genes. This means that a mutation in EPSPS-1 is likely not a component of resistance in the control populations, leaving M7 and M10 as the genes of greater interest. Future work on this project will consist of PCR amplification and sequencing for the EPSPS-1, M7, and M10 genes in *Erigeron bonariensis* in all 10 Valley populations, to determine whether the observed glyphosate resistance has multiple different genetic bases and/or origins in California's Central Valley.

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Chemistry

Session I

Poster No. 12

The Debilitating Effects from Environmental Neurotoxins on a Fruit Fly Model of ALS-PDC

Amyotrophic lateral sclerosis-Parkinsonism dementia complex (ALS-PDC) is a triad of neurodegenerative diseases characterized by a loss of motor function, tremors, and dementia. BMAA (Beta-methylamino-L-alanine), a non-natural amino acid, may cause symptoms of ALS-PDC due to its similar structure to glutamate, thus acting as a glutamate receptor agonist. Exposure to BMAA may be biomagnified in the food chain from the cyanobacteria that produce the BMAA, to the symbiotic roots of cycads. In the early 1950s, there was a high prevalence of ALS-PDC amongst the inhabitants of Guam, perhaps due to this BMAA biomagnification. *Drosophila melanogaster* (fruit fly) are used as a model for studying human neurodegenerative diseases and the neurotransmission's basic mechanism.

Canton S flies were fed BMAA at varying concentrations (12.5, 25, and 50 mM) to model the ingestion route of exposure similar to humans. The flies are tapped down a vial and the number of flies that are above the 5.5 cm mark after 30 seconds was recorded. The flies demonstrated a dose-dependent decreased ability to climb up the vial walls and a concentration-dependent hyperactivity followed by eventual loss of motor control or death over a period of 1-5 days. MK-801, an antagonist of the glutamate receptor N-Methyl-D-aspartate (NMDA), may mitigate the neurotoxic effects of BMAA.

In a parallel experiment, various concentrations of BOAA (Beta-N-oxalylamino-L-alanine) were added to standard fly food and given to groups of age-matched female flies. Surprisingly, BOAA has no effect on the viability or locomotor ability of the fruit fly. Additionally, omitting essential amino acids, such as isoleucine and arginine, from the flies' diet can shorten their lifespan. In contrast, when flies are co-fed L-serine with L-BMAA, there is a marked improvement in the locomotor and viability of the co-fed flies as compared to BMAA-only fed flies. All of these data together demonstrates fruit flies as an excellent model for recapitulating the features of ALS-PDC and showing promise for potential therapies using L-serine.

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Biology

Session I

Poster No. 13

The Nematicidal Activity of CED-4 Peptides on *Caenorhabditis elegans*

Plant parasitic nematodes are responsible for major crop losses worldwide. Finding an effective and environmentally safe nematicide is a crucial endeavor today, since effective nematicides, such as methyl bromide, have been banned from use. The ACU lab seeks alternate methods to kill plant parasitic nematodes. Apoptosis is the process of induced cell death (PCD). CED-4 protein is part of a protein cascade involved in PCD in *C. elegans*. It is an intermediate protein, which activates the CED-3 protein in the cascade. Since CED-4 protein is an intermediate protein, it makes it a key candidate to study whether increased amounts of the protein or its peptides are sufficient in inducing death in nematodes. Previous work by a graduate student in Dr. Alejandro Calderón-Urrea's lab determined that specific peptides derived from the CED-4 protein are sufficient in killing *C. elegans* in vitro. The objective of the experiment was to confirm the results of the previous experiment. We hypothesized peptides 2, 3 and 12 will have a higher mortality rate compared to the controls of our experiment. The peptides were tested at the concentration of 0.8mg/mL in a 96 well plate, and the nematodes were scored dead and alive for three days. The strain PD4251 of *C. elegans* expresses GFP in its muscle cells and it was used because it allows for efficient data collection under a fluorescent microscope. Our results confirmed the data of previous work and extended to include other peptides, which were also effective. Based on our three trials we found an average 91, 95 and 85 percent death rate in peptides 2, 3 and 12, respectively. Peptide 7 had a lower mortality rate, 72%, when compared to the other peptides. We can conclude from these results that peptide 2, 3 and 12 have potential in being effective nematicides. Future directions include testing the peptides on human cell lines to ensure the peptides are safe way for humans in killing plant parasitic nematodes.

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Biology

Session I

Poster No. 14

The Effect of Chalcone 17, Chalcone 25 and mix on different soil and non-soil microorganisms

Finding a new and effective nematicide to control plant parasitic nematodes (PPN) such as *Meloidogyne incognita*, is a very crucial process today, since agriculturalists desperately need new modes to control these parasites in way that is both effective and environmentally safe. After Methyl Bromide was banned for soil treatment because of many side effects, organic Chalcones were synthesized as an alternative possible nematicide to control the PPN's. Out of 8 different organic chalcones, chalcones 17 and 25 were shown to be most effective in killing the nematodes. Also, Chalcone 17 and 25 when both combined in low concentrations of $1 \times 10^{-5}M$, which shows 30% LD when tested on *Caenorhabditis elegans*, work synergistically to kill 100% of the nematodes. However, the effects of organic chalcones have not been tested on soil microorganisms. Plants and the beneficial soil microorganisms have developed and evolved together by adopting a symbiotic relationship. Plants cannot grow in a sterile environment, where the beneficial soil microorganisms are absent. The purpose of my project is to test the effect of chalcone 17, chalcone 25 and mix on different soil microorganisms.

My hypothesis is that the organic chalcone 17, 25 and the mix does not prevent the growth of different soil microorganisms.

The first aim of the project is to find the minimum inhibitory concentration of chalcones by performing a 96 well plate assay for each individual microorganism in its specific media in different concentrations of chalcone 17, 25 and mix. The second method of testing the effects of chalcones is by identifying the abundance of soil microorganisms found in a soil sample infected with *M. incognita* before and after their treatment with the chalcones using microbiome analysis. To sample bacterial communities in the most inclusive and accommodating means is by amplifying the bacterial 16S rRNA genes from extracted soil DNA. Based on the preliminary data, $1 \times 10^{-4}M$ of chalcones is the minimum inhibitory concentration in these microorganisms: *Listeria monocytogenes*, *Saccharomyces cerevisiae*, *Bacillus cereus*, *Bacillus subtilis* (ATCC:6633), and *Agrobacterium tumefaciens* (pGV2260). The concentrations of Chalcones having 100% LD in *C. elegans* show that Chalcones are not harming the soil microbiome which will be tested in the second aim of the project.

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Biology

Session I

Poster No. 15

Comparative analysis of five CRP-like protein homologs

CRP/FNR is one of the largest superfamilies of bacterial transcription factors. CRP is the representative family member that is activated upon binding to its ligand cAMP. CRP-like-protein (Clp) is another member of this family, but the ligand response of this protein is unique. Clp is constitutively active without the ligand cyclic-di-GMP. When Clp binds to cyclic di-GMP, it undergoes a conformational change to lose its DNA-binding ability. In this study, five Clp homologs from various bacteria with different sequence identities (56.9 – 81.0%) were characterized in comparison with the prototype *Xanthomonas axonopodis* Clp (*Arenimonas oryzae* 70.6%, *Dyella ginsengisoli* 58.7%, *Lysobacter arseniciresistens* 70.6%, *Pseudoxanthomonas suwonensis* 81.0%, and *Rhodanobacter fulvus* 56.9%). First, we individually cloned all of these genes into an expression vector (pBAD18Amp), and introduced each of the resultant clp-containing plasmids into Clp reporter *Escherichia coli* strains. In these *E. coli* strains, we measured constitutive activity and c-di-GMP responsiveness. All of these Clp homologs displayed the two characteristics of *X. axonopodis* Clp albeit not to the identical levels. This result reinforced our prior conclusion that the ligand-free activity and cyclic di-GMP responsiveness of Clp requires the D-helix and C-helix regions, respectively. The following sequence comparison of these Clp homologs revealed conserved residues and led us to further investigate these residues via site-directed mutagenesis. Our results here indicate that Clp is more widespread than previously thought, beyond *Xanthomonas* species, and also highlight the usefulness of comparative studies of these Clp homologs.

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Biology

Session I

Poster No. 16

Field imaging reveals perceptual and navigational strategies of wood ants in naturalistic environments

When an animal moves through their environment they must identify reliable sensory cues for guidance. Identifying these cues is not a trivial process because often it is not possible to know in advance which cues may be useful. In ants, a number of studies have identified several visual cues that can guide an ant, however, as to how the cues are perceived or prioritized is unknown. Our study aims to understand how ants value cues and how specific cues or combination of cues are learned. In order to investigate visual processes in ants, we used image processing and computational studies of natural scenes. We simulated foraging using a Levy walk, a mathematically optimized search strategy, and generated series of coordinates to be mapped out in the field. With these points determined, we went to the field to collect images. We took a series of panoramic images, 360 by 80 degrees, along a simulated foraging route in a wooded area (Allergy Free Garden) and an open area (O'Neil Park). Once images were collected we processed them through our algorithms that: convert to ant visual resolution of approximately 4 degree and extract features that have been experimentally shown to guide an ants route such as (edges, peaks, centroids). Once image from the route were collected and processed, we searched for the cues were most stable during the random walk. Our study of navigation over both short distances and long distances suggest that the using combined features were sufficient to guide the ant on subsequent routes and if the ant got near the goal, switching to edges allowed for more precise localization. These results have provided insight into the mechanisms involved in prioritization and perception of visual information. This study also demonstrates that image-matching foraging can be accomplished with storage of minimal information.

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Biology

Session I

Poster No. 17

Variation in Juvenile Chinook Salmon Diets Across Populations

The aim of the San Joaquin River Restoration Program (SJRRP) is to restore flows into San Joaquin River from the Friant dam to the confluence of the Merced River in order to re-establish a self-sustaining Chinook Salmon population. Our lab is an important part of the SJRRP as we study the vulnerable salmon juveniles and their habitat requirements. We are currently comparing juvenile Chinook Salmon diets across multiple riverine systems in western North America. We are conducting this comparison by performing literature meta-analysis of previous studies and comparing data on prey diversity and abundance from these studies to that of our own prey data from the San Joaquin River. Thus we are able to obtain a comparison of prevalent prey items across different river systems as well as a within river comparison. Based on our current research we observe a high number of crustacean prey taxa from within our main sites along the San-Joaquin River. This is quite analogous to our among river comparison in which crustacean and dipteran prey dominate. However, juveniles in the San Joaquin included a unusually high proportion of annelid (worm) prey in their diets, which was rarely reported in other salmon populations. Ongoing data collected from this study will aid in determining the feasibility of restoring Chinook Salmon populations back into the San Joaquin River, and help to advise SJRRP management on establishing realistic goals for salmon restoration.

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Biology

Session I

Poster No. 18

Developing a Nanobody Based ELISA for the Detection of *Listeria monocytogenes*.

Listeria monocytogenes is a gram-positive bacterial pathogen, and is the leading cause of death due to foodborne illness in the US. Early detection of *L. monocytogenes* in food is a key strategy to prevent future outbreaks. Detection methods currently being used are either time consuming (culture based method) or require a high level of technical skills (PCR based methods). This presents the need for new simple and rapid detection methods. We propose using nanobodies for the detection of *L. monocytogenes*. Nanobodies are the antigen-binding domain of the heavy-chain antibodies found in the Camelidae family. Nanobodies are smaller, more stable and easier to produce than conventional antibodies, which make them ideal candidates to be used for pathogen detection. Previous work in this area has led to the discovery of four highly specific nanobodies (R303, R330, R326 and R419) that bind the *L. monocytogenes* virulence factor, internalin B. This study aims to test the suitability of nanobodies to detect *L. monocytogenes* in an Enzyme Linked Immuno-Sorbent Assay (ELISA) format. Three out of four nanobodies (R303, R330, R326) have been successful in detecting immobilized internalin B leading to the conclusion that the nanobodies can bind internalin B in an ELISA format. Future work involves developing a nanobody based ELISA for detecting whole cell *Listeria*. Optimizing an ELISA will open new vistas in the fields of detection of *L. monocytogenes* and may lead to development of a novel *Listeria* biosensor.

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Biology

Session I

Poster No. 19

The Interactions of Myosin-X with mRNP complexes

Myosin-X (Myo10) is a motor protein that has been studied for its biological role in physiological cell extensions such as tunneling nanotubes (TNTs) and filopodia. TNTs are a newly discovered method of cellular communication that have been implicated in the spread of neurodegenerative disorders, cancer, and retroviral diseases such as HIV. However, the mechanism of TNT formation with Myo10 remains to be elucidated.

Work in our lab using cell fractionation, immunoprecipitation (IP) and mass spectrometry to uncover the role that Myo10 plays in the nucleus showed that Myo10 might interact with various messenger ribonucleoprotein (mRNP) complex proteins including Nucleolin (poly(A) RNA binding), DDX5 (mRNP export), Top1 (mRNP assembly), Matr3 (mRNA stabilization), and NOLC1 (poly(A) RNA binding) (Gousset unpublished). By utilizing fractionation and immunofluorescence (IF) microscopy, we found that Myo10 localizes to the perinuclear and core nucleus regions in the cell. However, the function of this subcellular localization is unknown.

In this study, we used IF microscopy to validate the interactions of Myo10 with the above listed proteins. Different antibodies labeled for the specific proteins found in the mass spectrometry results were used in combination with antibodies for Myo10. NOLC1, Nucleolin, and DDX5 co-localized with Myo10 in specific nuclear and nucleolar punctates in CAD cells, confirming our IP and mass spec data. These results also make clear that Myo10 may play a role in the anchoring of mRNP complexes within and around nucleoli, and in their transport out of the nucleus.

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Biology

Session I

Poster No. 20

Assessing Mitochondrial Function in Experimental *Caenorhabditis briggsae* Hybrids

Previous data from the Ross Lab shows that experimental intra-species hybrid lines of *Caenorhabditis briggsae* exhibit reduced organismal fitness that could be due to mitochondrial dysfunction. However, the molecular and genetic basis for this dysfunction is unclear. Mitochondria utilize the electron transport chain (ETC) to convert nutrients into fuel the body can use. The complexes of the ETC are encoded by both the mitochondrial and nuclear genome, with the exception of complex II. Therefore, I have hypothesized that reduced organismal fitness is due to a reduction in ETC efficiency in these cytonuclear hybrids (cybrids). To test this hypothesis, I have conducted mitochondrial enzyme assays to assess whether ETC function is compromised in these five dysfunctional cybrid lines relative to two control strains. Results from catalase show no significant difference between the two control strains, but a significant difference between one wild-type control strain and one cybrid strain. The enzyme catalase helps to protect cells from oxidative damage by reactive oxygen species (ROS). Therefore, the catalase activity difference observed between the control and hybrid lines could compensate for an increase in hybrid ROS levels. Next, Citrate synthase will be performed to help identify the amount of mitochondrial mass present. Identifying a biochemical difference between control and experimental cybrids is the first step in understanding the genetic basis of mitochondrial dysfunction, and possibly the process of speciation, in inter-population hybrids.

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Biology

Session I

Poster No. 21

Establishing absorption of organic chalcones in *Caenorhabditis elegans* by monitoring the absorption of DAPI and Hoechst Dyes

Plant parasitic nematodes (PPN's) are a huge problem in today's agriculture worldwide. Annually, they are the cause of a monetary loss of about 157 billion dollars. In order to begin to address this problem, *Caenorhabditis elegans* are being studied to find an effective and safe way to control PPN's. Although, *C. elegans* are not PPN's they are genetically very closely related and therefore, are a model organism to test.

Pervious work in Dr. Alejandro Calderón-Urrea's laboratory proved that two organic chalcones chemicals (17 and 25) were effective in killing the wild type strain of *C. elegans*. Further work found three recessive mutant strains, which were identified by their ability to survive in the presence of these chalcones. We have initiated genetic screens of mutagenized *C. elegans* in an attempt to identify genes responsible for the chalcone susceptibility. However, we must first determine if the chalcones can be readily absorbed by the nematodes. In this project, we used fluorescent dyes, similar in size to our chalcones, to test the assumption that the organic chalcones (and similarly sized molecules) can be absorbed by nematodes. Two specific fluorescent dyes, DAPI and Hoechst 33258, were used in this experiment due to their molecular size and weight, which resemble the organic chalcones. It was proved that the dyes had been absorbed by both wild type and chalcone mutants of *C. elegans*. The blue florescence that was observed in the worms led to the conclusion that it is possible that the organic chalcones are easily absorbed by *C. elegans* and therefore the mutant generated in our earlier screens are not absorption mutants but indeed mutants that can resist the action of chalcones.

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Biology

Session I

Poster No. 22

Screening of transgenic *Dunaliella primolecta* for wastewater treatment and accumulation of neural fatty acid

Wastewater treatment continues to be one of the main challenges faced around the world. One possible solution that can resolve this issue is through the use of *Dunaliella primolecta*. The purpose of this study is to genetically transform *Dunaliella primolecta* through the use of an *Agrobacterium tumefaciens* mediated transformation process generating a large number of mutants which possess an increased ability to treat wastewater and perform the maximum amount of reduction in chemical oxygen demand as compared to the untransformed cells. Benchmarks to accomplish our goal include: analyzing T-DNA integration and transgene expression within putative transformed cells; perform GUS gene expression in transformed cells; and standardize the protocol for cryopreserving *D. primolecta*.

Transformation was performed by co-cultivating *Agrobacterium tumefaciens* with *Dunaliella primolecta* in the suitable growth medium. After co-cultivation, we washed the cells with Cefotaxime to specifically kill *Agrobacterium* cells and the remaining cells were spread on plates containing murashige agar with Hygromycin thereby, only allowing the transformed cells to survive. We generated 12 putative transformed cell lines and extracted the DNA from each for further molecular analysis.

The putative transformed cells grew in the presence of hygromycin whereas the untransformed cells failed to grow. From our GUS assay we found that four cell lines yielded a significantly high RFU value which provides evidence that these cell lines were successfully transformed. Further testing needs to be performed to increase the transformation efficiency and successfully perform a BODIPY assay to measure the fatty acid content.

We successfully cryopreserved *D. primolecta* cells using 10% methanol in liquid nitrogen and the recovery of the cells after two days was approximately 60%. Based on our results within the GUS assay and the ability of the cells to grow in presence of hygromycin, we were able to successfully generate putative transformed cells of *D. primolecta*.

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Biology

Session I

Poster No. 23

The metabolite profile of human neural progenitor cells post-irradiation

Today, there are close to 700,000 people living with a primary brain or CNS tumor in the U.S., 17,000 of which are expected to die this year [ABTA 2017]. Radiation therapy is often used alongside chemotherapy in the treatment of brain tumors; however, chronic conditions of neurocognitive impairments have been observed in up to 91% of patients that were treated for central nervous system (CNS) tumors [Ivanov & Hei, 2014; Armstrong et al. 2009]. The most eminent side effects are associated with decreased hippocampus-related functions, like learning and memory impairments. Recently, irradiation treatment has been linked to a diminishing neural progenitor cell population in the brain, which may be one of the main causes for the neurocognitive impairments often seen in these patients [Ivanov & Hei, 2014]. It is important to now focus on elucidating the neural progenitor cell characteristics in order to better understand their response to irradiation treatment. While significant research has been pursued on stem cells and irradiation treatment, there is a gap in our knowledge when it comes to how irradiation affects human neural stem cells metabolism. We propose to address this gap by using ¹H-1D nuclear magnetic resonance (NMR) spectroscopy on human fetal brain-derived neural progenitor cells pre-and post-irradiation treatment. Our goal is to gain insight into the underlying mechanisms responsible for the neurodegenerative side effects associated with radiation therapy treatment of brain cancer.

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Biology

Session I

Poster No. 24

Fitness cost of glyphosate resistance in hairy fleabane (*Erigeron bonariensis*) under drought conditions

Many agriculturally invasive plant species have evolved resistance to various chemical herbicides. Glyphosate is a powerful, low-toxicity herbicide that has been extensively used in the San Joaquin Valley of California since the 1990s. Glyphosate resistance in hairy fleabane (*Erigeron bonariensis*) has become widespread in California since 2007. Simultaneously, since 2008, extreme drought conditions have become a major factor in California agriculture. Since this weed species competes with agricultural crops, and as water resources become limited due to climatic changes, our lab set out to study the interaction between glyphosate resistance (GR) and drought stress in hairy fleabane. Our hypothesis was that glyphosate resistance has no fitness cost under drought-stressed conditions.

Twenty plants each from a GR fleabane population and a glyphosate-sensitive (GS) population were grown in a greenhouse environment: ten plants of each biotype were exposed to drought stress conditions (40% field capacity) from transplantation at the 4-leaf stage until seed production. We measured different fitness components, such as height and leaf number over time, days to bolting and flowering, above-ground and below-ground biomass, and seed production.

Treatment showed a stronger effect than biotype on all measurements that showed significant differences between groups, including days to flowering (8.75 days earlier in drought-stressed plants), height and leaf production in younger plants (greater in the control group in growth weeks 1-3). However, there was a non-significant trend towards a reversal of the relative fitness of GR and GS plants in drought conditions: GR plants, which were consistently taller in control conditions, were shorter than GS plants under water stress.

Contrary to our hypothesis, glyphosate resistance has a small fitness cost in fleabane under drought-stress conditions, which might be significant with a larger sample size in repeated experimentation. Our future experiments may have implications for integrated pest management (IPM) in Central Valley agriculture.

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Biology

Session I

Poster No. 25

Chloropicrin and methyl iodide degradation facilitated by Rhodanobacter and Bacillus species - Identifying the mihA gene and its sequence

Members of the bacterial genera Rhodanobacter and Bacillus have been identified which possess the ability to breakdown pesticides using metabolic pathways containing methyltransferase binding and methyl hydrolase peptides. By isolating species which are capable of degrading the specific toxins chloropicrin and methyl iodide, and identifying the genes which enable these species to do so, the gathered information may be used to improve the processes of bioremediation. Within this study we have confirm the presence of the cmuA methyltransferase gene and previously unidentified mihA methyl hydrolase gene within species of the bacterial genera Rhodanobacter and Bacillus. Through the use of next generation sequencing and gene annotation we will obtain the complete genome of both Rhodanobacter sp. and Bacillus sp., while also elucidating the functions of genes related to pesticide degradation possessed by these species, including the mihA gene. By understanding the microbial genes used for pesticide removal, we can more efficiently utilize microbes containing these genes for useful bioremediation of chemicals.

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Biology

Session I

Poster No. 26

Evaluation of miRNAs regulating stem cell markers in Gemcitabine-resistant pancreatic cancer cells.

Pancreatic cancer (PC) is a notorious disease characterized by a five year survival rate of less than 5%, and is predicted to become the second leading cause of cancer-related deaths in United States by 2020. Even after the removal of cancerous tissue followed by chemotherapy, patients tend to experience relapse. The re-occurrence of the disease is primarily due to the development

of resistance in the cancer cells which decreases the effectiveness of the drug treatment. Presently, advanced and metastatic pancreatic cancer is usually treated by the first line chemotherapeutic drug Gemcitabine (Gem). Drug combination regimes including Metformin (Met) together with Gemcitabine have shown to reduce PC cell proliferation. Testing this combination in Gem-resistant pancreatic cancer cell lines could help increase effectiveness of treatment. However, the presence of cancer stem cells (CSCs) within the original tumor is also thought to play a major role in sustaining resistance towards chemotherapeutic treatments. Emerging data suggest that manipulating microRNAs (miRNAs) may be an effective strategy to control stem cell characteristics of CSCs and counter the inherent Gem-resistance that occurs in

PC cells. Therefore, evaluating the expression of specific miRNAs capable of re-establishing the sensitivity to Gem in PC cells may help in restoration of drug sensitivity. Once sensitivity is restored combination treatment (Gem-Met) would be an effective strategy to control and prevent relapse of the disease. The proposed research may provide a novel approach for the management of Gem-resistant pancreatic cancer.

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Session I

Poster No. 27

Are bladderwort near the lower size limit for capturing prey with suction feeding?

Bladderwort (Utricularia) make up more than 230 of the 650 known species of carnivorous plants. They have small bladder-like traps that use suction feeding to capture zooplankton.

Suction feeding is well understood in large organisms, such as adult fish. Hydrodynamic theory and experimental evidence from larval fish show that suction feeding is not effective for small suction feeders (gape <500 microns) and that capture success increases sharply with increasing gape. We hypothesize that suction feeders near the lower size limit should have large gapes relative to their body size to compensate for their small size. Bladderwort species differ in their average trap size, allowing us to explore the relationship between gape and body size without the confounding effects of ontogeny and growth. We predict that bladderwort are near the lower size limit of suction feeding and therefore show negative allometry: small traps have relatively large gapes compared with the gapes of larger traps. Such negative allometry may occur within a species or across species. Our null hypothesis is isometry – the ratio of gape to trap size is constant across trap sizes.

To test this hypothesis, we collected gape and trap diameters from nine species of bladderwort using a scanning confocal microscope. Average trap diameters range from 0.9 to 2.0 mm, average gapes range from 360 to 740 microns. All nine species scale isometrically, smaller traps do not have relatively larger gapes both within and across species. We conclude that none of these nine bladderwort species show morphological evidence for being near the lower size limit for suction feeding, contradicting findings in larval fish showing that suction feeding improves dramatically between gapes of 100 and 500 microns. We plan to measure capture success in bladderwort to compare their changes in capture success with those of larval fish.

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Biology

Session II

Poster No. 1

**Does subspecific variation correspond to cytotypic variation in the widespread taxon
Phlox speciosa (Polemoniaceae)?**

Phlox speciosa, or showy phlox, ranges from the Sierra Nevada of California into the Pacific Northwest (to British Columbia), and into Idaho and western Montana. It grows at low to middle elevations (100-2400 m), in rocky, wooded slopes and sagebrush habitat. Several subspecies and varieties were identified by previous taxonomists (originally Edgar Wherry in 1955), based on the obvious morphological variation in the group, but this variation does not correspond well to geography, and the current Flora of North America taxonomic treatment has suspended the recognition of subspecific taxa in *P. speciosa* pending extensive genetic and cytotypic investigation. We are exploring the genetic diversity and connectivity of 20 populations from across the range of this species. Our hypothesis was that *P. speciosa* would have ploidy level and substantial genetic variation between populations, based on its phylogenetic position in *Phlox*, its broad geographic range, and the huge amount of morphological and ecological variation the species encompasses. The project uses flow cytometry, and field sampling of leaf tissue (20 plants per population). Thus far, our results show no cytotypic variation in the species: all 15 populations sampled to date proved to be diploid ($2n=14$), as measured by carefully calibrated flow cytometry. Thus, we can conclude that the phenotypic and habitat variability that *P. speciosa* exhibits are not due to ploidy-level differences leading to intraspecific reproductive isolation. While this finding does not support our hypothesis, it provides the basis for further exploration of genetic connectivity between these diploid populations using codominant genotyping data from 7 microsatellite markers (previously implemented in other western North American *Phlox* species). We are continuing the project with 7 additional population samples and a new alternative hypothesis: that the observed patterns of morphological and ecological differentiation between populations are due to genetic discontinuity rather than simply phenotypic plasticity.

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Mathematics

Session II

Poster No. 2

Generating Classical Multiplier Sequences

Inspired by two claims in “Multiplier sequences, classes of generalized Bessel functions and open problems” by Csordas and Forgács, our main goal was to verify that two particular multiplier sequences can be generated using the methods of the aforementioned paper. We present proofs that certain Bessel-type functions generate multiplier sequences, whose generic terms are Cauchy-products of Laguerre polynomials and hypergeometric functions, respectively. We also give possible ways to extend proofs to a large class of generating functions.

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Biology Department

Session II

Poster No. 3

Characterization of zinc effect on YdeH, a diguanylate cyclase, and its zinc-site mutant

Cyclic di-GMP is a bacterial second messenger which dictates various cellular processes, including biofilm formation and virulence. Enzymes responsible for c-di-GMP production, diguanylate cyclases (DGCs), are abundant and encoded in most bacterial genomes. YdeH is one of the 14 *Escherichia coli* diguanylate cyclases containing a GGDEF motif, which is known to be essential for the synthesis of cyclic di-GMP from GTP. The crystal structure of YdeH shows that the enzyme has an N-terminal zinc-binding domain, which may negatively regulate the activity of YdeH based upon indirect in vivo data. However, direct evidence showing that zinc inhibits YdeH activity has yet to be presented. Here, we purified both wild type YdeH and a zinc-site mutant, C52A YdeH, and revealed the effect of zinc on their in vitro enzyme activities. Both proteins had a histag at their C-terminus, and therefore were purified through nickel affinity chromatography. Then, standard enzymatic reaction mixtures were prepared for both proteins in the absence or presence of Zn²⁺ (1 μM, 10 μM, 100 μM and 1 mM). After the reactions, the amounts of cyclic di-GMP produced were measured using a C18 column attached to an Agilent 1100 HPLC system. In the absence of zinc, wild type YdeH and the C52A mutant displayed a similar specific activity. Surprisingly, Zn²⁺ continued to inhibit the activity of C52A YdeH as well as wild type YdeH. This is unexpected since C52A YdeH has a substitution at one of four zinc-binding residues (His22, Cys52, His79, His83); therefore, it should have significantly decreased zinc affinity. This may imply either (i) both proteins were not purified in their zinc-free form because of the firm binding of zinc ion to the binding pocket, or (ii) C52A substitution may be corrected by an unknown, adventurous residue. To test the latter possibility, we are currently constructing double mutants of YdeH (C52A/H22A, C52A/H79A and C52A/H83A) which will then be purified and characterized.

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Chemistry

Session II

Poster No. 4

Active-metal mediated cluster growth of Au₂₅PET18 nanoclusters

Gold nanoclusters are said to be the bridge between Au(I)-thiolate complexes and thiolate-capped gold nanoparticles. Their optical, electrical, and catalytic properties largely differ from their bulkier counter parts (>3 nm) and have rightfully earned them their own classification. Unlike gold nanoparticles, atomically-precise gold nanoclusters are interesting in which small differences in size and structure determine their behavior. Similarly, modifying the core gives rise to unique properties and behavior not observed in monometallic nanoclusters. Active metals, such as Cadmium(II), Lead(II), and Mercury(II), integrated into Au₂₅PET18- (Au₂₅) bring about changes in electronic character. The fingerprint region within the UV-Vis range becomes almost featureless after introducing the active metals. Interestingly, their spectra closely resemble that of larger gold nanoclusters such as Au₁₄₀PET53. We speculate that some active metal ions are capable of inducing cluster growth of Au₂₅. Because a surface plasmon band, typically observed in bulky gold nanoparticles, is not present, these bimetallic nanoclusters are no larger than 3 nm. In this study, we monitor Au₂₅ growth under the presence of active metal cations by spectroscopic means.

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Biology

Session II

Poster No. 5

Glutathione affects virulence potential of *Pseudomonas aeruginosa*

Pseudomonas aeruginosa is a ubiquitous Gram-negative bacterium that can cause severe opportunistic infections. The principle redox buffer employed by this organism is glutathione (GSH). To assess the role of GSH in the virulence of *P. aeruginosa*, a number of analyses were performed using a mutant strain deficient in *gshA*, which does not produce GSH. The mutant strain exhibited a growth delay in minimal medium when compared to wild type. Furthermore, the *gshA* mutant strain was defective in biofilm formation and swarming motility, and produced reduced levels of pyocyanin, a key virulence factor. Finally, the *gshA* mutant strain demonstrated increased sensitivity to methyl viologen (a redox cycling agent) as well as the thiol-reactive antibiotics, fosfomycin and rifampin. Taken together, these data suggest a key role for GSH in the virulence of *P. aeruginosa*. We have recently begun studies of additional genes that may play a role in GSH production and cycling including *gor*, *trxB1*, and *trxB2*.

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Chemistry

Session II

Poster No. 6

EFFECT OF Tn GLYCOSYLATION ON THE BIOACTIVE EPITOPE CONFORMATION OF MUC1

Mucin 1 (MUC1) is a highly glycosylated protein containing a repeating 20 amino acid sequence called a Variable Number of Tandem Repeats (VNTR). In normal cells, MUC1 is heavily glycosylated, while in tumor cells the protein backbone is exposed due to truncated glycosylation. The exposed backbone is an ideal site to detect and treat tumor cells with antibodies. AR20.5 is a therapeutic antibody, which binds an epitope within the VNTR of MUC1 (sequence: PDTRPAP). Affinity studies of AR20.5 with unglycosylated and Tn (Thr-GalNAc) glycosylated MUC1 showed higher affinity of AR20.5 towards Tn glycosylated MUC1 compared to unglycosylated MUC1. Surprisingly, an X-ray structure of AR20.5 with the MUC1 glycopeptide epitope revealed that the Tn glycosylation of MUC1 did not directly interact with the antibody and thus does not form part of the epitope. The results from X-ray crystallography and affinity studies suggest a hypothesis where Tn glycosylation of MUC1 stabilizes an extended bioactive conformation that results in high-affinity binding of AR20.5. Here, the effect of Tn glycosylation on the conformation of a model MUC1 peptide in solution was studied using circular dichroism (CD) spectroscopy and nuclear magnetic resonance (NMR) spectroscopy. The preliminary CD studies suggest that in the absence of glycosylation MUC1 adopts type 1 β -turn conformation in solution that will be further validated using NMR methods. These structural studies using CD and NMR spectroscopic techniques are expected to provide how glycosylation alters the conformation preferences of MUC1 and thus its affinity for binding to AR20.5.

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Chemistry

Session II

Poster No. 7

Effects of divalent metal ions on BMAA and its carbamate adducts

Under physiological conditions the non-proteinogenic amino acid, β -Methylamino-L-Alanine (BMAA) is able to undergo structural modification in the presence of bicarbonate (HCO_3^-) to produce two different carbamylated species. The carbamate products produced are structurally similar to the excitatory amino acid glutamate and are presumed to be the primary causative agent in the progression of amyotrophic lateral sclerosis/Parkinsonism dementia complex (ALS/PDC). Though the formation of the carbamates in the presence of bicarbonate has been established, the role of how divalent metals disrupt the kinetic rate of formation of BMAA and its carbamates are not known. The prevalence of divalent metals (Cu^{2+} , Mg^{2+} , and Zn^{2+}) within the brain and the known chelation effects of BMAA is presumed to alter the rate of formation of the carbamate products. This study provides a systematic investigation of BMAA: Bicarbonate system in presence of various divalent metal ions using high-resolution solution-state nuclear magnetic resonance (NMR) spectroscopy. Based on the chemical shifts changes observed in the ^1H spectrum of BMAA in the presence of divalent metals suggest that the metal ions do interrupt the equilibrium between BMAA and its carbamates. In particular, two-dimensional exchange spectroscopy (EXSY) was used to characterize the changes in the dynamic equilibrium between BMAA and its carbamates in the presence of the various metal ions. These investigations suggest that Cu^{2+} , Mg^{2+} , and Zn^{2+} interacts with BMAA and its adducts differently leading to distinct dynamic equilibrium processes. Taken together these experimental results performed under physiological conditions may lead to newer mechanisms of action of BMAA and the role of the divalent metal ions.

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Industrial Technology

Session II

Poster No. 8

Digital Elevation Modeling of Agricultural Fields for Irrigation Management

The objective of this study is to develop a Digital Elevation Model (DEM) of the selected field and to infer effective water management and irrigation recommendations. Trimble WM Topo Base station was used in the study as the surveying equipment's. It has a base station and rover which is a pole mounted Global Navigation Satellite System (GNSS) receiver. This system works on the principle of Real Time Kinematics (RTK). There are various data collection methods but the gator was used. The pole was mounted on the gator and using the handheld Nomad Computer the surveying was initialized with a customized setting of 10 feet to automatically map data points which are geo-referenced. At the end of the survey, final data files were extracted from the Nomad 900 series handheld computer in an USB stick /drive or can be ported by wireless via connected farm solution. The data files are then extracted in Farm works or Multiplane's software. The software allows the user to run numerous analyses using the collected data file. The summary results of the analysis would include digital elevation model of the field, cut and fill contour models of the existing field as well as best fit models for rectifying leveling issues and recommending irrigation types and water management decisions. The types of conclusions that was reached for this project is that developing the DEM of farm land is possible, though the most difficult issue is having to create a data point every ten feet traversing the whole acre with the surveying equipment. The project concluded with having created data to be inputted into a database for future use to assist in leveling, and landscaping of the farm land to more accurately reflect better irrigation management.

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Chemistry Department

Session II

Poster No. 9

Flying Above Limitations: Measuring the Effects of BMAA on Fruit Fly Activity

Introduction: Beta-methyl amino alanine (BMAA), a non-natural amino acid, has been implicated to cause Amyotrophic lateral sclerosis-Parkinsonism dementia complex (ALS-PDC), a set of neurodegenerative disorder with symptoms including loss of motor function, tremors, and dementia. In the 1950s, a high prevalence of ALS-PDC was present on the island of Guam. The inhabitants of this island consumed high concentrations of BMAA biomagnified in the food chain from cycad trees which have a symbiotic relationship with cyanobacteria, the source of the non-natural amino acid. In this study, we investigated the effects of BMAA on *Drosophila melanogaster* (fruit fly) activity. The fruit fly model is ideal to study neurodegenerative diseases due to its similarities of neurons to that of humans.

Methods: We used a DAM2 *Drosophila* Activity Monitor to simultaneously measure the activity of 32 individual flies (gender and age-matched). Activity is measured by an IR sensor which counts each time a fly passes. Fly activity was measured over a 10 day period (12:12 hr light:dark cycle at 22 degrees Celsius. The treated groups were BMAA (1-15 mM), L-serine (1-15 mM), and L-serine+BMAA (1-15 mM); a control (agar + sucrose) was also included.

Results: The results revealed that the control and L-serine group portrayed no signs of slowed activity. On the other hand, the BMAA group showed the least activity while the BMAA+L-serine group presented improved activity over the BMAA group.

Conclusion: From the results, it further validates the role BMAA plays as a causative agent of ALS-PDC. At the same time, L-serine abrogates the effect of BMAA showing possibilities for treatment.

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Chemistry

Session II

Poster No. 10

Synthesis of Solution Stable Sulfenic Acids

Aging and age-related diseases, such as cancer, Alzheimer's and cardiovascular diseases, are incredibly complex and result from multifactorial processes. However, a common hallmark in these processes is the failure of the body's antioxidant system, resulting in damage through oxidative stress. Antioxidant supplementation has been reported to significantly reduce these damaging effects and minimize the loss of physiological function. Sulfenic acids (RSOH) have recently been suggested to be among the most potent of antioxidants and can terminate radical chain oxidation reactions efficiently. Despite their potential, the synthesis, isolation, and characterization of sulfenic acids have remained elusive due to two main reasons: 1) the lack of synthetic approaches and; 2) their tendency to undergo self-condensation reactions to form thiosulfinates—compounds that do not have antioxidant properties. The aim of this work is to synthesize a new generation of stable sulfenic acids. We have developed a practical synthetic approach to isopropyl sulfoxides, key precursors to sulfenic acids. Our route allows for an easy introduction of substituents that will stabilize the sulfenic acid via intramolecular hydrogen bonding, steric hindrance, and inductive effect. In this presentation, we will show the result of development and optimization of a transition-metal catalyzed S–H insertion reaction between diazo alkane and isopropyl thiol. We will also present IR and NMR analysis of the key intermediates synthesized in this study.

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Chemistry

Session II

Poster No. 11

5-O-Substituted-2,3-Dehydrosilibinins Exhibit Greater Anti-Proliferative Potency Than Silibinin in Three Prostate Cancer Cell Models

Silibinin is a major component from the extraction of milk thistle. The medicinal properties of milk thistle have been well known in Europe for many centuries. Recent research findings, based on several in vitro cell-based and in vivo animal studies, have revealed that silibinin possesses potential in treating prostate cancer. The additional studies concluded no toxicity toward human use of this product through oral administration. Moderate potency is one of the major problems to hinder its further clinical development. As part of our ongoing project to enhance the potency of silibinin by chemical modification, this study aims to investigate the effect of alkylation and aminoalkylation of 5-OH on the anti-proliferative potency in three human prostate cancer cell models. Seven 5-O-alkyl-2,3-dehydrosilibins have been successfully synthesized through a four-step procedure, including 7,20-O-dibenzoylation, oxidation followed by 3-O-benzoylation, 5-O-alkylation, and debenzoylation. Meantime, the synthetic approach to 5-O-aminoalkyl-3,7,20-O-trimethyl-2,3-dehydrosilibins has been figured out. All synthesized 5-O-alkyl-2,3-dehydrosilibins have been characterized with NMR and HRMS data. Our WST-1 cell proliferation assay results indicated all of these seven 5-O-alkyl-2,3-dehydrosilibins consistently exhibit greater potency than silibinin in three prostate cancer cell models.

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Biochemistry

Session II

Poster No. 12

Study of the Effect of Bcl-2 Overexpression on Oxamate-induced cytotoxicity in Prolymphocytes

Research on apoptosis and control of gene expression has produced many treatments to benefit the cancer community. Apoptosis is a programmed cell death which rids the body of potentially toxic cells. This death program is often inhibited in cancerous blood cells. In mammalian cells, glucose acts as a major fuel source to generate energy. Glucose breaks down into pyruvate via glycolysis. In normal aerobic cells pyruvate enters the mitochondria where it is oxidized by the Krebs Cycle to generate ATP. However, in cancerous cells, it is believed that an increased portion of this pyruvate generated by glycolysis is used for lactic fermentation; a process requiring the enzyme called lactate dehydrogenase (LDH). In actuality, there had been several studies showing that LDH inhibitors such as Oxamate can impact more severely growth and survival of cancer cells vs. normal cells.

The Bcl-2 family of proteins are a well-known regulator of apoptosis; an increase of the expression levels of their anti-apoptotic members such as Bcl-2 have been positively associated with cancer transformation for more than two decades. We recently observed that, in the murine prolymphocytes FL5.12 cell line, over-expression of Bcl-2 led to an increase in lactate production; indicating an up-regulation of fermentative metabolism. This process potentially mirrored how cancer cells use lactate fermentation to produce energy. We therefore studied the dose response relationship of the LDH inhibitor Oxamate on the survival of Bcl-2-overexpressing vs. Parental FL5.12 cells. We observed that higher doses of Oxamate were required to kill Bcl-2-overexpressing vs. Parental cells. This result suggests that the fermentative component of glucose metabolism is less critical for survival in Bcl-2 overexpressors; and consequently that Bcl-2 over-abundance does not trigger a Warburg-type phenotype to pro-lymphocytes. Future studies involve the testing of the same cell line over-expressing other Bcl-2-family type proto-oncogene such as Bcl-xL.

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Chemistry

Session II

Poster No. 13

Quantifying and characterizing the Criegee Intermediates formed in Alkene Ozonolysis by using a Scavenger

The formation of CH_2OO from the ozonolysis of alkenes was first proposed by Rudolph Criegee. The ozonolysis of alkene proceeds by the 1, 3-cycloaddition across an olefinic bond to produce a primary ozonide. The primary ozonide can decompose and form carbonyls as well as carbonyl oxides, called Criegee Intermediates (CI). Once Criegee intermediates are formed, they can react with SO_2 , H_2O_2 and NO_2 . In our research, we are trying to measure the formation of CI from the ozonolysis of 2,3-Dimethyl-2-butene (TME) using Proton Transfer Reaction Mass Spectrometer and Fourier Transform Infrared Spectrometer. The measurements of CI are achieved by using a CI scavenger called Hexafluoroacetone (HFA). The yield of the Criegee will be discussed by measuring the loss of TME against the loss of HFA and the formation of secondary ozonide against the loss of HFA.

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Chemistry

Session II

Poster No. 14

The Practical Synthetic Approach to 3-O-alkylamino-5,7,20-O-trimethyl-2,3-dehydrosilibinins

Prostate cancer is one of the leading causes of cancer deaths among men of all races. Roughly about 300,000 men die worldwide of castration-resistant prostate cancer each year, and approximately 28,000 of them are U.S men. Unfortunately, castration-resistant prostate cancer remains as an incurable disease despite the new agents created to prolong the life of the patients. As part of our ongoing research program in search of new effective anti-prostate cancer agents using naturally occurring silibinin as lead compound, 3-O-alkylamino- 5,7,20-O-trimethyl- 2,3-dehydrosilibinins have been designed to explore the effect of chemical modification of 2,3-dehydrosilibinin on anti-proliferative potency in prostate cancer cell models. This study focuses on working out a practical synthetic approach to 3-O-alkylamino- 5,7,20-O-trimethyl- 2,3-dehydrosilibinins. So far, a four-step reaction sequence has been identified as an efficient method, which has been successfully used for the synthesis of over twenty target silibinins in high yields. The four-step procedure includes: O-trimethylation of silibinin with dimethylsulfate under anaerobic conditions, oxidation of 5,7,20-O-trimethylsilibinin under aerobic and basic conditions, O-alkylation of 3-OH in 5,7,20-O-trimethyl- 2,3-dehydrosilibinin, and N-alkylation of 3-O-bromoalkyl- 5,7,20-O-trimethyl- 2,3-dehydrosilibinin with an appropriate amine. The structures for all synthesized compound have been characterized by ¹H NMR and ¹³C NMR data.

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Chemistry

Session II

Poster No. 15

Synthesis towards Hydnocarpin and Its Analogs as Anti-Prostate Cancer Agents

According to the American Cancer Society 161,360 men (1 out of every 7) will be diagnosed with prostate cancer in 2017 and 26,730 men will die of it. Prostate cancer is diagnosed in two forms—the androgen dependent form and the androgen insensitive form. The androgen dependent form can be treated in a variety of ways including ablation therapy, radiation therapy, and hormone therapy targeting the androgen receptors in men. Most frequently, this form of the disease is not life threatening and is generally monitored with no aggressive management actions taken. However, the more deadly form of prostate cancer, the androgen insensitive form, cannot be easily treated with current treatments, leading researchers to look to other methods for the treatment of these forms. Our objective was to create compounds with great anti-proliferative potency against prostate cancer cells. Specifically, this study is focusing on silibinin and hydnocarpin since previous research has displayed their cytotoxic potential against prostate cancer cell lines. Hydnocarpin, a flavonolignan originally isolated from *Hydnocarpus wightiana*, has been shown to possess pronounced cytotoxic effects against six human cancer cell lines and one murine cell line with IC₅₀ values of less than 4 µg/mL. Unfortunately, the high cost of extraction and/or synthesis of this compound has made it less feasible for use in cancer therapy. To solve this problem, this study aims to synthesize hydnocarpin and analogs in an efficient and cost effective way, using silibinin as our starting material. We have designed a three-step synthetic method to convert silibinin to hydnocarpin analogs. So far, we have successfully completed the first two reactions: i) trimethylation of silibinin under anaerobic conditions to generate 5,7,20-O-trimethylsilibinin; and ii) mesylation of 3-OH of 5,7,20-O-trimethylsilibinin. We expect to complete the last step elimination reaction to form the C2-C3 double bond within two to three weeks, which will lead to one desired hydnocarpin analog.

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Biology

Session II

Poster No. 16

The Effects of Logging and Prescribed Fire on Seed Production of Sierran Conifers

Seed rain was monitored in experimental forest treatment plots to investigate the effects of thinning and prescribed fire on seed production and seed dispersal distances of Sierra Nevada conifers. 18 1-ha forest research plots, established in the Teakettle Experimental Watershed, Sierra National Forest, have been manipulated in a 2 x 3 factorial design (fire or no fire; shelterwood thinning, California Spotted Owl protocol (CASPO) thinning, or no thinning) with three replicates of each treatment. 25 0.25m² seed traps have been installed on a 25-m grid in each of the 18 plots. Seed traps were installed in the control plots in summer 2000 and 2001 and in the treatment plots in summer 2001 and 2002, following completion of logging and fire treatments in summer and fall 2001. We now have seed rain collections through summer 2007 and are analyzing the patterns of seed production by five species of conifers common to mid-to high elevation forests on the west slope of the Sierra Nevada. We are comparing variation both within and among years, looking at both overall number of seed produced and individually by species. We will be paying particular attention to any differences in seed production between the pre-treatment period and the first three years after treatment (2002-2004) and the next three years (2005-2007). We are interested in how each species' fecundity was affected by these treatments and how they recovered over the next 6 years. This research will help us to understand the individual and cumulative effects of the two methods of logging and of prescribed burning on seed production and seed dispersal distances in White Fir, Red Fir, Sugar Pine, Jeffrey Pine, and Incense Cedar.

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Biology

Session II

Poster No. 17

**The Role of Disturbance on San Joaquin River Macroinvertebrate Assemblages;
Implications for Chinook Salmon Survival and Growth**

Implemented in 2009, the San Joaquin River Restoration Program (SJRRP) aims to restore water flows diminished by the construction of Friant Dam with the specific intention of restoring a self-sustaining population of Chinook Salmon to the San Joaquin River. Our lab plays an important role in the larger restoration efforts of the SJRRP by studying factors affecting juvenile Chinook Salmon survival and growth. This project addresses the issue of whether or not disturbance caused by the San Joaquin River's irregular hydrology contributes to variation in the abundance and composition of invertebrate assemblages, which serve as the primary source of prey for juvenile Chinook Salmon. This irregular hydrology includes some downriver stretches going dry over the summer when salmon are not present, and likely represents an important disturbance to this critical food source.

This study was conducted over a seven-month period (June-Dec 2016) with monthly sampling trips to four different sites along the San Joaquin River. These sites represented a gradient of 'consistent' to 'variable' hydrology downriver from Friant Dam. As expected, water temperatures and discharge were relatively stable at upriver sites in comparison to downriver sites. Invertebrates were collected from the river bed in addition to invertebrates moving downstream in the water column. The invertebrates in each sample were then sorted, counted, and identified in the laboratory. Data from the first four months of samples showed a gradient of invertebrate abundances across the four sites, with lower abundances downriver. These patterns of spatial variation in temperature and prey supply have important implications for habitat suitability for juvenile Chinook Salmon and the success of the SJRRP.

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Biology

Session II

Poster No. 18

Cloning Strategies for the Expression of Myosin-X in Yeast

The protein Myosin-X (Myo10) plays an important role in the formation of tunneling nanotubes (TNTs) in neuronal CAD cells. TNTs are actin-rich intercellular connections that allow for transfer of signals, organelles, and pathogens. These structures also play an important role in the spread of diseases like HIV, proteopathic diseases, and chemoresistance of cancer. Uncovering the regulatory mechanism of Myo10 is difficult *in vivo*, thus we propose to produce and purify recombinant Myo10 for *in vitro* biochemical experiments. The first step toward this goal is to use the well-characterized *Pichia pastoris* expression system to produce Myo10. I am using PICZalpha, an expression vector from the *P. pastoris* yeast system that is designed to secrete the desired protein into the yeast supernatant. In order to introduce T7-tagged Myo10 into the PICZalpha vector, the vector had to have Nhe and Xba restriction sites. The Xba site was already present, and I mutated one Kpn restriction site to an Nhe site using QuikChange mutagenesis. These sites resulted in complementary ends when cut, but self-ligation of the vector was prevented using Calf Intestinal Alkaline Phosphatase, which dephosphorylated the ends of the cut vector. The T7-Myo10 insert was then ligated into the vector and transformed into XL-Gold competent cells. Four colonies from the transformation were isolated, and after plasmid DNA purification, the DNA was sent for sequencing. Three of the four colonies contained the correct sequence for the T7-Myo10 insert, while one sample contained an inverted sequence.

My next step is expressing T7-Myo in yeast. If successful, I will shortly be able to secrete, collect, and purify the T7-Myo10 recombinant protein using a T7-tagged affinity purification column. This isolated protein has unlimited potential for future *in vitro* applications, and should shed light on possible Myo10 binding partners and identify proteases that cleave Myo10 under physiological conditions.

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Chemistry

Session II

Poster No. 19

**Hand-held Laser-based Chemical Sensors for Absorption and Fluorescence
Spectrometry: Application in Chlorophyll Measurements**

Spectrophotometers utilize the properties of light and its unique interaction with chemicals to characterize and quantify their presence. The manufacture of hand-held, field operable spectrophotometers however, has been very limited. Therefore, the production of such a device that couples simplicity with rigidity will prove beneficial to the detection of possible hazards that exist in various environments. Two types of spectrometers were manufactured, fluorescence and absorption, employing widely available materials, electronics, and laser pointers. Using chlorophyll as a model system, we have performed analyses with these devices. The simplicity of these devices will provide learning opportunities for students in the theory and application of spectroscopy and the construction of spectrometers/ sensing devices.

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Clovis Community College

Chemistry

Session II

Poster No. 20

**Analysis of Water Samples for Perfluorooctanoic Acid and Perfluorooctanesulfonic Acid
by LC-MS in the Clovis Metropolitan Area**

Perfluorooctanoic Acids (PFOAs) are byproducts of Teflon production and other industrial processes. These acids contaminate groundwater and are practically inseparable from the water aquifer.¹ Carcinogenic properties and toxicity to animals are common health concerns linked to high levels of PFOAs in water.² The levels of these species present in the water supply will be investigated. Quantitation will be accomplished with direct injection or extraction and concentration followed by LC-MS analysis. The instrument will use acetonitrile, and D.I. water with 5mM ammonium formate mobile phase, C-18 column, complimentary UV absorbance and ionized with atmospheric pressure ionization (API) and run in negative ion mode. Neat standards and mass spectral libraries will be used to identify compounds. Our purpose is to spawn awareness of the contamination in local groundwater in order to influence change. This may lead to a positive outcome for residents of the Clovis Metropolitan Area and improve information about the local water quality.

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Biology

Session II

Poster No. 21

Simulation of scene perception, navigation and information storage in wood ants

A number of experiments have revealed how different visual features are used to guide familiar foraging routes in wood ants. We have studied how visual cues that ants use are extracted, prioritized and stored during navigation. A foraging model was created in MATLAB to simulate navigation in a procedurally generated environment where the visual cues could be precisely characterized. In these environments, our algorithms extracted and stored the visual cues in a network viewed during a single foraging event. Following a random foraging event, the success on subsequent foraging bouts using the stored information was examined. On subsequent foraging walks we found the success of the simulated ant in finding the goal location using only a particular cue or a combination of cues depended on two factors – the length of the route and decay rate of information in the network. To further explore this we simulated the foraging event between 1000 and 10000 sampling points and implemented linear or exponential decay in the networks storing the information. Our data suggests that the optimal strategy is to sample and store 1000 to 2000 points along the foraging route with a network subjected to exponential decay. These parameters resulted in a stored representation that allowed the simulated ant to find the goal on subsequent foraging bouts. Additionally, we tested our model in two environments: clustered and opened. In both conditions, the model allowed the ant to return to the goal with high accuracy. The results of these simulations have provided insight into the mechanisms involved in prioritization and perception of visual information, it supports that ants need only processes relevant cues intermittently and they do not continually process visual information. Additionally, it has let us investigate how learning and storage of spatial information can be optimized in simple networks and nervous systems.

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Biology

Session II

Poster No. 22

Impact of Atmospheric Oxidation on the Cellular Toxicity of Cigarette Smoke

Various studies, especially those observing first and secondhand smoke, have confirmed the hazards of tobacco smoke on health. Tobacco smoke that exists in the atmosphere and includes mainstream and side-stream smoke has been termed secondhand smoke (SHS) or environmental tobacco smoke (ETS). When these particles linger, even in the absence of active smoking, humans may be exposed to these persistent ETS compounds—this has been termed thirdhand smoke. Thirdhand smoke is residual tobacco that comes in contact with indoor surfaces and/or can undergo chemical transformations when exposed to atmospheric species like ozone and nitrous acid.³ Recent work suggests that thirdhand smoke is an emerging environmental health risk and may be more toxic than SHS. Our aim is to quantify the effect of thirdhand smoke residue exposure on various cell lines. More specifically, the goal is to evaluate potential cytotoxic effects of smoke residue when exposed to ozone.

Thirdhand smoke filter extracts have been tested on three cell lines, A549 (human lung epithelial carcinoma), CCL-93 (Chinese hamster lung fibroblast), and TK6 (human spleen lymphoblast) using a microplate-based colorimetric WST-1 assay which measures cellular proliferation, viability, and cytotoxicity by the level of mitochondrial dehydrogenase activity. Smoke extract is applied at varying concentrations (2.5%, 2%, 1.5%, 1%, 0.75%, 0.5%, 0.25%, 0.1%, 0.05%, and 0.01%) and subsequently measured for absorbance using a plate reader at 440nm. Cell proliferation ratios were obtained relative to controls and then normalized to trial specific extracted particle masses and recorded in mg/ml. As expected, higher concentrations of thirdhand smoke residue inhibited cell proliferation most significantly. The mean IC₅₀ values (inhibitory concentration to reduce cell response by half) for trials exposed to ozone and for standard trials (without ozone) are 0.12 ± 0.012 mg/ml and 0.15 ± 0.070 mg/ml respectively. Taken together, these results suggest that the cellular impact of the smoke residue is deleterious, particularly when exposed to ozone.

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Chemistry

Session II

Poster No. 23

Electronic Cigarette Solution and Vapor Analysis with GC-MS and LC-MS

Electronic cigarettes (E-cigs) or Electronic Nicotine Delivery Systems (ENDS) have been promoted as a safer alternative to regular tobacco cigarettes to deliver nicotine to a user. This project set out to create methods of analysis for ENDS liquids and vapor. Different e-cigarette liquids and the vapor from those liquids vaporized in different devices were analyzed. Results were gathered to compare what compounds are present both in the room temperature liquid and the resulting vapor after heating and vaporization. Methods of analysis include qualitative and quantitative analysis using Solid Phase Micro Extraction (SPME) Gas Chromatography-Mass Spectrometry (GC-MS) and direct liquid injection Liquid Chromatography-Mass Spectrometry (LC-MS). Nicotine, propylene glycol, glycerin, menthol, carbon dioxide, several flavor compounds, and other derivative compounds were identified in the samples with standards and mass spectral libraries. Samples of the e-cigarette liquids and of the vapor produced by the ENDS device were spiked with internal standards to facilitate quantification. Compounds that have been identified as toxic were identified as being present in detectable concentrations in ENDS vapor samples. The use of LC-MS enabled compounds to be identified that were present in the liquids before they were heated and vaporized.

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Chemistry

Session II

Poster No. 24

Investigating Hydrogen Peroxide Production In Particulate Matter

Particulate matter has been identified as a source of the formation of Reactive Oxygen Species or ROS. ROS include compounds such as hydrogen peroxide, hydroxyl radicals, and superoxides. ROS are particularly interesting in the field of atmospheric chemistry due to their capacity to affect aerosol aging. Aerosol aging impacts the atmosphere through the changing of its composition potentially causing climate effects. Of interest in this project is the capacity for particulate matter to produce hydrogen peroxide and the techniques employed in measuring hydrogen peroxide production in particulate matter. Included in this study is the analysis of particulate matter samples obtained in Fresno and Claremont California in order to quantify hydrogen peroxide production and investigate its sources. The correlation between this production and the chemical constituents of particulate matter will be discussed.

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Chemistry

Session II

Poster No. 25

Three dimensional structure of antifreeze glycoproteins (AFGP) in dimethyl sulfoxide (DMSO) by high-resolution nuclear magnetic resonance (NMR) spectroscopy

Antifreeze glycoproteins (AFGP) is a class of biological antifreezes that inhibits the ice crystal growth within all fish living in the polar region. Even though the function of AFGP is known, its mechanism at the molecular level still remains a mystery. The primary structure of AFGP consists of repeating tri-peptide sequences of (Ala-Ala-Thr*)_n, where Thr* is glycosylated with the disaccharide beta-D-galactopyranosyl-(1-3)-2-acetamido-2-deoxy-α-D-galactopyranose. The number of repeating tri-peptide sequences range from 4 (shortest) to 55 (longest). AFGP does not hold a static three-dimensional structure and is highly dynamic while in its native state. We hypothesize that the inherent flexibility of AFGP is closely coupled to its function. The structure of AFGP, in its native state, will need to be determined in order to understand the antifreeze mechanism at the molecular level.

Nuclear magnetic resonance (NMR) spectroscopy provides a powerful option to investigate proteins in solution state. Since AFGP consists of identical repeating tri-peptide sequences and does not hold a static structure, this results in major resonance overlaps in the proton NMR spectrum of AFGP. One of the solutions to overcome the resonance overlaps is to use a non-native solvent, such as dimethyl sulfoxide, to induce non-native structure(s), which holds a static structure while in solution. The shortest number of repeating tri-peptide sequences, known as AFGP fraction 8 (AFGP8), was used to reduce the number of resonance overlaps. The structure of AFGP8, in dimethyl sulfoxide, was determined using the NMR data. As for future direction of the project, the non-native structure can be used as a tracker for the titration of dimethyl sulfoxide back to water to determine the native structure of AFGP.

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Chemistry

Session II

Poster No. 26

Determination of the Effects of Particulate Matter Aerosols on ROS Production in Alveolar Macrophage Cells

We are determining the effects that particulate matter (PM) has on the production of reactive oxygen species (ROS) in alveolar macrophage cells with an aim to find a relationship between the two. We use Teflon air filters that have collected particulate matter over a prolonged exposure to the atmosphere. In our experiments, we extract the particulate matter that has collected on the Teflon filters through elution of PM from a square cutout of the filter (1.2 cm x 1.2 cm) in ethanol and water in a 6-well plate. The filters are weighed before and after extraction to calculate PM concentration of each treatment. We then expose alveolar macrophage cells to the PM treatments in a 96-well plate incubated for one hour. Dichlorofluorescein (DCF) can be used to track the production of Reactive Oxygen Species (ROS) in the cells because it becomes fluorescent after being oxidized by ROS. By measuring relative fluorescence signals, we can quantitatively determine the effect of differing concentrations of PM treatments on the cells. We observe every time a positive trend between PM concentrations (in $\mu\text{g}/\text{well}$) and DCF signals (in relative fluorescence units—RFU). However, the amplitude of increase of the specific DCF-based fluorescence signals appear to be sample-dependent; possibly due to a wide variety of chemical entities present on the filters. Currently, we are isolating individual species found on the filter to observe their effects on the cells. Copper was an element found abundantly in the sample, so we have been testing the individual effect of copper ions on the cells. We have created mock exposures by exposing the cells to various controlled concentrated solutions of copper (II) sulfate (CuSO_4); and our preliminary results show a positive correlation between copper concentration (in ng/ml) and average RFU. In conclusion, we have shown that ROS production in alveolar macrophage cells in response to exposure to particulate matter depends on the chemical composition of PM samples. Currently, we are isolating the effects of individual chemicals (such as copper ions) on the cells. The copper experiments show a positive relationship between copper concentration and average RFU; suggesting that this element might be an important trigger component of the PM-induced ROS response in lung macrophages.

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Chemistry

Session II

Poster No. 27

Characterization of the Interloop Disulfide Bond in High Affinity Binding of Camel VHH to *Listeria monocytogenes*

Listeria monocytogenes (*L. monocytogenes*) is a food-borne bacterial pathogen that can provoke the fatal disease listeriosis. Nearly 1,600 people contract listeriosis annually, with over 260 fatalities. *L. monocytogenes* expresses a virulence factor, Internalin B (InlB), that facilitates internalization into host cells. InlB exhibits a leucine-rich repeat (LRR) region that interacts with host cell receptors and is thus a site for therapeutic intervention.

Camels, llamas, and alpacas possess unique heavy chain antibodies, cloning the antigen-binding domain produces the smallest known antigen-binding fragment: the VHH, single-domain antibody, or nanobody.

The camel VHH R303 binds InlB-LRR with high affinity and neutralizes *L. monocytogenes*. R303 possesses three convex complementarity-determining regions (CDRs) that function in antigen binding. The CDR3 of R303 is characteristically longer than the other CDRs and contains a non-canonical interloop disulfide bond between CDR1 and CDR3 which may function to stabilize the binding interaction with InlB. To examine the role of this disulfide bond in InlB binding the interloop disulfide bond was removed from R303 via site-directed mutagenesis. Indirect ELISA was performed to analyze the binding affinity of cys-mutant R303 for InlB. The binding affinities of wild-type and cys-mutant R303 were determined to be nearly identical. Fluorescence microscopy demonstrates that the cys-mutant R303 neutralizes *L. monocytogenes* invasion in vitro. To assess the role of the interloop disulfide bond on thermal stability of R303, circular dichroism spectroscopy will be performed to determine the melting temperatures of wild-type and cys-mutant R303. X-ray crystallography will be performed to analyze the structural intricacies of the interaction of cys-mutant R303 and InlB. This study provides evidence that the interloop disulfide bond is not critical to the binding propensity of R303 for InlB.

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psychology

Session III

Poster No. 1

The Effects of Peer Leadership Participation on Student Veterans' Ideas about Self and Others

Since October 2001, over 2.1 million U.S. troops have deployed as part of the Global War on Terror (GWOT), which includes Operation Iraqi Freedom, Operation Enduring Freedom and Operation New Dawn (US Government Accountability Office, 2014). As veterans deploy, many enroll into colleges in search for a better education (Akerman, DiRamio, & Mitchell, 2009). The inflow of veterans on campus, has provoked a considerable interest in the adjustment, both in academics and socially, of the student veteran (Garnezy & Crose, 1948). Military college students are a unique set of college students that need specific support services to aid them in their college career. The American Council on Education reports (Radford, 2009) that 85% of college student veterans are at least 24 years old, and over 60% have a dependent spouse or child. The differences between civilian students and veteran students may lead student veterans to hold an oversimplified view of traditional college students (Jones, 2013).

The Veterans Embracing Transition (VET) Connect Peer Leadership Program is a University based effort to assist student veterans in transitioning to campus and civilian life. Peer Leaders receive training to provide outreach to educate the campus community about the needs and perspectives of veterans (Klaw, Li, Avalos, & Diaz, 2016). Exploratory findings in a qualitative research indicate that through their participation in VET Connect student veterans gained a sense that civilians do indeed care (12, 92%) about veterans. Over half of the participants (8, 61%) reported changing ideas about themselves as veterans, seeing themselves at first as "not needing anybody," and then discovering that relationships were important to their sense of self. In their services as peer educators, students discovered that they were not significantly different to other SJSU students and as a result, they were able to view other students without a fixed or oversimplified idea.

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Political Science

Session III

Poster No. 2

U.S. Participation in Global Climate Change Resolutions: Analysis of the Kyoto Protocol

The ratification of treaties particularly, the Kyoto Protocol (KP) is complicated due to domestic forces such as democracies, presidency, and public opinion. The United States is the second largest emitter of carbon emission and has yet to sign on to the stringent mitigation efforts of the KP. Climate change is an issue considered unrelated to national security however, it is one of the most dangerous, national, and global threat. Next, ratification and implementation are domestic factors that increase stability and credibility of international agreements. The process may be dreadfully slow, but the commitment level of democratic states tends to be significantly high. The lack of legislative support during President Clinton's administration and President Bush's links with the energy industry are additional examples of factors constraining support for the agreement. Lastly, public opposition towards anthropogenic climate change stems from disbelief in global warming. Climate change is one of the most pressing global issues present today that requires critical repair. The stringent goals of the KP are an excellent way towards mitigation and key elements of international governance. The U.S. can maintain its role as a superpower by taking the lead on this issue and avoid domestic forces constraining the adoption of this agreement. If the U.S. ratifies the KP, other countries are more likely to follow this nation's footsteps. Although the ratification process is complex, it is important that our legislative and executive push the policy forward by placing it higher on the political agenda through the use of media.

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Psychology

Session III

Poster No. 3

Effects of Secondary Trauma in Military Families

Family secondary trauma was examined in relation to veterans' Post Traumatic Stress Disorder symptoms in the context of a literature review and case studies. Multiple deployments have negative effects in spouses and children. Military personnel's wives were surveyed in relation to marital quality and psychological arousal. Children and particularly adolescents were at great risk for emotional and restructuring harm. Medical data were examined in some studies which looked in couples' distress. Other studies examined military connected couples and veterans' wives. Results indicated relation of PTSD symptoms and greater marital distress. Additional examinations found statistically significant relation between parental deployments, sibling deployments, and symptoms of depression and helplessness in children and adolescents. Different treatments and community support can help alleviate distress and build coping skills for families. Recent research highlights the symptoms of PTSD as the main reason for family distress. The current study is limited to literature review and case studies. More research is needed to increase family support and provide avenues for family counseling.

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Psychology

Session III

Poster No. 4

The Effects of Anger and Happiness on Opposite Valence Racial Stereotypes

This research examines angry and happy emotions (versus neutral) and how they affect racial stereotyping. Research in the past has found that both anger and happiness increase people's' reliance on stereotype information versus neutral emotion when making social judgments. However, these stereotypes were presented in a negative and not a positive context. Also, past studies focused exclusively on negatively stereotyped racial groups (e.g., Hispanics) and not positively stereotyped racial groups (e.g., Asians) in a social judgment situation. This research concentrates on both positively and negatively stereotyped groups, in both a negative and a positive context, with positive and negative emotions. This experiment explores Hispanic stereotypes in both a negative (assault) and positive (saving a life) context for participants who were induced to be either angry, happy, or neutral. Furthermore, this study includes a stereotype-inconsistent condition that differs from the trait of aggressiveness associated with Hispanics. Implications about the effects and limitations that anger and happiness have on increasing stereotyping versus neutrality are discussed.

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Family Medicine and Emergency Medicine

Session III

Poster No. 5

Patient Satisfaction with Ketamine for Pain Management in the Emergency Department

Opioids have long been used in the emergency department (ED) setting for pain control, but with concern for effectiveness, addiction, and adverse physiological effects of receiving opioids, such as hypoxia, hypotension, nausea and tolerance, physicians are interested in alternative methods for managing pain. Ketamine has been used for procedural sedation for several decades and has only recently been considered in low dosages for analgesia because of its better safety profile and fewer adverse hemodynamic and respiratory effects. In this study, we investigated patient satisfaction with ketamine for pain control in an ED setting. We examined the effect of ketamine on change in pain score, satisfaction, and preference for receipt in the future. All patients who received ketamine for pain were asked to volunteer for the study, unless they were under 18, had an altered level of consciousness, or were receiving ketamine for a non-pain complaint. Ninety-eight patients were interviewed before and after receiving ketamine; demographic data was obtained through chart review. Most patients were women or White. The primary indications for receiving ketamine were 33% for abdominal pain, 24% for back pain, and 15% for body/extremity pain. A repeated-measures ANOVA determined the mean pain score significantly decreased ($p < .001$); however, it did not decrease significantly for one indication over another, for a particular gender, ethnicity, or age. Patients were asked if they would prefer ketamine again and 73% agreed. Only 28% had an adverse experience to the medication (e.g., hallucinations, unpleasant feelings). Ketamine was effective at improving pain for the majority of patients in our sample and is worth exploring further as an option for pain management in the ED.

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Nursing

Session III

Poster No. 6

Reducing Stigma-Driven Health Disparities in People Living with HIV (PLWH): A Literature Review

Introduction: Research has found that HIV-related stigma has numerous negative impacts on the lives of people living with HIV (PLWH). Although there are more resources than ever dedicated to HIV/AIDS efforts, stigma continues to be a major factor challenging the prevention and treatment of HIV today. Understanding the impacts of stigma on health outcomes and quality of life in PLWH is essential to the addressing the global HIV epidemic and reducing health disparities.

Search Strategy: We conducted a secondary meta-analysis of existing research that discussed and evaluated the impacts of HIV-related stigma and discrimination on PLWH. We searched the following databases for peer-reviewed articles: EBSCO Host, Cumulative Index of Nursing and Allied Health Literature (CINAHL), and PubMed. We also obtained reports from Centers for Disease Control (CDC), Food and Drug Administration (FDA), Office of the High Commissioner for Human Rights (OHCHR), World Health Organization (WHO), and the Joint United Nations Programme on HIV/AIDS (UNAIDS).

Results: Our review of the literature revealed that HIV-related stigma is a socially constructed global phenomenon that reflects social and cultural tradition. Most current stigma reduction interventions are designed to address individual-level stigma (symbolic stigma). While this has contributed to improvements in individual attitudes towards PLWH, interventions at the individual-level alone do not address the macro-level attitudes and societal norms that influence individual ideals and behaviors.

Conclusion: Findings in the literature review suggest that because of the pervasiveness of HIV-related stigma globally, addressing stigma is imperative to the HIV response. It also suggests that interventions which address stigma at the structural level and target multiple domains might have a more profound impact on HIV-related health outcomes.

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Biology

Session III

Poster No. 7

PESTICIDE EVALUATION OF MITOCHONDRIAL DYSFUNCTION IN HUMAN NEURAL STEM CELLS

Worldwide, 5.6 billion tons of pesticides are produced yearly (Alavanja et al. 2014). Pesticides have been linked to neurodegenerative diseases such as Parkinson (PD) and Alzheimer's (AD) as well as neurodevelopmental disorders (Richardson et al. 2014). Alzheimer's disease affects 44 million people worldwide and these numbers are expected to triple in the next forty years (Alzheimer's Association et al. 2016). Parkinson's disease affects ten million individuals worldwide. By 2030, these numbers are expected to increase by an astounding 80 percent (PD Foundation, 2016). From a health-cost perspective, these diseases will cost billions of dollars. And despite the billions of dollars the pharmaceutical sector has spent trying to find a cure or a way to slow down the pathology of PD and AD, major breakthroughs remain elusive (Crow et al. 2016).

The Central Valley is considered the agricultural heartland of California for its billion-dollar economy. Recent public health research from the UC Davis Mind Institute found that women living near agricultural pesticide activity in their second and third trimester of pregnancy have a higher risk of having children with neural developmental disorders (Shelton et al. 2014). Scientists also found that individuals who lived within 500m of a pesticide spray zone had a 75% increased risk for PD (Costello et al. 2009). To date, the underlying causes of PD and AD remain unknown. Our preliminary data obtained in collaboration with Sanford-Burnham (SBP) showed that rat cerebral cortical explant cultures experienced cytotoxic effects when exposed to high concentrations of the pesticides paraquat and maneb in vitro. The cytotoxicity was associated with mitochondrial dysfunction. As a result of this data, we propose to evaluate the impact of a new antioxidant supplement designed to reduce the level of free radicals in mitochondria on human neural stem cells before pesticide treatment. We hypothesize that the antioxidant will reduce the cytotoxic effects induced by these pesticides on the neural stem cells. If the hypothesis is supported, then consumption of the antioxidant supplement may help reduce the pesticide exposure risk to susceptible populations.

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Endocrinology/Gland

Session III

Poster No. 8

Elimination of Sliding Scale Insulin In a Nursing Home Setting

Widespread use of Sliding Scale Insulin (SSI) in nursing homes continues despite best practice recommendations. Wide fluctuations in blood sugars are not prevented by sliding scales. Rather than being proactive they are reactive. We initiated a quality improvement project using an interdisciplinary approach to create a "No Sliding Scale Zone" within our extended care community living center at Veterans Administration Central California Health Care System (VACCHCS) – Fresno.

Clinical pharmacist in collaboration with the endocrinologist designed an individualized order set for basal – bolus insulin, to deliver fixed dose meal insulin based on pre-meal blood glucose plus a percentage of meal consumed.

A cohort of 16 elderly males (mean age 70 +/- 9 Standard Deviation) were admitted to the Community Living Center (CLC) for short-term rehab were evaluated. Comparison of acute care blood sugars using insulin while on a sliding scale were compared to blood sugars post admission to the CLC using our "No Sliding Scale Zone" order set. A typical order might read: 10 units SQ Aspart Insulin if blood sugar is equal to or greater than 200 or consumes at least 65% of the meal

Blood Sugar and Hypoglycemic Events over a 3 day period with sliding scale versus no sliding scale insulin were analyzed:

Mean 3 day blood sugars using sliding scale "Acute Care" = (180 +/- 57 SD) Mean 3 day blood sugars using No Sliding Scale "CLC" = (173 +/- 53 SD) Hypoglycemic Events over the same 3 day period: Acute Care Hypoglycemic Events = 8 CLC Hypoglycemic Events = 5

Given the small sample size and retrospective analysis we were unable to show any clear improvements of glycemic control. We were however, able to change culture and create a safe new "No Sliding Scale Zone" within the CLC. By administering rapid acting insulin based on meal consumption we avoid concerns about late arriving meal trays and have increased awareness among staff about meal time intake on a daily basis.

Future analysis of our order set and how we can further simplify the use of insulin analogs in the extended care setting will allow us to improve care and quality of life in our residents with diabetes.

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Family and Community Medicine

Session III

Poster No. 9

Comparison of HbA1c as a screening tool for GDM in first trimester pregnant women

Gestational diabetes mellitus (GDM), carbohydrate intolerance that develops during pregnancy, affects around 5-7% of pregnancies. Current recommendations suggest screening all women for GDM around 24-28 weeks gestation using a glucose tolerance test (GTT). Hemoglobin A1c (HbA1c) monitors average blood glucose levels over a 3 month period in non-pregnant patients with diabetes. This research is exploring how well an HbA1c at 15 weeks gestation identifies patients that later develop GDM.

A retrospective cross-sectional study of pregnant women seen in three different prenatal clinics located in California's Central Valley. Patients with an HbA1c during the first 15 weeks of their pregnancy were included. Women with anemia (hemoglobin < 10 gm/dl), preexisting diabetes or HbA1c > 6.5, patients with pregnancy loss or delivery at or prior to 28 weeks of gestation, chronic renal disease, pancreatic disease or other severe illness were excluded.

Outcome measure was GDM status. HbA1c was categorized into <5.7 and 5.7-6.4 levels. Secondary information includes age, ethnicity, number of pregnancies, and known risk factors for GDM.

Eight hundred and thirty charts were reviewed with 75 (9%) meeting inclusion criteria. Of this subset, the majority (94%) fell into the <5.7 HbA1c category. Twenty had GDM, of which eighteen had an HbA1c <5.7. HbA1c values for those with GDM and those without overlapped completely.

This study is limited; the simple conclusion from the small sample size is that A1C measured prior to 15wks of gestation is a terrible screening tool for GDM, with very poor sensitivity. However, a prospective study would provide more data for determining if HbA1c aids in screening for GDM, and would benefit from a different gestational age range for screening with the A1C (eg. 20-28wga). A recent study by Khalafallah et al. (2016) demonstrated promising support for using HbA1c as a screening tool in this later gestational age range.

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Session III

Poster No. 10

Intracranial Vascular Steal as a Mechanism for Symptoms Ipsilateral to a High-Grade Carotid Stenosis

Vascular steal phenomenon has been described in territories including subclavian steal, coronary steal, but also potentially exists in the cerebral vasculature. Cerebral steal is possible when pressure differences exist between two circulatory beds. High-grade arterial stenosis may create such a pressure differential. We describe a rare case of symptomatic cerebral vascular steal.

This 76-year-old man presented with progressive right-sided weakness. Past medical history included low-grade astrocytoma treated with radiation and coronary artery and peripheral vascular disease. Imaging studies demonstrated high-grade stenosis of the supraclinoid right internal carotid artery, and MRI perfusion showed changes suspicious for vascular steal across the anterior communicating artery with relative ischemia of the left hemisphere. This correlated with his right hemiparesis and expressive aphasia. Cerebral angiogram was performed for angiographic confirmation of the steal, and treatment was performed with intracranial angioplasty and stenting.

Cerebral angiography depicted rapid backfilling along the right anterior cerebral artery with filling of the right middle cerebral artery territory on left internal carotid injection, consistent with vascular steal. After balloon angioplasty and stenting of the right carotid stenosis, there was return of anterograde flow, and no further backfilling on left carotid injection follow up runs, indicating a reversal of the steal. Clinical follow up at one month showed significant motor improvement with resolution of expressive aphasia.

We describe a case of cerebral vascular steal phenomenon producing relative ischemia to the left hemisphere by critical stenosis in the right supraclinoid carotid artery producing steal across the anterior communicating vessel, consistent with the patient's right-sided symptoms. This was resolved after treatment of the stenosis. This case highlights that intracerebral steal phenomenon needs to be considered as a potential mechanism for symptoms ipsilateral to a vascular lesion in the appropriate clinical context.

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Kinesiology

Session III

Poster No. 11

Examining Team Cultures of Success in High Performance Field Hockey Through Self-Determination Theory

According to self-determination theory, individuals have a need to feel: (a) competent, (b) relatedness, or a sense of belongingness or connections with others, and (c) autonomy, or independence in making decisions (Deci & Ryan, 2000). Self-determination theory has been shown to be an important factor in coaching success and how coaches create a winning culture (Lara-Bercial & Mallett, 2016; Mallett, 2005; Vallée & Bloom; 2016). Therefore, the purpose of this presentation is to examine how high performance female coaches create and experience a winning team culture, using self-determination theory as the conceptual framework. Seven NCAA DI head coaches were selected based on their experience (26 to 37 years), and history of program growth and success (Conference and/or National Championship wins). Three researchers independently reviewed and coded the interview transcripts and met weekly to participate in peer debriefing meetings. Results demonstrated that competence, relatedness, and autonomy all play a role in mediating motivation and cultivating winning team cultures in high performance field hockey programs. Coach competency changed over time and was closely linked to professional coaching success. Coaches identified the importance of relationships among all members of the field hockey program. Relatedness was cultivated through established team cultures, team expectations, open communication between players, coaches, and assistant coaches, and team-bonding activities. Lastly, autonomy was a key theme in building a winning team culture. Coaches incorporated opportunities for autonomy by entrusting players with decision making responsibilities, within limits that they set. Coach autonomy was largely determined by the nature of the coach's relationship with their athletic department and superiors. These results are consistent with existing research on high performance team cultures and self-determination theory's relevance in sport settings. A unique contribution of the study is the perspective of female coaches within winning team cultures, a view-point that has rarely been examined.

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Department of Kinesiology

Session III

Poster No. 12

THE 'YIPS' IN DIVISION I COLLEGIATE SPORTS: PREVALENCE, CONDITIONS, AND FACTORS

The yips is a sudden involuntary, abnormal body movement that affects an athlete's performance with twitches or feelings of temporary paralysis of the body. The condition has been studied from both a neurological and psychological aspect, but the cause of the yips has yet to be found. Research has mostly focused on golf but there is also limited data from other sports. The aim of the present study is to find the prevalence of the yips in Division I collegiate sports. Another aim of the study is to discover conditions and common factors associated with development of the yips. A survey including questions about prevalence, conditions, and factors associated with the yips was created, and it was completed by 242 Division I collegiate student-athletes. It was found that 13.2% of participants have experienced the yips in their athletic career and female athletes were more prone to develop the yips compared to male athletes. Also, 81.3% participants reported the yips experience in their upper extremities. The results provide a better understanding of the yips across a variety of sports. Further research about the yips within female athletes and sport movements that predominantly involve upper extremities is needed to learn more about the yips experience and eventually develop a diagnostic tool. Education of athletic personnel regarding the yips is also recommended to properly recognize and manage the condition.

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Kinesiology

Session III

Poster No. 13

The Effect of Hydration on Landing Error Scoring System Scores in Dehydrated, Hyperthermic, and Fatigued Males

Objective: To examine the effects of exercise-induced dehydration, hyperthermia, and fatigue on Landing Error Scoring System (LESS) scores during a jump-landing task. The second purpose is to determine if a personalized hydration plan during exercise affects LESS scores during a post-exercise jump-landing task. Methods: Five recreationally active ($\text{VO}_{2\text{max}}: 60.1 \pm 6.2 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$), heat-acclimatized males ($25.4 \pm 5.7 \text{ yr}$; $175.7 \pm 8.2 \text{ cm}$) completed two trials: with fluid replacement, equal to their sweat rate receiving fluid every 10 min (EXP) and without receiving 100 mL of fluid every 30 min (CON), in a counterbalanced, randomized, cross-over fashion. Exercise consisted of a 50-90 min intermittent exercise protocol that took place outdoors ($\text{WBGT} \geq 26^\circ\text{C}$). Exercise was terminated when gastrointestinal temperature (T_{gi}) = 39.5°C and fatigue $\geq 7/10$, or exercise time = 90 min. Percent dehydration was determined by total body mass change measured via body weights pre-exercise (PRE) and post-exercise (POST). T_{gi} , heart rate (HR), and perceived fatigue were measured PRE, during exercise, POST. Three jump-landing tasks were filmed with two video cameras recording the frontal and sagittal plane movements PRE and POST. An experienced grader evaluated jump-landing movement technique using the LESS. Statistical Analysis: A two-way repeated measures ANOVA compared time (PRE vs POST), trial (EXP vs. CON), and interaction effects for primary dependent and independent variables. A priori dependent t-tests evaluated pairwise comparisons of practical significance. Results: The intermittent exercise protocol induced similar dehydration (%) (2.59 ± 0.52 , 0.92 ± 0.41 ; $p < 0.001$), hyperthermia ($^\circ\text{C}$) (39.29 ± 0.31 , 39.03 ± 0.61 ; $p = 0.425$), and fatigue (9 ± 1 , 9 ± 2 ; $p = 0.424$) in CON and EXP. Dehydration, hyperthermia, and fatigue did not affect POST LESS scores ($p = 0.437$), nor did the personal hydration plan ($p = 1.00$). Conclusion: LESS scores were not affected by exercise-induced dehydration, hyperthermia, and fatigue. Similarly, a personal hydration plan during exercise did not mitigate changes in LESS scores post-exercise.

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Chemistry

Session III

Poster No. 14

Electronic Conduction of Solid State Thick Films of Alkanethiolate Capped Ag Nanoparticles

Electronic conductivity, σ_{EL} , in solid state thick films of alkanethiolate Ag nanoparticles (Ag MPCs) occurs via an electron hopping process wherein electron(s) propagate from one Ag MPC to another through a field of alkanethiolates. In our investigation, hexanethiolate Ag nanoparticles are prepared via a modified two phase Brust method, characterized via UV-Vis by surface plasmon resonance (SPR) absorption and tunneling electron microscopy (TEM) for average size and size distribution determination. Additionally, Ag MPCs capped with alkanethiolates varying in chain length from seven to twelve are prepared via single solution phase ligand replacement reactions. Solid state films are prepared by the drop cast method on interdigitated array electrodes (IDAs), which feature both a heating element and resistance temperature detector (RTD) for both temperature control and determination. Conductivity of these films is measured via linear sweep voltammetry (LSV). We hypothesize that the electron hopping rate constant, k_{EX} , in these films is both alkyl chain length and temperature dependent.

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Chemistry

Session III

Poster No. 15

Study of Invertase Catalyzed Sucrose Hydrolysis in the presence of Sucralose by Blood Glucometer and Nuclear Magnetic Resonance Spectroscopy

Sucralose, a derivative of sucrose, is a noncaloric artificial sweetener used as a sugar substitute because of its sweet taste and zero caloric effects. Studies suggest that sucralose is biologically inert because it enters and exits the body unchanged. Although studies on sucralose have shown that it is not metabolized, more studies are required to better understand its functionality in the body. Specifically, does sucralose also interact with other biological processes and proteins? The inversion of sucrose by the enzyme invertase is a key biological process, which if inhibited could have unfavorable consequences. In this study, we investigate the effect of steady-state enzyme kinetic reactions on the substrate sucrose in the presence of sucralose and invertase enzyme. Analysis of the time-based product inhibition gives insight into sucralose induced alterations in the binding and efficiency of the enzyme to the substrate. Real-time progression of enzyme kinetics are performed using nuclear magnetic resonance (NMR) spectroscopy and the results are validated using blood glucometer. Our results find that sucralose competitively inhibits the inversion of sucrose, suggesting that sucralose is not physiologically inert. Ultimately, questioning the health impact of sucralose and other noncaloric artificial sweeteners and their impact in normal biological functions.

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Biology

Session III

Poster No. 16

Analysis of Prey Variation of Juvenile Chinook Salmon by Stable Isotope Analysis

The goal of the San Joaquin River Restoration Program is to restore and maintain Chinook Salmon in the San Joaquin River below Friant Dam to the confluence of the Merced River, which is the 'nursery' area for juvenile Chinook Salmon. However, it is unknown if this stretch of the river can be counted on as suitable habitat to restore Chinook Salmon. To better understand how juvenile survival and growth may vary along the restoration area, we are collaborating on using experimental net pens in three different locations along the River. The nets retain fish, but they allow water and small invertebrates to pass through. Because of this, it is assumed that the captive salmon will be on a diet consisting exclusively of invertebrates found in that part of the river. However, there are also free-ranging fish that are captured, but they are not isolated in net pens. Do they have the same access to and consume the same types of prey as their counterparts in the net pens? We need a way to determine if variation in prey consumed and the resultant growth of juveniles is affected by location and/or net pen or free-living status and to see whether this changes over time. This project will resolve these issues by conducting stable isotope analysis (SIA) on juveniles, which is a way to chemically track their food sources. This project focuses on comparing the stable isotope ratios of free living and salmon in net pens. We can compare the diets of salmon found in the three different sites with the growth rates observed during their time in the net pens. The stable isotope analysis is currently being done at the UC Davis Stable Isotope Lab and the results are projected to be available to us by April 1st.

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Chemistry Department

Session III

Poster No. 17

ANALYSIS OF COLOR OF “CRIMSON SEEDLESS” GRAPES TREATED WITH ORO151

Although “Crimson Seedless” is a popular late-season red table grape in California Central Valley, its poor coloration greatly affects its economic value. The use of Plant Growth Regulators is essential to achieve the desirable red color of this variety. In this study, we test the effect of a new plant growth regulator, ORO 151, on enhancing Crimson Seedless color in Fresno State grape yard. Anthocyanins, red pigments of “Crimson Seedless” skins, are quantified to assess the effectiveness of ORO 151. After the first season, results from UV-VIS spectroscopy analysis showed that grapes treated with ORO 151 produced a significantly higher level of anthocyanins in grape skins compared with those of the control grapes. Especially, the grapes applied ORO151 with Wetcit, an adjuvant, produced 14.25 mg/L anthocyanins, five times higher than those of the control. Result from HPLC analysis also showed that the level of all anthocyanin species in the grapes treated with ORO 151 were higher than those of the control.

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Mechanical Engineering (Energy Engineering Research Group)

Session III

Poster No. 18

ZnO-Epoxy-Graphene Electro-active Composites

Piezoelectricity can be defined as a linear electro-mechanical interaction between the mechanical energy and electrical energy states that is governed by the lattice structure of materials; with a unit cell that has no inversion of symmetry. Under application of mechanical strain certain materials become electrically polarized known as direct piezoelectric effect and vice versa. It is well known that two-phase piezoelectric-epoxy composites offer benefits over their single phase counterparts, as the properties of the constituent phases combine to improve the range of applicability. The electrical properties of the polymer matrix may be enhanced by including electrically conducting inclusions however, less is known about the mechanisms that drive the changes in these properties. The purpose of this project is to study the role of the dielectric and piezoelectric properties of graphene based composite piezoelectric materials. Due to the unique electrical and mechanical properties such as it is stretchable up to 20% of its initial length and it has high conductivity due to the unidirectional structure with the ballistic transport of electrons, the role of graphene is critical in tailoring the electrical and mechanical properties of the multiphase composites. ZnO-Epoxy-Graphene composites are fabricated and their properties are characterized by measurement of the piezoelectric and dielectric properties. The three phase ZnO-Epoxy-graphene sol-gel is prepared by dispersing graphene in ethanol and subsequent sonication in an ultrasonicator. A mixture of ZnO and Epoxy resin will be added to the graphene suspension in ethanol and the mixture will be sonicated again. The micro-structure of these composites is also be studied using the Scanning Electron Microscope (SEM) and Energy-dispersive X-ray spectroscopy (EDS) in the Mechanical Engineering Department in the Lyles College of Engineering. The electrical properties will be investigated using an impedance analyzer.

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Chemical Engineering (Biochemical Emphasis)

Session III

Poster No. 19

HIV-1 protease inhibitors from marine brown algae derived compounds: a literature review

The human immunodeficiency virus type 1 (HIV-1) is an infectious disease, where if left untreated it can be fatal and progress to acquired immunodeficiency syndrome (AIDS). Finding a cure and more treatments for HIV has become a top priority in medical research and due to the cost of synthetic HIV medication, finding a low-cost alternative is essential. Marine pharmacology has provided a possible solution to costly HIV medication through marine brown algae derived compounds that inhibit the HIV-1 protease (PR). The objective of this study is to emphasize the necessity for further research in HIV-1 protease inhibition using marine wildlife derived compounds. In order to better understand the process of protease inhibitors I will examine the process of producing and purifying HIV-1 PR, extracting and isolating brown algal compounds and the assays used to test the inhibition effects of the brown alga compounds. This study demonstrates the potential of marine pharmacology as an inexpensive alternative to synthetic pharmaceuticals for HIV-1 PR inhibition.

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Physics

Session III

Poster No. 20

Optimal sensitivity of x-ray fluorescence detection of arsenic in skin phantoms using an x-ray optics system

Arsenic (As) is a well-known toxic element. While the toxicity of acute As poisoning was known for centuries, the adverse health effects of long-term As exposure were the focus of more recent studies. The As exposure occurs mostly via human consumption of contaminated well water – a naturally occurring problem in many parts of the world. The excess of As intake leads to its accumulation in keratin-rich tissues such as skin, nails, and hair. Skin is less prone to external As contamination, hence, a better biomarker than nails or hair.

In x-ray fluorescence (XRF) techniques elements in trace concentrations of a few $\mu\text{g/g}$ or lower can be identified via the detection of their characteristic x-rays emitted during the x-ray irradiation. Low radiation dose ($<20 \text{ mGy}$) studies with portable spectrometers demonstrated their potential for the assessment of long-term As exposure, particularly in remote parts of the world. However, the built-in excitation-detection geometry in the portable spectrometers was not optimized for the detection of the superficially distributed As within the skin. In this study the sensitivity of As detection in fiberglass resin skin phantoms was found to reach a maximum for a 5-degree angle between the phantom surface and the x-ray beam. An x-ray optics system ($\sim 25 \mu\text{m}$ beam size at 4 mm focal length), an x-ray detector, and a positional stage assembly were used to measure the peak amplitudes of As Ka (10.5 keV) in skin phantoms doped with As in 0, 4, 6, 8, and 12 $\mu\text{g/g}$ concentrations. Using three 180 s trials for each As concentration a linear calibration with a slope value of 19.4 ± 0.6 counts per $\mu\text{g/g}$ of As concentration was obtained. This sensitivity value is more than two times higher than previously published values obtained with portable spectrometers in skin phantoms in similar x-ray exposure experiments.

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Engineering

Session III

Poster No. 21

A Primer on Life Cycle Analysis of Cementitious Composites with a Focus on Embodied Energy and Emissions

This project presents a preliminary study on the sustainability of concrete with a focus on emissions and embodied energy of its ingredients. These characteristics are essential in developing a life-cycle analysis model for embodied energy and emissions. The results of such analysis determined the application of alternative cementitious and granular materials in sustainable infrastructures. The first part of the project involves a review of standard practices and criteria for properties of cementitious composite materials, such as structural performance, thermal and acoustic insulation, etc. This review includes sustainability rating systems such as ENVISION, LEAD, and BREEAM. The second part of the project focuses on the energy inputs and emissions of alternative and supplementary ingredients, including supplementary cementitious materials, alternative aggregates, non-potable water, reinforcing fibers, admixtures and other ingredients. The last part of the report introduces a life-cycle model to cover various phases of production and application. Results indicate that production of cement is the most energy intensive process, responsible for the largest amount of carbon dioxide emissions. However, this impact is reduced by incorporating supplementary cementitious materials such as fly ash and slag. Results also indicate that application of certain alternative materials enhances the durability of concrete and reduced the need for additional energy intensive repair processes.

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Mechanical Engineering (Energy Engineering Research Group)

Session III

Poster No. 22

Water purification using plasma micro-discharge towards development a hybrid water treatment system

The greatest challenge facing our world, today, is a lack of clean water. In 2013, the United Nations reported that 783 million people lacked access to clean water while approximately 2.5 billion did not have adequate sanitation, causing six to eight million deaths annually. Additionally, nearly 90% of wastewater is not treated before reentering natural bodies of water, destroying entire ecosystems, and populations that use the contaminated water. This project seeks to research and develop systems utilizing micro-plasma discharge to purify water efficiently. Plasma has a number of newly emerging uses, including water treatment processes, which have multiple benefits that include a lack of toxic byproducts. Researchers at NASA's Glenn Research Center in Cleveland, Ohio have developed a plasma discharge method of water reclamation, for use on spacecrafts, but the technology has diverse applications. Such developments, paired with new energy production technologies, will allow plasma based water purification systems to address the global demands for improved sanitation and clean water. This project begins with construction of an apparatus that will produce a corona discharge, a type of plasma discharge with high voltage and low current, by creating a high electric potential between a conductive needle and a grounded electrode submerged in water. The discharge propagated across the intermediate region causes electroporation in bacteria, preventing them from reproducing; UV radiation, which kills other organisms; and Ozonation, which chemically cleanses the water. Water contamination data will be collected to optimize the effectiveness and energy efficiency of the system. Both electrode distance between the needle and grounded plane, and use of a dispersive medium positioned between the two, will be considered. The findings will allow future researchers to begin with an optimized system, providing a foundation for the design of improved water treatment systems.

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Mechanical Engineering (Energy Engineering Research Group)

Session III

Poster No. 23

Epoxy and ZnO based viscoelastic and electro-active composites towards enhancing acoustic absorption in mechanical and civil structures

A combination of solution based processing have been used to synthesize and fabricate viscoelastic polymer composites with embedded electro-active materials such as Epoxy matrix based BaTiO₃, ZnO and ZnO nanowire composites. These materials will enhance mitigation of impact and acoustic disturbance by means of absorption of vibrational energy and eventual energy conversion to electrical energy. The electron transport properties of these materials were enhanced and tailored by addition of conductive phases such as graphene and carbon nanotubes. The geometry and composition of the components are varied in the composite systems to optimize the electro-mechanical coupling, dielectric and piezoelectric properties of these materials. Micro-plasma based corona discharge techniques are used to align the dipoles of the electro-active component and also for localized surface modification towards variation in surface energy of these visco-elastic composites. The effect of variation in surface energy and its relationship with surface bonding to metal and graphene electrodes are studied towards effective energy conversion by utilizing different regimes of electron transport such as electron hopping and tunneling electron transport. The microstructure of the materials are also analyzed with the help of a scanning electron microscope. The elemental distribution, ageing effects, degradation of the materials and electrodes and surface morphology were analyzed with the help of raman spectroscopy and an atomic force microscope. The electro-mechanical and dielectric properties are studied using an impedance analyzer and a piezometer. The visco-elastic materials are also characterized based on their acoustic absorption properties by the use of an impedance tube and different acoustic sources.

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Mechanical Engineering

Session III

Poster No. 24

Chemical Recycling of Si PV Panels

A current Si PV solar module has a life expectancy of 30 years. Disposing of these end of life panels is becoming an environmentally hazardous process. On the other hand, silicon, which is the primary material in a PV solar panel, is expensive owing to its limited supply. Researchers have found out that silicon can be recovered from the spent cells and the damaged PV module can be remanufactured using proper recycling methods. There are two types of methods used for recycling a solar panel. One is by chemical recycling and the other is by thermal recycling.

The project presents about the chemical recycling of end of life PV solar panels and various processes involved in it. The recycling of PV panels includes two important steps: PV solar cell separation by thermal delamination process and then cleansing the surface of the cell by a chemical etching process. The cell is then recycled using a series of recycling steps conducted on the silicon extracted by the chemical etching process.

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Civil Engineering

Session III

Poster No. 25

A Sustainable Approach to Assess the Resilience of Perforated Wood Shear Walls

A holistic approach to assess performance of perforated wood shear walls with large openings was performed. This approach incorporates the ENVISION sustainability rating system to assess the impacts of openings on both architectural and structural characteristics of wood shear walls. These characteristics relate to various functions of an opening, such as lighting and insulation, as well as strength and ductility requirements of the shear wall. Analyzing wood shear walls subject to extreme loading, such as earthquake-induced excitation, provides an opportunity to assess the resilience of the system. Comparison of such assessment with the code-based approach to performance-based design of perforated wood shear walls allows architects and engineers to gain more insights about sustainability and resilience of the system as one unit.

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Physics and Mathematics

Session III

Poster No. 26

Force applied by any surface

The purpose of this project was to take the idea of the normal force from a slope problem done by many students in physics 4A, and see if it could be generalized to other surfaces. Students who have taken 4A are aware that it is possible to find the force a slanted line will apply on an object in order to support the object against gravity, and this project takes the idea one step further.

Techniques used involved constraining forces(same concept as the 4A slope problem), as well as some vector calculus. The constraining force is our end result which has a "dummy function" in it where you would plug in the function defining a surface, and vector calculus was used to keep the math as general as possible without making any assumptions.

The results were promising, showing a very general form for finding the normal force of any given function. This result incorporates multiple data points about the system, including the function of the surface, the velocity of an object on the surface, the mass of the object, as well as any external forces being applied on the object(including but not limited to gravity). An example will be included showing that this generalized form will generate the slope problem done in 4A.

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Agricultural Business

Session IV

Poster No. 1

Stochastic Simulation for the Future of California Blueberry Production

California blueberry production, typically, has been limited to northern California and the coast line because blueberries prefer cooler and wetter climates (Blizzard, 2008). Advancements in irrigation as well as the recent water conservation technologies have supported the possibility of blueberries being grown in other parts of California, such as the Central Valley (Meeks, 2009). The purpose of this study is to examine the overall profitability and the future production of blueberries in California.

This study uses state level blueberry production data from United States Department of Agriculture – National Agricultural Statistics Service (USDA-NASS) for forecasting future production in California (USDA-NASS, 2017). In order to estimate production feasibility, farm level production cost data are collected from various sources, such as University of California Cooperative Extension and other sources (UC-Extension, 2012; Jimenez, 2009). The simulation is conducted using Multivariate Empirical Probability Distributions model in Simulation for Excel to Analyze Risk, SIMETAR software (Richardson et al., 2000). Production cost data are combined, and compared with the forecasted production level in a spreadsheet model.

Descriptive data summary shows that blueberry production has steadily increased more than 200% from 1,700 acres in 2005 to 5,900 acres in 2015. Yields per acre have also increased due to increased efficiencies, from 4,800 cwt/acre to 10,900 cwt/acre over the same period. Moreover, the total value for California blueberries has also steadily increased from \$40.6MM in 2005 to \$117.3MM in 2015. Preliminary forecast and feasibility results indicate that the growth in blueberry production will continue and the growth will probably be supported by new investments in central valley.

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Industrial Technology

Session IV

Poster No. 2

Analytics for SmartFarming (Soil Library for Sensors)

The objective of the research is to create a Do It Yourself kit for Farmers and crop consultants with affordable Data Acquisition System for deployment in the farm (SmartFarm). To carry out this objective, we have to build a soil library for testing soil sensors across the board E.g. Soil moisture, soil pH and soil electrical conductivity. By building a soil library, we can integrate different sensors for various soil parameters. Soil samples was collected from Earlimart, California and had to undergo various grinding processes. The soil grinding processes included the use of a Soil Tumbler which was used to break down heavy clogs of soil with the help of large-sized pebbles. Another process included grinding soil through a soil grinding machine and using multiple sieves to attain fine soil. Initially we started with 5 types of soil and we will expand it to 12 types based on availability. Through testing various sensors and probes on the various soil types present in the soil library, we can create a reference database and upload it to an open-source cloud which will enable growers and crop consultants to verify with the data they collected. This free open-source cloud access will give farmers a better option to decide what's best for their crops rather than spending big money on commercial cloud based companies. We have successfully created a soil library for working with the sensors. We can use this to analyze new data analytics tools, agronomics and precision agriculture/site-specific crop management.

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Animal Science

Session IV

Poster No. 3

The Effects of Various Levels of Protein, Lysine, Fat, and Fiber on Swine Growth and Pork Quality

Davey (1976) found that improvements in carcass composition are associated with the feeding of higher protein levels. Diets with higher protein content were associated with lower intramuscular fat content and less-tender (higher shear force value) meat. Therefore, the objective of this study was to determine how varying levels of protein, lysine, fat, and fiber in swine diets affected swine growth and pork quality. The study was performed at the Fresno State Swine Unit where data was collected on a total of 12 crossbred barrows, 2 barrows per treatment per replication (3 replications), with littermates in each test group. The barrows started at approximately 4 months of age and were fed specific diets for approximately 59 d. Two different diets were used: a commercial hog feed (protein- min 14%, lysine- min 0.69%, fat- min 6.8%, fiber- max 8.7%) and a show hog feed (protein- min 22%, lysine- min 1.55%, fat- min 1.80%, fiber- max 2.6%). The data collected were weekly weights, dressing percentage, instrumental color (L^* , a^* , b^*), subjective color, firmness, marbling, loin eye area, and tenth and last rib fat thickness. Data were analyzed using the Proc ANOVA procedure of SAS with statistical differences being set at $p < 0.05$. The results of this study determined there were minimal differences between the two diets when it came to weekly weights and pork quality. However, the barrows fed the show feed had a higher dressing percentage (76% vs 72%; $p = 0.0111$) and higher muscle score (2.5 vs 2; $p < 0.0001$). All live weights and pork quality traits were not significantly different ($p > 0.1$). Results of this study suggest that diets higher in protein and lysine and in lower fat and fiber leads to a higher dressing percentage and muscle score. Therefore, carcasses should end with more product on them.

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Family and Food Science

Session IV

Poster No. 4

Family-Based Workshops Associated with an Increase in Vegetable Consumption

Abstract:

Objective: To test the effectiveness of a child nutrition class within a 6-week family-based healthy eating program that included a focus on increasing fruit and vegetable consumption among Latino children.

Methods: A 6 week child nutrition education class for Latino children between the ages of 5- to 16- years old with a focus on portion control, MyPlate government recommendations, increased fruit and vegetable consumption, and sugar moderation.

Hypothesis: By the end of a 6 week child nutrition education classes, the children in the experimental group will increase their consumption of fruits and vegetables.

Results: After the six-week intervention program the frequency of vegetable intake increased significantly. During the pre-survey the parents reported the child eating one vegetable a day (other than fried potatoes). The post-survey showed that the child had increased vegetable intake to two vegetables a day. Unfortunately, this significance was not seen in fruit consumption. Parents reported their children eating one and a half pieces of fruit a day in the pre-survey test, and this number did not change in the post-survey test.

Conclusions and Implications: Children do not meet the daily dietary guidelines for fruit and vegetable intake. Children who do not consume an adequate amount of fruits and vegetables have an increased risk of developing chronic diseases, obesity, and a compromised immune system. Nutrition education for both parents and children is essential to increasing fruit and vegetable intake. Through nutrition education families can better understand the importance of regularly consuming a variety of fruits and vegetables in their diet.

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Department of Communicative Sciences and Deaf Studies

Session IV

Poster No. 6

**COMPARING THE EFFICACY OF PICTURE CARD STIMULI TO STORYBOOK STIMULI IN
TEACHING MORPHOLOGIC STRUCTURES TO CHILDREN WITH EXPRESSIVE LANGUAGE
DISORDERS**

The purpose of this research study was to investigate the efficacy of discrete trial teaching (DTT) using picture card stimuli compared to DTT using storybook stimuli in teaching morphologic structures to children with expressive language disorders. One 7-year-old female child met the inclusion criteria and participated in the study. The author conducted an alternating research design between DTT using picture card stimuli and DTT using storybook stimuli with two separate target behaviors; irregular past tense verbs (experiment 1) and irregular plurals (experiment 2). The results indicated that DTT using both types of stimuli were effective, with little difference in the relative efficacy of DTT delivered with picture cards compared to DTT delivered with storybook stimuli. Results of probes for generalization and maintenance indicated that the participant was able to retain the targeted irregular past tense verbs and irregular plurals. Future research should be conducted to determine if the complexity of storybooks and the number of opportunities provided to evoke the targeted word or behavior would display any significant gains in favor of DTT embedded in storybook stimuli as opposed to DTT using picture stimuli.

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Communicative Sciences and Deaf Studies

Session IV

Poster No. 7

“IT’S OUR NORMAL” – A FOLLOW-UP STUDY ON ADAPTATIONS FAMILIES MAKE FOR OLDER CHILDREN WITH DEVELOPMENTAL DISABILITIES

The objectives of this study were to determine the accommodations that families of older children with developmental disabilities (DD) make in order to positively adapt to the child. A framework based on resiliency theory was utilized in order to address the following research questions: (1) What specific accommodations have family members made for their children with DD and how have these accommodations changed over the years? (2) How have the perceptions of these family members changed over the years? (3) What role(s) have service professionals made in the development of these accommodations, and how have relationships with these professionals changed over the years? (4) How have services changed over the years as the child has gotten older?

This was a follow-up to a qualitative study originally conducted by Maul and Singer (2009). A grounded theory framework was used to discover which common themes may have persisted throughout the years, as well as new themes that might have emerged as the children got older. Eight families were interviewed during the course of this study. Six of the families who participated in the original study agreed to be interviewed for this follow-up, and two of the families were new to the study. The ages of the target children ranged from 12 to 22 years. An interview guide was used in order to facilitate the interviews.

The results of the study revealed the following themes: (1) “it’s our normal”/acceptance of the child; (2) parents as experts; (3) general safety; (4) approaching adulthood; (5) services; and (6) family as a team versus family as a barrier. An analysis of the original study was also conducted on responses from the original six families. The conclusion discussed the implications of these themes and how they could be applied to professional practice.

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Physical Therapy

Session IV

Poster No. 8

A Multidimensional Rehabilitation Program for a 69 Year-Old Male with a Fear of Falls: A Case Report

Gait and balance disorders, which can lead to falls, present an extensive risk to the elderly population with multiple health conditions. As a result, an increase in fear of falling has been connected to reduced activity participation. The purpose of this case report is to demonstrate the effectiveness of rehabilitation interventions for improving balance and gait of a high-functioning client, with multiple comorbidities, and a fear of falling.

The client was 69-year-old, Caucasian male with medical diagnoses of bilateral (B) hip replacements and peripheral neuropathy presenting to the Fresno State Gait Balance and Mobility Center (GBMC) for physical therapy. His primary impairments were postural instability and a fear of falling.

Interventions focused on dynamic gait variation, computerized limits of stability training, and facilitated proper organization and integration of balance sensory systems. Specialized agility training was featured to promote the client's return to recreational activity.

There were significant improvements in appropriate sensory organization and integration for balance and gait demonstrated by a 5-point increase in the Fullerton Advanced Balance Scale and a 7-point increase in the Functional Gait Assessment outcome measures. The client exhibited increased limits of stability confirmed by advancements in reaction time and directional control.

The multifaceted intervention approach of gait, balance, strength, and sensory organization training proved to be effective in enhancing globalized movement patterns and overall function.

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Plant Science

Session IV

Poster No. 9

Identification of potential oomycete plant pathogens from natural waterways in Fresno County to irrigation reservoirs at the University Agricultural Laboratory

Phytophthora spp. and Pythium spp. belong to a class of fungal-like organisms known as oomycetes. Many species in these two genera cause devastating yield losses to a variety of annual and perennial crops grown in California. Previous research on the University Agricultural Laboratory (UAL) at California State University, Fresno identified a number of known oomycete pathogens from the soil and irrigation reservoirs. The species identified from the UAL are also frequently baited from streams from forest ecosystems in California. The objectives of this current research were to 1) expand the previous survey by baiting oomycete plant pathogens from natural waterways supplying Fresno County crops, 2) characterize baited oomycetes to species, and 3) compare species composition from natural waterways and the UAL to determine a possible source for these oomycetes to enter the irrigation reservoirs at the UAL. Oomycetes were detected from water samples using a standard pear baiting technique. Symptomatic fruit tissue was excised and plated on an oomycete selective medium. Resulting isolates were characterized using direct colony PCR and DNA sequencing. With the exception of Pythium dissotocum and Pythium aphanidermatum, there was little evidence of an overlap in species composition between the natural waterways and the UAL. However, three species recently described as pathogenic to pistachio were identified. Phytophthora parsiana, Phytopythium helicoides, and Phytophthora taxon walnut, were detected in several locations that could potentially be transmitted to the UAL through irrigation water.

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Plant Science

Session IV

Poster No. 10

OPTIMIZING NUTRIENT MEDIUM ION CONCENTRATION FOR LABORATORY-CULTURED AQUATIC UTRICULARIA PLANTS

Carnivorous plants are challenging to propagate because of their unusually low-nutrient habitats. We need protocols to grow them in laboratory conditions, because carnivorous plants are increasingly relevant to fundamental research (genetics and evolution: the genus *Utricularia* has species with the smallest genome among angiosperms) and applied research (bio-inspired engineering: pitcher plants have non-stick surfaces to catch prey). We still lack recipes that describe or customize a nutrient medium specific for *Utricularia* (bladderworts) to make propagating them in a lab easier. The gold-standard for culturing these plants is still an extract of sphagnum peat-moss in distilled water. However, peat solutions are chemically complex, making it difficult to control pH, osmotic pressure, and relative nutrient ion content. The nutrients contributed by captured prey also create some variability that limits our ability to conduct growth and mineral nutrition studies. Our objective was to develop an inorganic synthetic culture medium that closely replicates low-nutrient native habitats, without confounding variability in concentrations of plant available nitrogen, phosphate, potassium and major micronutrients. We compared growth rates (strand length) in plants grown in different dilutions of peat-water solution and the corresponding ion concentrations in our synthetic culture medium. Our results indicate that growth rates in our synthetic media are minimal compared with the peat-water solution at all levels of dilution, suggesting a significant contribution from polysaccharides, organic forms of nitrogen, and phosphate found naturally in peat moss.

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Plant Science

Session IV

Poster No. 11

**Effect of Walnut and Pistachio Sap on Spore Germination and Mycelial Growth of :
Neofusicoccum mediterraneum, *Neofusicoccum parvum*, *Phomopsis* (Nomelini spp.),
and *Diaporthe neotheicola* (*Phomopsis neotheicola*)**

Spore suspensions from one isolate of each of *Neofusicoccum mediterraneum*, *Neofusicoccum parvum*, *Phomopsis* (Nomelini spp.), and *Diaporthe neotheicola* (*Phomopsis neotheicola*) were treated with filtered sap extracted from commercial walnut and pistachio cultivars and spore germination rates were measured. Additionally, filtered sap was applied to 4 mm mycelial plugs and the growth measured after incubation. Pistachio sap increased the mycelial growth of *phomopsis*, *Neofusicoccum parvum*, and *Neofusicoccum mediterraneum*. Walnut sap inhibited the mycelial growth of *Diaporthe neotheicola* (*Phomopsis neotheicola*). Walnut sap decreased the spore germination rates of all four isolates tested.

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Department of Child, Family and Consumer Sciences

Session IV

Poster No. 12

The Effect of a Six-Week Family-Based Healthy Eating program for Latino Children on their Consumption of Sugar-Sweetened Beverages, Fast Foods, and Sweets

Objective: Childhood obesity is prevalent. Research has shown that family-based interventions can form long-term lifestyle changes in dietary habits (St. Jeor, et. al. 2002). This study evaluates the effectiveness of the six-week family-based healthy eating and behavior program, Abriendo Caminos. The primary focus of this study is to evaluate the efficacy of this program on the reduction of sugar-sweetened beverages, (SSBs), sweets, and fast foods, consumed by Latino children at the end of their participation in this program.

Methods: A total of 29 families participated in two cycles of the Abriendo Caminos workshops. Abriendo Caminos is a healthy living program for Hispanic families with a child between the ages of 5-18. The study specifically looked at the pre and post data relating to the consumption of SSBs, sweets, and fast foods of Latino children participating in the program. Initial data were collected through pre and post parent-reported surveys.

Results: The results of the program's pre and post surveys show no statistically significant change concerning the consumption of SSBs: $t(20) = .08$, $p = n. s.$ However, there was significant reduction in the consumption of fast foods ($t(17) = 2.26$, $p = .037$), and a comparable reduction in sweets ($t(16) = 2.05$, $p = .057$).

Conclusions: The lack of any statistically significant changes in SSBs could be attributed to the reported low baseline consumption of SSBs. We emphasize moderation rather than elimination. However, the data concerning the consumption of fast foods and sweets did show reductions. Programs like Abriendo Caminos may have a positive effect on the dietary habits of Latino children. Further studies on the efficacy of longer term intervention programs are warranted.

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Psychology

Session IV

Poster No. 13

EVALUATING THE EFFECTS OF HIGH-PROBABILITY/LOW-PROBABILITY SEQUENCES ON A MEASURE OF INTERROGATIVE SUGGESTIBILITY

Interrogative suggestibility is characterized by factors present during interrogations that make people more likely to accept inaccurate information and change their responses accordingly. Research on interrogative suggestibility has been vital in changing the way interrogations are conducted in court trials, yet many different factors that are present during interrogations, have not been investigated. Recent research has emphasized the importance of verbal feedback, yet no research has analyzed the possible effects if any, of building such momentum during interrogations by manipulating the order of questions (suggestible vs. non-suggestible). High-probability/low-probability sequences involve presenting tasks that are more likely to be completed first, then presenting tasks that are less likely to be completed. The purpose of this study was to examine the effects of high-probability/low-probability sequences on a measure of interrogative suggestibility, by altering the order of questions presented in an analogue interrogative context. Fifty-two undergraduate college students participated in the study, and each participant was assessed individually. Two randomly assigned passages from the Gudjonsson Suggestibility Scales Manual were used. All participants were exposed to both conditions in the study. The baseline condition consisted of the presentation of questions in the standard order; one non-suggestible question followed by 3 suggestible questions. The high-probability/low-probability sequence condition consisted of presenting 5 non-suggestible questions followed by 15 suggestible questions. Results showed a statistical significant difference between the high-probability/low-probability sequence condition and the baseline condition for the participants' first responses to the questions. No other correlations between any of the other variables showed any statistical significance. The effect obtained in this study between the two conditions tested for the first responses to the questions is of importance because it shows the effects of building momentum during questioning. In addition, it highlights the importance of limiting these sequences in contexts where compliance may not be beneficial.

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Criminology

Session IV

Poster No. 14

Thesis

The aim of the proposed research is to examine the causes of inmate-on-inmate female violence in prisons. The main research question will ask what variables are responsible for inmate-on-inmate female violence in prisons. The study will test the hypothesis according to the reviewed literature; "Prison environment predicts the increase of inmate-on-inmate female violence in prison. The proposed study will be based on the already collected data set, which is already identified by the researcher, that is; "Women Coping in Prison at the Fluvanna Correctional Center for Women in Virginia, 1999-2000 (1CPSR 3354)."

The study will be secondary in nature. The proposed sample size will be 80 subjects to fit the study in question. The proposed research will be basically quantitative in nature due to the limited time frame. Quantitative data collection methods will correspond to those of the study on which the data set is based. The researcher will use Statistics for Social Science as a computer software program (SPSS). Qualitative data will be reviewed based on the existing literature in order to obtain a clear understanding of the proposed study topic.

After accessing the identified data set, data will be statistically analyzed at two levels. The Univariate analysis will be performed with cross tabulation to establish and explain the relationships between the dependent and independent variables. After the analysis, the researcher will then make interpretations and discussions of the findings as portrayed by the statistical tables. The proposed study will allow a deeper understanding of the causes of inmate-on-inmate female violence in prison, whether violence is explained according to the facts that are external to the female inmate or individual factors. However, the variables that will guide the study will be determined by the secondary data set accessed.

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Anthropology

Session IV

Poster No. 15

Changing Reduction Sequences of Obsidian from the Grandad Site, Central Sierra.

The Grandad site, located in the Central Sierra near Mariposa, California, has produced evidence of continuous occupation from 9,000 BP (stem points) to contact with Europeans (DSN) based on point types. An analysis of the obsidian chipping waste from two deep archaeological excavation units (0-100cm & 0-60cm) on which we performed a series of mass lithic analysis; a process in which flakes (or debris left over from making the points) were sorted out by the three types of flakes which shows production sequences of tools or in this case points being manufactured which are broken down into primary, secondary, tertiary/ interior, and size. This provides evidence of a changing reduction sequence from biface blank characteristics of large dart points to flake based reduction sequences characteristic of arrow points. We looked at the changing amounts of cortex on obsidian flakes with the depths and concluded that both archaeological units reflects the changes in how the obsidian was coming to the site.

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Computer Science

Session IV

Poster No. 16

Mobile application implementation of biologically inspired visual scene perception.

Computations used for visual scene perception can be studied by analyzing the way in which ants navigate within familiar scenes. Ants traveling between home and a foraging area can set their direction using the surrounding panorama. Features such as edges, peaks, centroids and troughs are available to facilitate route learning and have been shown in previous experiments to be used for navigation. Known behaviors of ants have been used to develop image analysis algorithms that can rapidly extract visual information from any scene and provide testable predictions about the reliability and stability within complex, and cluttered panoramic scenes.

The project here uses Android and the Tango (Google – Alphabet, Inc.) platform device for implementation of image processing algorithms to explore navigational processes. The Tango device utilizes a series of inbuilt sensors for motion tracking, area learning and depth perception. Using this mobile platform we have developed novel imaging applications. This application captures an image and converts it to a low-resolution gray scale image representative of an ant's view of the world. Using this image information we implement a series of OpenCV filters, such as Robinson and Sobel operators that allows us to process edge, peak and trough information and a Blob filter that allows us to extract centroids. With the growing advent of 3D sensors being implemented in phones and tablets, the application provides the ability to visualize the environment in ant perceptive. This provides a unique approach for engaging students in an interdisciplinary way by combining biology, behavior and computer science as well as provides a platform to test new navigational algorithms and hypotheses.

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Computer Engineering

Session IV

Poster No. 17

Testing and Testable Design of Digital System using Industry-Verified Electronics Design Automation Tools

The intention of this paper is to introduce and share empirical knowledge on Synopsys TetraMax, an Automatic Test Pattern Generation (ATPG) for design, verification and testing of digital logic circuits. TetraMax is an ATPG tool used by the largest innovative silicon companies globally to automatically generate test vectors for design verification of Application Specific Integrated Circuits (ASIC). TetraMax is the leading tool for generating minimum test patterns possible that covers maximum test coverage for a wide range of designs. The unparalleled ease-of-use and high performance provided by TetraMax allows designers to quickly create efficient, compact test for even the most complex designs. We will share our knowledge gained through building and configuring Synopsys tools and their application for the design, verification and testing of VLSI circuits. The careers field of VLSI verification and test offers excellent opportunities for fresh engineering graduates. This paper will help engineers to apply theoretical concepts with verified industry tools allows them to gain a deeper level of knowledge of VLSI design, verification and testing, therefore enabling them to become career ready upon graduation. This pedagogical experience on VLSI testing and testable design covering the fundamentals of VLSI test processes and automatic test equipment, test economics, classic D-algorithm, faults, fault modeling and fault simulation in conjunction with the empirical learning of industry leading Synopsys tools for ATPG will be discussed in the paper along with the necessary flowchart's, diagrams and test results. And the same will be presented in the Symposium.

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Mechanical Engineering (Energy Engineering Research Group)

Session IV

Poster No. 18

Fabrication and Characterization of Barium Titanate based Flexible Two-Phase Lead-Free Piezoelectric Composites

Lead-based piezoelectric composites have been studied extensively for their implementation in systems as energy harvesters and as sensors because of their ability to convert a mechanical force into an electrical output and vice versa. Their main drawback, however, is their toxicity which limits their feasibility in applications where environmental risks are a concern or where they can come into contact with consumers. Therefore, lead-free piezoelectric materials such as barium titanate and zinc oxide are being studied since they are promising candidates for use in these applications where lead is not an option. In order to determine how barium titanate and zinc oxide based composites compare to their lead-based counterparts, their properties are studied by dispersing them in an epoxy matrix with different volume fractions that range from 0.10 to 0.70 and coated onto stainless-steel substrates. Silver paint is then applied to the exposed surface to manufacture capacitors that will be used to analyze their dielectric and piezoelectric properties with the aid of an impedance analyzer and a piezometer. A scanning electron microscope (SEM) will also be used to analyze the surface structure of the composite and clusters of the particles embedded within the matrix. The preliminary results from the analyses of barium titanate and zinc oxide are promising. The dielectric constant for barium titanate composites varies from 1.70 to 51.00 and SEM images show that the distribution of particles is uniform throughout. They still cannot compete with their lead-based counterparts with a quantitative measure, but new methods are constantly being discovered to aid in reducing that gap.

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Physics

Session IV

Poster No. 19

Improving lead detectability in plaster-of-Paris bone phantoms using a grazing-angle geometry x-ray fluorescence measurement

The adverse health effects of human lead (Pb) exposure were studied for the past several decades. Consequently, the human Pb exposure has decreased by its removal from common chemicals such as paint and gasoline. Concerns still remain in developing countries and in children where developmental problems were linked to low Pb blood concentration ($<10 \mu\text{g/dL}$). About 95% of the human Pb burden is in the bone. Therefore, the bone Pb concentration is a better indicator of exposure than blood Pb used in clinical assessments. In vivo measurements of Pb concentration in human tibia bone are performed using a K-shell x-ray fluorescence method that uses the gamma-rays emitted by Cd-109 radioisotope. Cost and radiation safety restricted this method to just a few laboratories worldwide. The lower energy L-shell x-ray fluorescence (LXRF) is an alternative method researched in the 1980s and uses an x-ray tube. Lower intensity LXRF emissions, however, pose challenges for the method's translation to in vivo studies.

Grazing-angle is an XRF technique in which sensitivity is enhanced by designing a small incident angle (\sim few degrees) between the x-ray beam and the sample to reduce the x-ray scatter. We employed this technique using a cylindrical $75 \mu\text{g/g}$ Pb-doped plaster-of-Paris ($\text{CaSO}_4 \cdot 1/2 \text{H}_2\text{O}$) bone phantom, a $25\text{-}\mu\text{m}$ x-ray beam, and a counting x-ray detector. Using a positioning stage the bone phantom was placed tangent to the x-ray beam and then moved in $100\text{-}\mu\text{m}$ steps. A single 30 s x-ray spectrum was acquired for each position. Within a 2 mm range an optimal position was found for which the Pb Ka and Pb K β peak amplitudes were measured to be (11.1 ± 0.8) and (11.2 ± 0.4) counts, respectively. The procedure was repeated for the lower Pb concentration bone phantoms: 0, 8, 15, 30, 45, and $60 \mu\text{g/g}$ to obtain a minimum detection value of $7.5 \pm 0.5 \mu\text{g/g}$.

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Civil Engineering

Session IV

Poster No. 20

Subsidence in the Central Valley

The pumping of groundwater over an extended period of time causes land subsidence. Land subsidence is the sinking of the land when water is removed from its place. Land subsidence has many effects on natural systems and man-made infrastructures such as gradient changes in water conveyance structures, which in turn can cause reductions in designed flow capacity. Water conveyance structures tend to be the most sensitive to subsidence but damages to roads, railways, bridges, pipelines, building and wells also occur. The damages combined from subsidence in the Central Valley result in the cost of millions of dollars each year.

A Geo-technical Engineering point of view will focus on the soils where the subsidence is occurring. The soil properties and information from the subsidence area will help identify differences of consolidation due to the types of soils. The differences of soils and consolidation can help show where and possibly why the problem is occurring differently in different areas. With this information, reasonable predictions of future subsidence through a Geo-technical Engineering point of view can be made and a model can be created using the information from different areas. A computer program known as GeoStudio2016 can be used to model consolidation by inputting the necessary information. With the help of this program the model can be used for future predictions and in turn show probable future problems which can hopefully be avoided.

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Mechanical Engineering

Session IV

Poster No. 21

ZnS thin films grown by pulsed electrodeposition method to be used in solar cells

Zinc sulfide (ZnS) is non-toxic, direct bandgap material suitable to be used as the window layer of solar cells. ZnS thin films were grown using pulse electrodeposition carried on an electrolytic bath composed of 25 mM ZnSO₄ and 10 mM of Na₂S₂O₃. ZnS was deposited using a two-electrode configuration on fluorine doped tin oxide glass. Photoelectrochemical cell tests were used to determine the conductivity type of the thin films. The ZnS thin films obtained displayed an n-type conductivity. Optimal growth temperature was of 85 °C whilst pH was kept at 2.0. The surface morphology of the ZnS were characterized using Scanning Electron Microscopy. ZnS grown by pulse electrodeposition is comparable to the ZnS grown by other more expensive fabrication methods such as chemical bath deposition.

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Mechanical Engineering (Energy Engineering Research Group)

Session IV

Poster No. 22

Fabrication of novel lead free methyl ammonium-iodide based perovskite solar cells

In the energy industry new ways of producing energy is necessary. The public image of the energy industry is suffering, due to producing energy from coal and nuclear power. The general populous views these methods with a negative connotation. The new idea is natural renewable energy, which is viewed by the public as very safe and positive. A very popular energy area is solar energy. One of the leading solar technologies is silicon based solar panels. The current research is into the relatively new field of perovskite solar cells, but in the specific niche of lead-free perovskite solar cells. Perovskite solar cells in general show great promise even compared to silicon. The great thing about perovskite solar cells is that they can be manufactured cheaply in traditional wet lab environment. Due to the low cost of production and the high efficiency, research in this field is very promising and in high demand. Most research in terms of efficiency has been in lead based perovskite structures. This research direction investigates into the causes of degradation of efficiency in lead free methylammonium-iodide based perovskite solar cells over time in open environments. The fabrication is a solution based fabrication in a traditional wet laboratory environment. The testing procedure involves a controlled light source and controlled area of exposure to be able to calculate efficiency. A scanning electron microscope and an EDS is used to examine microstructural and elemental properties. Furthermore, an atomic-force microscopy and energy-dispersive X-ray spectroscopy test for surface properties.

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mechanical engineering

Session IV

Poster No. 24

Modeling and control of the prosthetic leg

Currently, many commercial prosthetic legs are available in the market, but most of those prosthetic legs are either extremely expensive, or difficult to operate. Hydraulic brake is a braking mechanism which is inexpensive and easier to operate compared to other devices. The purpose of the study is to model a prosthetic leg that can replace the human leg and do the simulation to test the performance. The prosthetic leg maintains similar physical properties as a real one, such as dimensions and mass. The dynamics of the human knee are understood and presented in the theoretical equations. Control algorithms are researched and trialed to achieve the optimal control for the leg. The experimental model is created to evaluate the performance of motion of both hip joint and knee joint. The simulation results demonstrate that the performance of the prosthetic leg and control algorithms are working well in level walking to users. This project may potentially be used to set up the robotic model, replace a human leg, or doing the future research by using other brake systems.

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Mechanical Engineering (Energy Engineering Research Group)

Session IV

Poster No. 25

Micro-plasma based surface modification of flexible ZnO-Epoxy-Carbon nanotube composites

Plasma is the fourth and most abundant state of matter. It is composed of a quasi-neutral gas composed of both neutral particles and charged ions. Plasma has a number of different uses including material processing, semiconductor manufacturing, material synthesis, and also water treatment. Atmospheric pressure and ambient temperature micro-plasmas have been used for polarization of piezo-composites towards alignment of the electric dipoles. Dielectric polarization is caused when a dipole moment is formed in an insulating material because of an external electric field. When a dielectric interacts with electric field a shift in charge distribution takes place, aligning the positive and negative ions with the electric field. By this mechanism important circuit elements such as capacitors can be developed. The same phenomenon of plasma micro-discharge can also be used for surface modification of piezoelectric-composites towards activation and enhancement of electrical properties of the material surface. This can be achieved by chain polymerization of the surface in organic composite thin films that changes the surface bonding characteristics. The current work focuses on the development of a corona discharge setup for surface modification of piezoelectric flexible composites: ZnO-Epoxy and ZnO-Epoxy-Carbon Nanotubes. Initial work shows a small variation in variation in the capacitance in the range of 10 - 100 pF. An impedance analyzer will be used to characterize the electrical properties of the composites. The variation in micro-structure will be investigated using a scanning electron microscope and a raman spectrometer.

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Civil Engineering

Session IV

Poster No. 26

Hands-on Learning with Mechanically Stabilized Earth Sandbox

Hands-on learning in engineering field is a very powerful tool to learn basic designing skills necessary for the profession. American Society of Civil Engineers (ASCE) regularly conducts competitions for students to encourage the experiential learning by giving challenging design tasks. The Geo-Wall challenge is one of such challenges in the subject of Geotechnical Engineering. The design challenge is to construct a Mechanically Stabilized Earth (MSE) wall and find its load resisting capacity. MSE wall refers to the construction of earthen retaining wall that contains manufactured reinforcement to provide additional structural stability. MSE walls are routinely used in construction of bridges where there are constraints on size and shape of the wall. A commercially available sand was used as a backfill material and paper strips were used to simulate reinforcement in the wall. The experiments were carried out to determine whether paper reinforcement could support the lateral loads exerted by self-weight of sand. The structural components were analyzed for connections and several soils tests were conducted to determine index properties of the sand. It was found that the orientation of the plywood walls played great importance when determining the deformation of the sidewalls under load. The fixed connection style incorporated added increased rigidity, strength, and absolved previous leakage failures.

The most difficult part of this design challenge was to design the reinforcement which was simulated by paper strips. MSE sandbox wall developed and analyzed using paper reinforcement resisted nearly 500 lbs. of sand. Conducting such an in-depth analysis was a major accomplishment for the Fresno State Team. Apart from achieving the learning goals, it provided the students an opportunity to work as a team and the confidence to build their careers.



April 19, 2017

Oral Presentation

Abstracts

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Northern California Consortium Doctor of Nursing Practice Program

Care of persons aging with Autism and Intellectual Disability

As healthcare improves, the ability to extend life expectancy for individuals with chronic illnesses also improves. Quality health care for adults with developmental disabilities who are living longer and faced with the typical aging health issues is becoming a public health concern (Bruder, Kerins, Mazzarella, Sims, & Stein, 2012).

This quality improvement project is designed to promote continuity of nursing care to patients with developmental disabilities including autism, by providing a Client-Focused Nursing Care Enhancing (CFNCE) tool that can communicate essential client care needs. The CFNCE tool is a comprehensive, individualized nursing care plan based on Henderson's Model, with the goal of identifying key factors that will increase the client's comfort and provide needed guidance to nursing staff in regards to activities of daily living. The project utilizes the nursing process approach to developing the CFNCE tool with cognizance to the autism characteristics: impaired social interaction, communication, and stereotypic or ritualistic behavior.

This Study used mixed methods, a quantitative descriptive study comprised of survey related to the effectiveness of the piloted tool from nursing staff/caregivers on site. A qualitative component was used to gather client information by semi-structured interviews of nursing staff and caregivers. Also, some minimal chart review was conducted to gather further data on the participants.

A Client-Focused Nursing Care Enhancing(CFNCE) tool was created for four (4) clients that utilized Henderson theory (14 basic needs) to identified the special needs and preferred method of care for the four clients. The nursing tool helps health professionals with nursing care and nursing assessments, help to reduce trauma/behavioral crisis, promote client's independence within their capability, and improve the quality of life and ultimately reduces the cost of nursing care in the long run.

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Biology

Chemical-kinetic rate laws applied to predator-prey population dynamics

When large numbers of predators individually attack large numbers of prey, it may be expected that important characteristics of the pairwise interactions (encounter probability, capture success, etc) are reflected in the population dynamics. The parameters of interest appear in rate equations that are analogous to those of chemical kinetics (e.g. the Michaelis-Menten mechanism). However, absolute rate analysis of natural populations can be confounded by incompletely known initial conditions and open boundaries. Our laboratory has developed an experimental predator-prey model characterized by uniform conditions under a high degree of experimental control: We conduct in vitro batch-mode trials between aquatic carnivorous bladderwort plants (*Utricularia vulgaris*) and free-swimming ostracods (*Cypridopsis* spp.). Approximately one thousand capture events have been individually resolved as a function of size (optically) or time (acoustically). The differential predation rates can be described by a kinetic model modified to include size and speed distributions. Theoretically predicted capture rate trends are in general agreement with observations, but the latter reveal a forbidden area of the parameter space—a lower size limit to capture success—which is evidence for a mechanical constraint that is not included in the model. In this way integrated rate laws, which are black-box descriptions of populations, can be used to test the elementary steps of a prey capture mechanism.

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Educational Leadership

RESILIENT DOCTORAL STUDENTS IN CALIFORNIA: A REFLECTIVE STUDY OF THE RELATION BETWEEN CHILDHOOD CHALLENGES AND ACADEMIC SUCCESS

This qualitative phenomenological study examined a better understanding of how people with four or more Adverse Childhood Experiences (ACEs) were able to navigate adversity, graduate college, and ultimately pursue doctoral programs. The research question asked, "What are the academic and social experiences of doctoral students who had four or more Adverse Childhood Experiences?" A secondary question also explored "How did resiliency help these participants navigate the educational system leading up to entering a doctoral program?" The case study was conducted with seven participants who all had seven or more ACEs and went on to be academically successful. This research discovered insights into the resilient lives of these individuals. Their historical narratives generated an exploration of the nature of trauma and how certain individuals were able to overcome adversity. Several major themes that emerged from the participant's personal narratives were: being resourceful, staying active, being fearful, fighting through tough situations, ability to hide, feelings of guilt, suppressing emotions, seeking therapy, setting goals to validate, self-talk, and additional nuances to the existing research on resiliency. Based on these findings implications and recommendations for educators were made such as: the need to overcome barriers and develop relationships, the need to promote a student's self-worth, the need to provide opportunities for students to be active, the need to create safe educational environments, the need for proper goal setting, and the need to support at-risk youth with social and emotional supports. Recommendations were made for a longitudinal study with a larger sample size of a similar population, to expand on the existing research on academic success for persons with childhood trauma.

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Modern and Classical Languages and Literatures

Una mosca vivaracha: Los límites de la ciencia ante lo fantástico / A lively fly: the limits of science to the fantastic

This research essay analyzes "lo fantástico" (the fantastic) in the short story «Los testigos» by Julio Cortázar through the application of the scientific method. Through this short story, which is about a fly that flies upside down, Julio Cortázar uses the fantastic to show the limits of the scientific method (observation, hypothesis, experimentation, and theory) to reach a logical conclusion and give a scientific explanation to the strange or abnormal event of the fly that flies upside down. As a result, this research highlights the limits that science can have to "strange" events that cannot be explained by scientific methods, but at the same time, emphasizes that this do not discard them from not existing or happening. Furthermore, this research ends with the conclusion that, although there are things or events that cannot be explained with logic, it does not mean that it is something supernatural but rather something that is part of our daily lives.

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Educational Leadership

AI: The Effects of Using Appreciative Inquiry as a Professional Learning Change Agent and California Community Colleges

Appreciative inquiry (AI) is an organizational strategy first developed by David Cooperrider (1986). If followed rigorously, practitioners use the AI model to guide organizational change through a focus on building from an organization's strengths and valuing all stakeholder experiences and input.

The purpose of this study was framed using social learning theory and based on two primary research questions. How was appreciative inquiry used at each institution? And, what were the long-term effects of using appreciative inquiry as a change agent?

The researcher conducted open-ended interviews with ten participants from two California community colleges. Interview data was coded for themes. Major themes included the goals of the participants relative to the use of AI, the structure of AI professional learning experiences, and the short- and long-term outcomes of using AI as a professional learning change agent.

Participants spoke of the organic nature of the implementation process. They almost universally expressed their desire to create change that was internalized by the other faculty and staff at their institutions. Participants all spoke of the delicate nature of implementing any type of change at a community college and the care they took in building relationships with other faculty and staff as a key component of the process. Another major theme was the admiration they felt for the positive nature of the AI process, particularly compared to other professional learning experiences in which they had participated.

Participants did not observe long-term institutional change. However, they did see lasting change for some individuals and groups at each institution. Most participants mentioned their belief that the AI experience can only produce sustained shifts in professional practice for those staff members and campus organizations that willingly participate in the process. Any attempt to force participation will result in failure to create long-term change.

Based on these results, the researcher concluded that the AI process has potential to create institutional change at California community colleges. The process must be carefully introduced. Change must be allowed to take place organically, even as the AI structure is deliberately applied. Any effort to coerce participants to embrace the principles of AI is likely to produce diminished results.

Cooperrider, D. (1986). *Appreciative inquiry: Toward a methodology for understanding and enhancing organizational innovation*. Retrieved from ProQuest Digital Dissertations. (AAT 8611485)

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Educational Leadership

The Effects of Linked Learning on Teacher Motivation, Deficit Thinking and Teacher Burnout Across Low, Mid, and High Poverty Linked Learning School Settings

The purpose of the study was to explore the role of Linked Learning in teacher motivation, teacher burnout and the deficit thinking paradigm across school poverty levels. The Motivational Systems Theory was used to explore teacher motivation in terms of goal setting, personal agency beliefs and teacher emotions. Teacher burnout was looked at through personal accomplishment, depersonalization and emotional exhaustion. The deficit thinking paradigm was explored by examining perceptions and teacher expectations. The mixed method study included participants from schools engaged in Linked Learning in multiple school districts throughout central California.

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Psychology

Effects of Mental Illness Stigma Dimensions on Treatment Attitudes

Mental illness stigma has been known to be a barrier to seeking psychological treatment. The stigma that is perpetuated has numerous detrimental effects on the individual and their surrounding circle (Corrigan, 2010). Additionally, there is research to suggest that dimensions of stigma, such as anger (Thaw, 1976), blame (Mehta, 1997), and social distancing (Marcus, 1994), play a role in reluctance to seek treatment. This study focuses on this gap in the literature by addressing the possibility for mental illness stigma and its dimensions as barriers for positive regard of psychiatric treatment. Three questionnaires will be included in this online study available to the Introductory Psychology pool. The questionnaires have all been tested for internal reliability and consistency. The Public Stigma Scale is an 18-item Likert scale that measures mental illness stigma. The AQ-27 is a Likert-based measure for dimensions of mental illness stigma. The ATSPPHS is a 29 item Likert scale for measuring attitudes toward seeking professional psychological help. It is hypothesized that individuals with high public stigma scores will have poorer treatment-seeking attitudes than participants who have lower public stigma scores. Additionally, we hypothesize that higher levels of anger, blame, and social distancing will predict less willingness to seek treatment. Following the collection of data, it is anticipated that a multiple regression will be used to analyze the data. Data analysis is expected to be completed by early April of 2017.

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DELPHS

PERCEIVED SELF EFFICACY OF PRINCIPALS IN OVER AND UNDERACHIEVING SCHOOLS

The role of a principal in today's schools is demanding and requires them to lead in many different capacities in order to support student achievement. The purpose of this study was to investigate whether a principal's perceived self-efficacy, or the belief in one's capability to lead, correlates with academic achievement at high-achieving and low-achieving schools in five key leadership areas—establishing a vision and purpose; transforming school culture and climate; improving instruction; managing people, data, systems, and processes; and building capacity in others.

A mixed-methods study was conducted using a survey asking principals in public school districts across the state of California to rate their levels of perceived self-efficacy in the five key areas of leadership. Principals selected for the survey were identified as leading schools with a high percentage of free and reduced-priced meals and had either above average student achievement or below average student achievement.

The results of the study showed that the principals' perceived self-efficacy had no significant correlation in four of the five key leadership areas despite their schools performance. The key leadership area of improving instruction showed some correlation between the principals' perceived levels of self-efficacy and student achievement data.

Based on the results of the study, instructional leadership plays a key role in improved student achievement, and a principal's level of self-efficacy for improving instruction is important for increasing student achievement. Recommendations call for further study of specific behaviors associated with the perceptions of the principals.

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Doctoral Program in Educational Leadership

TESTING AN ONLINE INTERVENTION TO DEVELOP PURPOSE AND HOPE IN FIRST YEAR COLLEGE STUDENTS AT A MINORITY SERVING INSTITUTION

Disconnected and uncertain about the future before them, first-year students are struggling to complete their college degrees (Complete College America, 2011). According to College Board Advocacy and Policy Center (2011), California State University system's goal for 2025 is to increase freshmen graduation rates from 19% to 40%, while also minimizing years of degree completion from the average 6 years to 4 years. However, what are the strategies in place to reach the 2025 goal, specifically in Hispanic-serving institutions? First-year students do not always have a sense of purpose and clarity about their academic pathway, causing students to take excessive units, change majors, and/or drop out of college (College Board Advocacy and Policy Center, 2011). Research has shown a positive relationship between psychological constructs (i.e. self-determination, self-actualization, the development of a sense of purpose), academic achievement, and overall human wellbeing (Blumer, 1934; Chickering, 1969; Deci, 2005; Miller & Prince, 1977; Rogers, 1951, 1961; Ryan & Deci, 2000). This dissertation examined an online interventional strategy to promote a sense of purpose and hope in first-years students and contributes supportive evidence in the importance of integrating total development of students in higher education. The sample consisted of 81 students enrolled in University 1 and a matched sample of 181 students not enrolled in University 1 courses. The intervention was tested with a pre-post test randomized controlled trial. There were two comparison groups: an online hope intervention and a control group with a neutral content. The dependent variables were sense of purpose and hope. Qualitative results explored what motivations first-year students had and if this intervention helps them clarify their purpose and develop a sense of hope. The practical significance of findings from this study was to encourage post-secondary institutions to adopt and promote methods in helping students develop a sense of purpose and foster holistic development of first-year students such as the empirically tested online intervention: Grounding Exploration Self-Actualization to gain a sense of Purpose (GESAP).

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Doctoral Program in Educational Leadership

A Narrative Research Study of Cultural Capital, Social Identity, and Self-Efficacy Impact on the Academic Achievement of Professional Hmong Women

Hmong women today are revolutionizing in elite professional occupations in areas such as education, medical, and politics as a result of academic achievement in the United States since Hmong resettlement 40 years ago. Because of gender role and cultural expectations anchoring Hmong women to Hmong cultural norms and traditions, it is essentially important to feature success stories of Hmong women who have pioneered many different pathways to achieve academic success. The purpose of this narrative research study was investigated to highlight ten professional Hmong women's stories of their journey to academic success. This research study aims to highlight successful stories of professional Hmong women who have achieved academic success for the younger generations of aspiring Hmong women, and to create awareness on the importance and outcome of academic success.

This study utilizes a qualitative approach and includes 15 interview questions that was created and guided by the theoretical framework of this dissertation consisting of three theories: cultural capital, social identity, and self-efficacy. The qualitative data includes multiple perspectives of professional Hmong women on their childhood background, experience growing up as a Hmong woman, and family perception on education. Professional Hmong women participants ranged in multidisciplinary subject areas and reside in different demographic locations. Because this research study is currently developing and is in the data collection stage, results will not be reported until the latter. However, in the interim, it is important to convey that results will use a narrative inquiry analysis to investigate first hand experiences of participants to find common themes, repetitive phrases, and create meaning to provide insights on the impact of cultural capital, social identity, and self-efficacy. Interview transcripts and field notes will undergo open and axial coding to find distinctive concepts and categories for comparison to find commonality and themes.

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Doctoral Program in Educational Leadership

Leadership Practices In A Linked Learning Environment Focused On Equitable Practices Of Language Minority Students

Linked Learning leadership practices provide equitable learning environments for language minority students. Linked Learning is a high school reform initiative that seeks to successfully prepare students for postsecondary education and careers by engaging students in linking strong academics with demanding technical learning, and thereby strengthening their real-world experience in a wide range of fields (ConnectEd, 2014). Leadership practices in a Linked Learning environment affect teacher efficacy and teacher deficit thinking when examining their perspective on leadership practices. Transactional or transformational leadership practices influence educational outcomes for language minority students and their educators.' Examining teacher efficacy and deficit thinking with the implementation of transactional and transformational leadership practices influenced educational outcomes for language minority students. The purpose of this qualitative study was to investigate high school leadership practices of their roles in a Linked Learning language minority environment through an interview and surveys. This study contributes to literature regarding leadership practices and Linked Learning environments. A conceptual framework was developed utilizing transactional and transformational leadership practices. This study contributed to research distributed on Linked Learning leadership practices in regards to equitable practices for language minority student communities. The data collected reflected leadership practices in a Linked Learning environment with a focus on the effects of language minorities in an equitable community of practice and two teacher components. The data collected on teacher self-efficacy and teacher deficit thinking reflected how language minority students are serviced in a Linked Learning environment under transactional or transformational leadership practices.

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DPELFS- Doctoral Program in Educational Leadership

DOES A SHAME RESILIENT WISE INTERVENTION (SWRI) PROMOTE A SENSE OF BELONGING AND ADDITIONAL NON COGNITIVE SKILLS SUCH AS GRIT, MINDSET, AND HOPE IN FIRST GENERATION STUDENTS NEWLY ADMITTED TO HIGHER EDUCATION?

The aim of this research is to test the Shame Resiliency Theory (SRT) in a higher education setting by replicating specific processes of the Difference-Education Intervention (DEI). The literature reviewed in this study examined four non-cognitive skills: grit, hope, mindset, and sense of belonging. After carefully reviewing the literature, the Shame Resilient Wise Intervention (SWRI) was created to establish a precise theoretical foundation to interventions like DEI. A convenience sampling technique was utilized to recruit participants for the intervention. A total of 174 first-generation freshmen students and continuing education students were enlisted from seven class sections at Fresno State. Data will be collected using written responses from 12 panelists' who are post-graduate students' at Fresno State. Video of the panel discussion will be recorded in both the intervention and the controlled groups. The study will take a quantitative approach to measure students' grit; hope; mindset; and sense of belong using a pre and post test to determine if this intervention makes any difference on non-cognitive skills for students in the intervention. A qualitative approach will be taken to determine: (1) if panelist referenced their background in the intervention; (2) to understand what themes first generations students share in their transition to Fresno State; and (3) to determine if and how SRT was used as the panelists' shared their stories. The findings will help bring more of a theoretical foundation for interventions like DEI and help higher educational institutes understand what first generation students' face in their transition. This research will suggest if shame should be further explored and codified in higher education settings. The study will also outline recommendations that can help higher education settings understand what first generation students experience in their transition, and what strategies can help them become more successful.

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Kremen Education

A QUALITATIVE STUDY OF AFRICAN AMERICAN MALE PRINCIPALS IN CENTRAL CALIFORNIA: UNDERSTANDING THE FACTORS IMPACTING THEIR PROFESSIONAL DEVELOPMENT AND SUCCESS

This study examines factors impacting the development and success of African American male principals in Central California. Using work from Kofi Lomotey to illuminate educational leadership qualities exhibited by African American principals, this study enlists the voices of seven African American males to describe their development and successes as principals. The seven principals interviewed for this study are the only African American male principals in Central California, making this study about their development and success critically important. These seven also represent about 1% of the principal pool in a region with 5% African American students. The need for their leadership is magnified given the negative educational outcomes for males of color in Central California, such as suspensions and expulsions. The literature reviewed for this study examined the universal academic belief that "relationships" are one the strongest motivators impacting the success of students of color. Combined with research that suggests educators are the best role models and mentors for African American male students, this study uses the African American male principals voice to describe the factors for successfully educating their students. The data, once collected, will be analyzed through a constant comparative method through the NVIVO software used for qualitative data analysis. The findings will be structured according to Lomotey's three educational leadership qualities for serving American American male youth: (a) commitment to their education, (b) compassion for, and understanding of youth and their communities, and (c) confidence that they are intelligent learners. Based on the plan to approach findings in this manner, recommendations will be outlined for the importance of increasing the presence of African American male principals throughout Central California.

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Civil and Geomatics Engineering

Seismic Performance of Unbonded Post-Tensioned Rocking Walls: Shaking Table Experiments

The damage caused by earthquakes and subsequent economic losses underscore the need for developing seismic resilient buildings. Over the past two decades, several researchers investigated the use of rocking wall systems to resist earthquake induced forces. These walls are often designed with unbonded post-tensioning as primary reinforcement across the connection interface between the wall and foundation, which helps the system to self-center while minimizing structural damage during major seismic events. The Single Rocking Walls (SRWs) mostly dissipate the energy imparted to them during earthquakes due to the impact of the rocking body on the foundation. However, in order to come up with supplemental damping for such systems, a PreWEC concept (precast rocking walls jointed to end/side columns with easily-replaceable steel O-connector) previously established. Despite extensive progress on the design of rocking walls, uncertainty in their dynamic behavior due to insufficient attention given to this topic, has limited widespread implementation of self-centering precast concrete wall systems. To overcome this limitation, two phases of dynamic shaking table experiments were conducted using Network for Earthquake Engineering Simulation (NEES) shake table facility of the University of Nevada at Reno (UNR) to test a total of eight wall specimens with and without additional energy dissipation. In addition to presenting the experimental results from global and local perspectives, an assessment of dynamic behavior of these rocking systems will be presented. Results from both phases of testing will be compared to highlight the effect of initial post-tensioning, the amount of supplementary energy dissipation, and the ground motions on the dynamic behavior of rocking walls.

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Pharmaceutical and Biomedical Sciences

FORMULATION AND EVALUATION OF POLYMERIC MIXED MICELLES FOR DELIVERY OF QUERCETIN TO BREAST CANCER

Introduction: Quercetin, a flavonoid is found in many plants, fruits and vegetables. It has wide range of pharmacological properties including antioxidant, anti-inflammatory, and anti-proliferative activities. The application of quercetin as a therapeutic agent is greatly restricted due to its low water solubility and poor bioavailability. Polymeric micelles have been emerged as an effective drug delivery system owing to their small particle size, high stability, high encapsulation efficiency, sustained release of drug, enhanced cellular uptake and increased biological activity. The present investigation was carried out to develop micelle delivery system from mixture of Pluronic polymers containing quercetin. Methods: Micelles composed of various Pluronic polymers in different proportion with different concentration of quercetin were prepared by thin film hydration method. The micelles were characterized for their physicochemical properties. In vitro cytotoxicity of the prepared micelles were studied in MCF-7 and MDA MB 231, an epithelial and a metastatic breast cancer cell lines respectively, by MTT assay. Results: The best formulation was obtained with Pluronic polymers composed of P123 and P407 in the molar ratio of 7:3. The particle size of quercetin-loaded micelles was 24.83 ± 0.44 nm and 37.10 ± 4.23 nm before and after lyophilization, respectively. The drug loading was $8.75 \pm 0.41\%$ with $87.48 \pm 4.15\%$ encapsulation efficiency. Quercetin release from the micelles was sustained over 7 days. The solubility of quercetin was significantly increased (1035 fold) than pure quercetin. The micelles have low critical micelle concentration indicating their stability in aqueous media. The IC₅₀ value of the micelles were around 23 μ M and 44 μ M in MCF-7 and MDA MB 231 cell lines, respectively which were 6 and 2.9 fold respectively, less than the free drug. Conclusion: The mixed micelles prepared from P123/P407 (7:3 molar ratio) containing quercetin can serve as an effective drug delivery system for treatment of breast cancer.

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Aligning Leadership Qualities of Special Education Teachers with Teacher/Paraeducator Collaboration

Most special education teachers work with a number of paraeducators in the classroom. Working with multiple paraeducators requires being an effective leader. Teachers are not receiving the training they need in order to most effectively and efficiently work along with paraeducators. If teachers are not trained to appropriately supervise paraeducators, then there is likely to be a disconnect between what should be going on in the classroom and what is actually taking place in the classroom. Teachers who are not adequately prepared to supervise paraeducators may not be able to model the best example for paraeducators or make the best use of paraeducators time.

The purpose of this study is to align the leadership qualities mentioned by John Adair (2009) with the qualities effective special education teachers must possess in order to have effective collaboration with paraeducators. The two research questions posed are:

How do teachers learn to supervise, collaborate, and work with paraeducators despite the fact that neither had any training on how to do it?

Are leadership skills of special education teachers related to the quality of collaboration with paraeducators in the classroom?

An online survey was used to measure demographics, leadership and collaboration variables. Individual interview with teachers on how they learned to supervise, work with, and collaborate with paraeducators were also conducted. Results from 58 surveys and 11 individual interviews are being analyzed.

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Psychology

The Relationship among CBCL (Child Behavior Checklist), EQ-C (Empathy Quotient), SQ-C (Systemizing Quotient), and AQ-C (Autism Quotient)

Introduction. Autism Spectrum Disorders (ASD) is characterized by social communication impairments and restricted, repetitive patterns of behavior; constructs closely related to empathy quotient (EQ) and systemizing quotient (SQ), respectively. We know that autism quotient (AQ) scores are higher in males than females and in people with ASD compared to controls, but we don't know how EQ, SQ, and AQ relate to standard social-emotional measures. The first objective of this study was to replicate established sex differences in EQ, SQ, and AQ, as well as the relationship typically observed among these measures. The second objective was to explore the relationship among the child behavior checklist (CBCL), EQ, SQ, and AQ.

Methods. As part of a larger study, 66 parents of 4- to 6-year-old children (31 female, 35 male) completed the EQ, SQ, AQ, and CBCL. Overall, these measures have good psychometric properties.

Results. Results from a one-way analysis of variance indicated that boys scored lower on EQ and higher on SQ and AQ than girls, although these differences were not statistically significant. Pearson Product Moment correlations replicated established patterns between these measures, such that AQ was positively related to SQ and negatively related to EQ. Correlations using Bonferroni adjusted alpha levels of .003 per test (.05/15) were conducted between the five CBCL scores and EQ, SQ, and AQ. Pervasive developmental problems, attention deficit/hyperactivity problems, and oppositional defiant problems were negatively correlated to EQ and positively correlated to AQ. AQ was also positively related to affective and anxiety problems. No significant findings emerged between SQ and CBCL scales.

Conclusions. Our findings replicated established patterns between EQ, SQ, and AQ, and provide support for the use of AQ in identifying children at risk for general deficits in social-emotional functioning. They also question the utility of AQ as a screening tool specific to ASD.

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Educational Leadership

THE IMPACT of service-learning on engagement and degree completion for undergraduate students

In light of growing concerns over increasing the number of college graduates in the U.S., particularly among traditionally underrepresented student populations, this mixed methods study evaluated the impact of service-learning on institutional engagement and graduation rates. The study focused on the impact of service-learning experiences on students with low socio-economic status (SES) or who identify as members of traditionally underrepresented minority (URM) populations. The intent was to develop a better understanding of how engagement indicators are influenced by service-learning in order to help practitioners design service-learning courses that maximize the experiences that contribute to student success. Quantitative methods were used to evaluate if participation in service-learning is predictive of degree attainment, and to identify the differences in engagement indicators from the National Survey of Student Engagement (NSSE), among students who participate in service-learning compared to those who did not. Qualitative methods were used to deepen the understanding of how service-learning impacts engagement and graduation rates for SES and URM undergraduate students. Interviews were conducted with students at senior status who participated in service-learning, and focus groups were held with recent alumni about the factors that contributed to their institutional engagement and degree obtainment. Among the results, the study found that students who took one or more service-learning courses reported enhanced academic challenge through higher-order learning and collaborative learning. Furthermore, service-learning experiences supported an improved campus environment for students through quality interactions with other students, faculty and individuals at their service-learning site. The study confirmed previous research indicating that service-learning is an effective high-impact practice that promotes improved outcomes for undergraduate students.

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History

Wokou in the 16th & 17th Century

My research examines how the establishment of global maritime links and trade during the sixteenth and seventeenth centuries affected the surge and collapse of inter-Asian pirate networks in the East and South China seas. I examine the Wokou pirates over these two centuries and trace how they adapted to the changing world they lived in and how they fit into the much larger picture of a globalizing maritime trade network during this era. I compare government documents from China and Japan to determine how these governments tried to deal with the Wokou dilemma and how the Wokou themselves responded to such policies. I also use personal diaries, maps, and other supplementary documents in my analysis to provide a fuller picture of the Wokou and how they thrived during these two centuries. So far, my research has shown that the Wokou of the 16th and 17th centuries had to adapt quickly in response to government policies trying to rid the seas of them. From the personal diaries and letters one can see that Wokou were considered many different things depending on the position of the viewer. It has also shown that with the influx of European merchants into Asia the line between merchant and pirate became an arbitrary one, creating a fertile zone for pirates to grow by taking advantage of the power struggle between Asia and Europe happening during these centuries.

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Educational Leadership

Student SELF-EFFICACY (PERSONAL AGENCY) AND MOTIVATION IN LOW, MID, AND HIGH POVERTY LINKED LEARNING SCHOOL SETTINGS

The research study compared personal agency and motivation of students in low, mid, and high poverty level, Linked Learning pathways. Specifically, the study examined student personal agency beliefs, goal setting practices, and student emotional connectedness. This study aimed to examine student perceptions of Linked Learning pathway experiences and student motivation in low, mid, and high poverty school settings. A transformative and explanatory mixed method approach (Creswell, 2014) was used to illuminate if there was a difference in student experiences across poverty levels. The study extended to explore reasons why differences existed or did not exist. Explanatory methodology was utilized for analysis of the results of quantitative data followed by analysis of qualitative data to capture a layered analysis (Creswell, 2014). Data was collected from five high school districts that spanned the state of California. Participants were students enrolled in programs which use the Linked Learning approach. Students participated in completing an online survey. Four focus group interviews were conducted of students in both Linked Learning certified pathways and non-certified pathways utilizing the Linked Learning approach.

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CHEMISTRY

Structure-Activity Relationship Studies of Silibinin as Anti-Prostate Cancer Agents

Silibinin is a naturally occurring flavonolignan and was extracted from a well-known traditional European medicine named milk thistle. Among several medicinal properties of silibinin, the potential in treating prostate cancer has recently stood out of the crowds. Although silibinin has entered phase I clinical trial in advanced prostate cancer patients, its moderate potency and poor bioavailability diminished interest in its further clinical development. The overarching objective of silibinin project in our research group is to engineer silibinin derivatives with enhanced potency and bioavailability. To achieve this goal, we started with exploring the in vitro potency of new chemical entities derived from silibinin by structural manipulations on four hydroxyl groups and C2-C3 bond. So far, over eighty derivatives have been successfully synthesized through four- to seven-step procedures. The in vitro anti-proliferative potency of all derivatives was screened by WST-1 cell proliferative assay. Our structure-activity relationship data indicate that i) various substituents (including several alkyl groups and alkylamino moieties) on any one of these hydroxyl groups are tolerable; ii) monoalkylation is more favorable to the potency than dialkylation; iii) The alkylamino moieties make greater contribution to the potency than the alkyl groups; and iv) C2-C3 double bond is more favorable than C2-C3 single bond for the potency.

Keywords: silibinin, prostate cancer, anti-proliferative activity

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Mechanical Engineering

Fresno Solar Cell: The proposed low-cost high efficient solar cell from non-toxic and earth abundant semiconductors.

Solar panels, installed on residential applications, have efficiencies ranging from 15% to 22%. The most widely used terrestrial solar cell structure has single junction architecture absorbing a small section of solar spectrum with an efficiency limit of 33% (Shockley–Queisser limit). The multijunction solar cells have a theoretical efficiency of 86%, where a series of varying bandgap semiconductor can absorb a wider section energy from the solar spectrum. The objective is to fabricate a cost effective multijunction solar cell that is eventually suitable for terrestrial applications.

The solar cell modeled on the proposed method, the Fresno cell, combines several characteristics to fabricate improved devices. They are to be manufactured from semiconductors consisting non-toxic and abundant elements, such as Cu, Zn, Sn and S. Electrodeposition, the selected fabrication method, has low-cost features such as capable of scaling up, extremely low wastage levels, and improved yield by utilizing ISFETs (ion specific field effect transistors). Currently, solar cells fabricated by electrodeposited fabrication method have the lowest market value on \$/W basis. By deploying the graded bandgap solar cell structure, which absorbs a wider section of the electromagnetic spectrum, a higher efficiency solar cells with multijunction capability can be designed. The method has the capability to fabricate semiconductors with variable composition by varying the growth voltage. This variable material composition represents different bandgaps, absorbing variable segments of solar spectrum.

Through electrodeposited semiconductors fabricated from earth abundant and non-toxic elements, improved yield by deploying ISFET, and graded bandgap solar cell architecture, a low-cost, high-efficiency solar cell is expected. Experimentation is continuing to validate the analytical model.



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Poster Presentation Abstracts

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Department of Biology

Session I

Poster No. 1

How trap morphology changes with trap size for the carnivorous plant bladderwort

Bladderwort (*Utricularia*) are carnivorous plants that specialize in catching prey using active, submerged suction traps. These traps are among the smallest suction feeders. Hydrodynamic models of suction feeding predict that (1) suction flow is strongest when the mouth opening is circular; and that (2) prey capture success declines steeply below a critical gape of 500 microns. Bladderwort are constrained in conforming with those predictions because (1) their mouth is closed by a hinged door that might distort the mouth opening to be more oval and/or more crescent shaped; (2) bladderwort are near the lower critical gape. We focus on the bladderwort species *Utricularia vulgaris* because it has a particularly wide range of trap sizes. Based on hydrodynamic theory we hypothesize (1) that all traps maintain a roughly circular mouth across the entire trap size range and (2) that small traps have relatively larger gapes than large traps in order to stay above the critical size limit for the gape. We predict that in *U. vulgaris*, trap size is more variable than mouth shape and that trap size varies more than mouth size. To test our hypotheses, we measured the size and shape of 200 traps and mouths using a dissection microscope and image processing software. We found that size parameters (trap length, mouth width, mouth height) vary more than shape parameters (ratio of mouth width to height, index for how crescent versus circular the mouth is, ratio of mouth height to trap length) and that mouths are roughly circular (not oval, not crescent-shaped) across trap sizes. These findings are consistent with the hypothesis that traps maintain a circular mouth across trap sizes, but they refute the hypothesis that mouth size should change with trap size. We concluded that bladderwort keep the shape of their traps constant across a wide size range.

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Biology

Session I

Poster No. 2

Exploring Evolution Acceptance Profiles Among Non-Science Majors

Although evolution is a central organizing principle of biology, only 4 in 10 Americans agree that humans and higher apes share a common ancestor. Since evolution is a critical and foundational component of scientific literacy, and the general education biology course is one of the final opportunities to influence scientific literacy of college educated individuals, it is vital to understand what non-science majors know and how they learn about evolution. One of the most convenient methods to measure evolution acceptance in these settings is to use the Measure of Acceptance of the Theory of Evolution (MATE). Recent work supports that the MATE measures two (not one) distinct forms of evolution acceptance – (a) acceptance of evolution facts and data and (b) acceptance of the credibility of evolution. In this study, we uncovered 5 distinct evolution acceptance ‘profiles’ by conducting k-means cluster analysis on the two evolution acceptance scores generated by the MATE. We subsequently explored how patterns in interview data described the 5 evolution acceptance profiles. The study was conducted at a 4-year doctoral-granting university with moderate research activity in the western United States. The MATE in its original form was administered to a convenience sample of undergraduate college students from multiple sections of a general education biology course both pre- and post-instruction (N=1045). From this sample, we selected 5 students from each of five distinct acceptance profiles that emerged from the MATE data and conducted semi-structured interviews with these students (n=25). Analysis is currently underway, including descriptive and inferential statistics of MATE scores and inductive coding of interview transcripts based on the research questions and existing theoretical frameworks for explaining evolution thinking and acceptance. We expect results of the study to better inform goals for teaching evolution to non-science majors and refine standards for teaching evolution in grades 13-16.

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Family and Consumer Science

Session I

Poster No. 3

Family Mealtimes: Clearing the Path to the Prevention of Childhood Obesity in Hispanic Children

Introduction: Hispanic-American children are at an increased risk of obesity. There is a large consensus within the research community that eating meals together as a family is a protective factor against obesity. Abriendo Caminos is a 6-week healthy living program for Hispanic families that includes a workshop of the importance of family togetherness and an emphasis on shared family meals. It was hypothesized that the frequency of shared family meals would increase by the end of the program.

Methods: For this study, families who came from a Mexican or Puerto Rican heritage, had a child between the ages of 4-18 and spoke Spanish as their first language were recruited as part of our study. A total of 57 families participated in the study and were randomly assigned to participate in the workshops or in a control group (29 experimental, 28 control). Baseline data was collected in the form of questionnaires and anthropomorphic measurements before the program began, and post assessments were collected at the end of the program, as well as 6 months later.

Results: At baseline, the average frequency of family mealtimes for those who participated in the workshops was 4.6 per week, and that number increased to 5.19 after the workshops, though this number was not statistically significant.

Conclusion: Overall, this was a preliminary analysis and we are currently recruiting more families to participate in our workshops. In our final analysis, we will have more statistical power to detect differences. Family interventions are needed to not only teach families ways to promote health, but also because an increase in the quality and quantity of family mealtimes may be associated with lower levels of obesity, but more research is needed to more closely examine this relationship.

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Political Science

Session I

Poster No. 4

How Conditions Play a Role in the Adoption of Voter ID Laws in State Legislatures

This study examines the conditions that lead to the adoption of voter ID laws. Past research has shown that political predispositions, party identification, ideology, racial composition in a district, and electoral competition are conditions that influence the way individuals vote for or against voter ID laws. Past researchers have also identified the effects that voter ID laws have on individual, but research has not identified what leads states to adopt these laws. Voter ID laws have become a controversial issue as some people believe they are intended to suppress minority groups from voting and thus alter the electorate in favor of a certain party, while others believe they were intended to prevent voter fraud. My research resolves these conflicting issues and adds to existing literature by looking at conditions such as political context, demographic makeup of states, partisan control in state legislatures, and amount of public support in order to identify what conditions lead some states to adopt restrictive versus lenient voter ID policies. If voter ID laws are truly about oppression, I would expect these laws to be in states that have large percentages of ethnic minority groups and people with low socioeconomic status, and strong partisan control in state legislatures.

Looking at presidential and gubernatorial elections, my dependent variable is the strictness of the voter ID law and my independent variables are the various conditions listed above. I separate the data into a four quadrant coding scheme: Strict Voter Identification Laws in force in 2016, Non-Strict Voter Identification Laws in force in 2016, Photo ID required, and Non Photo ID required. I also determine what conditions correlate with the factors in the coding scheme. My results will have practical and academic implications, as it will help the electorate understand why some states adopt restrictive voter ID policies.

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Animal Science and Agricultural Education

Session I

Poster No. 5

The Effects of High School Involvement on Levels of Servant Leadership of Fresno State Agriculture Students

The objective of this research was to discover if high school involvement in clubs and organizations affect students' level of servant leadership and involvement in the California State University, Fresno Jordan College of Agricultural Sciences and Technology (JCAST).

An email survey was sent to 2,386 students in JCAST. The 39-question instrument was adapted from a survey developed by Scanga (2010) to measure motivational factors for obtaining leadership positions. The first 23 questions assessed the five constructs of servant leadership and questions 24 through 39 measured grade level, age, gender, grade point average, ethnicity, major, high school involvement, and college involvement.

The survey had a response rate of 11.6% (n=281). Of the respondents, 75% were female (n=211) and 24% were male. Additionally, 79% were in a high school club and 56% of those in a club served in an officer position. Results showed 68% had been a member of a college club, and 44% of those in a college club had also served as an officer within their organization. The overall mean score on the Servant Leadership Scale was 78.3 (SD 10.2) with scores ranging from 45 to 103. Correlations were found between the Total Servant Leadership score and holding an office in a high school club or organization. There was a positive relationship between the Total Servant Leadership score and membership in a college club or organization.

Although small, it can be concluded that there is a positive relationship between students holding an office in a club or organization during high school and their servant leadership score. A positive relationship can also be concluded between participation in a college club or organization and the total servant leadership score. Given the information, students who wish to improve in the area of servant leadership should consider becoming involved in organizations.

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Biology

Session I

Poster No. 6

Identifying protein expression changes in zoledronic acid-treated metastatic breast cancer cell spheroids

In 2017, an estimated 250,000 American women will be diagnosed with breast cancer and over 40,000 will die from it. Most death from cancer is attributed to metastasis of cancer cells, primarily to the bone. Previous research suggests that the drug, zoledronic acid, decreases metastasis of breast cancer to bone. Although some research has provided insight as to possible mechanisms for this decrease, it remains largely unknown. Our goal is to clarify the biochemical effects of zoledronic acid on breast cancer cells so that we can develop a deeper understanding of events driving breast cancer metastasis and how to influence it. This may lead to improved treatment and therapy options for breast cancer patients. For this study, metastatic breast cancer cells were cultured into three-dimensional, tumor-like structures called spheroids to more accurately represent in-vivo, or life-like conditions. Untreated spheroids were observed and imaged showing individual breast cancer cells migrating away from the spheroid mass. However, cell migration was considerably decreased when spheroid cultures were treated with zoledronic acid. Based on these observations, we hypothesize that certain proteins present in breast cancer or secreted into the extracellular region help guide these motile cells and that zoledronic acid causes changes to these signals. To test this, we will extract the proteins from treated and untreated spheroids and visualize them on a protein gel. If we note any differences, we will excise the specific proteins from the gel and identify them through common protein chemistry techniques such as mass spectrometry. We anticipate significant differences between the treated and the untreated spheroids as we predict that zoledronic acid inhibits the production of a variety of growth factors in metastatic breast cancer.

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Biology

Session I

Poster No. 7

Reactive Oxygen Species and Developmental Delay in *Caenorhabditis briggsae*

To understand how species form, it is useful to study hybrid dysfunction. Hybrid dysfunction is evident when crosses between two individuals of the same species produce offspring that have reduced fitness. This suggests that a combination of genes from the parents causes poor health in the hybrid offspring. I study this process in the nematode *Caenorhabditis briggsae*. When two strains of *C. briggsae* are crossed, they produce a hybrid F1 generation. When F1 hermaphrodites self-replicate, the F2 generation exhibits developmental delay in ~20% of the progeny. Developmental delay is evident because these F2 individuals take ~33% longer to reach adulthood than wild-type siblings. Developmental delay is a mild form of hybrid dysfunction; my project seeks to identify the molecular/cellular basis for why it occurs. The reason for exhibiting delay is unknown; my hypothesis is that mitochondrial dysfunction causes reduced development rate. This is founded upon the idea that detrimental genetic interactions in hybrids of other species are known to cause mitochondria to produce reduced amounts of adenosine triphosphate (ATP). Mitochondrial gene mutations cause retarded development. Thus, mitochondrial biochemical dysfunction could connect the organismal phenotype of developmental delay to a genetic basis of hybrid delay: incompatible genes involved in ATP production. To test the hypothesis, I assess whether mitochondrial dysfunction is evident in delayed F2 hybrids. As a proxy for mitochondrial dysfunction, I measure levels of reactive oxygen species (ROS) by feeding the nematodes MitoSOX Red, a dye that targets the mitochondria in live cells and fluoresces quantitatively depending on levels of ROS in the mitochondria. Dysfunctional mitochondria have been shown to produce elevated ROS levels in some *C. briggsae* hybrid strains. I assess fluorescence intensity by fluorescence microscopy followed by computational comparison of pixel brightness between delayed and wild-type individuals. I recently observed decreased levels of ROS in delayed individuals.

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Department of Physics

Session I

Poster No. 8

Optimization of silicon nanocrystal synthesis via plasma-enhanced chemical vapor deposition

Currently, bulk silicon is used extensively in many applications. However, because of its high cost and maximum theoretical efficiency of only 31%, bulk silicon is not an ideal material for solar cells. Due to quantum confinement, silicon nanocrystals (SiNCs) potentially can solve these problems, as the cost would be considerably reduced since the silicon does not need to be defect-free, and one could build a multiple-junction solar cell (87% maximum theoretical efficiency) by tuning the SiNC's bandgap. Toward this end, a reactor was constructed to fabricate SiNCs via plasma-enhanced chemical vapor deposition (PECVD), and was subsequently optimized to grow SiNCs with a narrow size distribution.

The reactor consisted of a quartz tube connected to silane (SiH_4) and argon tanks at one end and a collection chamber at the other, which was connected to a mechanical vacuum pump. The system was maintained at an internal pressure of ~ 1 -5 Torr when gases were flowing. Mass flow controllers were used to regulate the flow of argon and silane. A 13.56 MHz radio-frequency (RF) generator applied power through a matching network to four copper ring electrodes placed on the tube, thus generating plasma. With this electrode setup, power delivery percentages reached up to 98% for pure argon plasmas and 86% for argon-silane plasmas, substantially higher than those typically reported in the literature ($\sim 30\%$). To find optimal growth conditions, the argon flow rate, silane flow rate, RF power, and internal pressure were adjusted.

The as-grown SiNCs have a brownish-yellow color. Samples were or will be analyzed using ultra-violet (UV) spectroscopy, scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy, and transmission electron spectroscopy to determine their morphological/crystal structure, size, and chemical composition. Preliminary UV spectra agree with SiNC characteristics in reference papers, while initial SEM images show clusters of SiNCs. This PECVD method will be further perfected for use in later experiments.

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Civil and Geomatics Engineering

Session I

Poster No. 9

Experimental Evaluation of Dynamic Characteristics of Structural Systems

This study investigates the dynamic characteristics of multi-story buildings to ground base excitations. This is done by examining (i) different failure mechanisms of structures during past earthquakes; and (ii) experimental procedures to evaluate the natural period and viscous damping ratio of the structural systems. For this project, two scaled wooden buildings were constructed in the structural lab of the Lyles College of Engineering and subjected to a series of free vibration testing and harmonic motions using a small scale shaking table. These test units were designed with different heights and types of lateral load resisting elements (i.e., bracing vs. moment resisting frames). The experimental results were used to evaluate the dynamic characteristics of these specimens. A comparison of the measured natural periods and damping ratios is conducted to fully understand the differences between the dynamic behavior of the two lateral load resisting systems at different heights.

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Mechanical Engineering

Session I

Poster No. 10

MRF cone type knee brake

Magnetorheological fluid (MRF) is a fluid that consists of magnetic particles suspended in oil. Under normal conditions, the MRF behaves like normal oil and has the fluid properties of oil, but when a magnetic field is applied to the oil, the viscosity increases and the shearing stress on the surface in contact with the flow. By controlling the magnetic field acting on a device containing the MRF, a braking motion can be created. We are conducting research in the effort to create a new shape for a MRF brake that will be used as a prosthetic knee to assist amputees walk. Our design is a conoid shape, which we see as the middle ground between existing brakes shapes. One being thin with a large radius and the other thick with a smaller radius. The conoid shape main advantage over the other two is that it has a larger working surface where the shearing will occur relative to its total size. The research being conducted is being done to optimize the manufacturing process of the device and the magnetic functions of the device. Due to the design being our own, there are no prior designs that we can look to for guidance, so the placement, size, and shape of the magnetic coils being used in the device need to be researched so that the device can operate efficiently and effectively. The manufacturing of the device is important to consider for the design because one of the goals is that the device can be easily manufactured so that the price may be affordable. The main goal of the project is to build a device that can be used as a substitute for a real knee and imitate its strength and torque so that the user is able to move without difficulty.

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Chemistry

Session I

Poster No. 11

Determination of Imidacloprid in Central California Honey and the Decline of the Bee Population

Neonicotinoids are a family of pesticides that mimic nicotine and are toxic to insects. Imidacloprid is a neonicotinoid that may be responsible for the recent decline in the bee population. Decreased pollination negatively impacts Central California's local agriculture-based communities. In this procedure, analysis was performed with the use of liquid chromatography-mass spectroscopy (LC-MS) in order to determine the presence of imidacloprid in local honey from mass spectra. Fluorenone, an intermediate used in pesticides, was detected using Gas chromatography-mass spectroscopy (GC-MS). Controls used were extracted from a commercial product and checked for purity using a UV-Vis spectrophotometer. Different concentrations of imidacloprid were measured to create a standard curve. The honey sample was spiked with imidacloprid to identify the presence and concentration of the neonicotinoid. Possible traces have been detected of imidacloprid in honey samples. Traces of fluorenone have also been detected in samples.

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Chemistry

Session I

Poster No. 12

Analysis of the effects of Bcl-2 family proteins on carbohydrate metabolism of prolymphocytes

B- cell lymphoma 2 (Bcl-2) family proteins are the key regulators of the intrinsic pathway in the programmed cell death (apoptosis). Bcl-2 family proteins have both pro-apoptotic and anti-apoptotic proteins. The overexpression of the anti- apoptotic protein Bcl-2 is associated with certain types of diseases such as blood cancer. Our goal is to study Bcl-2 effects on Tumor metabolism. Cancer cells exhibit high rates of lactic acid fermentation compared to normal cells. This has led to the assumption that cancer cells universally shift their metabolism toward anaerobic respiration (i.e. the Warburg effect). However, several studies also indicate that the rate of aerobic respiration is elevated as well in certain types of tumors such as glioma. This suggests that cancer cells may also display elevated rates of energy metabolism in general, rather than an exclusive increase of lactic fermentation.

In our study we used a fetal prolymphocytic murine cell line (FL 5.12) cultivated in an IDMEM 25 mM glucose medium. This cell line has been shown to induce lymphoma when overexpressing Bcl-2 after injection in mice. Basal respiration rates of Parental and Bcl-2-overexpressing FL5.12 cells were measured through measurement of oxygen consumption over time using a Clark-type oxygen electrode (JObasal). Uncoupled (i.e. in the presence of CCCP, JOCCCP) and non-coupled (i.e. in the presence of oligomycin, an inhibitor of the mitochondrial ATP synthase, JOoligo) respiratory rates were also be measured in order to determine the 'oxidative phosphorylation regime' of these cells (i.e. [JObasal - JOoligo]/ [JOCCCP - JOoligo]). Our results show no significant change in JObasal, JOCCCP, JOoligo or oxidative phosphorylation regime between or Parental and Bcl-2-overexpressing FL5.12 cells. We also were able to observe that Bcl-2 overexpression leads to an increase in lactic acid fermentation in FL5.12 cells in resting (non-growth) conditions; and we are currently implementing a ¹³C-NMR-based approach to estimate Bcl-2 effects on lactic fermentation of growing cells. Taken together, these results indicate that Bcl-2-overexpression driven increase of lactic acid fermentation is not associated to a Warburg-type metabolic shift as respiration rates remained unchanged. Future experiments include the metabolic study of Bcl-2 overexpression in FL5.12 growing in a medium containing 5 mM of glucose only to mimic normal glycaemia.

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Electrical Engineering

Session I

Poster No. 13

Implementing Image Compression Technique using TSIHT algorithm

This paper proposes a novel progressive image compression algorithm using the wavelet transform. Rapidly growing number of high-resolution images have come with the advancement of consumer products in various multimedia applications. Due to the huge amount of data involved, even a compressed image is significant in size; large image sent over low-bandwidth links will still need lengthy transmission-time, especially in computation-limited or network-limited environment, such as the portable device. A better solution is to encode image as transmit bit-stream simultaneously and progressively. Wavelets are effective in capturing directional information in images using a flexible set of basic functions and filtering process that are elongated and directional. Since the contour let transform is redundant, a wavelet based contour let transform has been applied on the image. The wavelet based contour let transform is the wavelet transform followed by the contour let transform on the sub bands. This paper presents a new algorithm for progressive image coding, called tag setting in hierarchical tree (TSIHT). The TSIHT coding can save the memory requirement while keeping the low-bit-rate quality high. The TSIHT algorithm has been implemented onto a chip with 0.35 μ m 1P4M CMOS technology. In this work, proposed TSIHT coding using tag flags can effectively reduce amount of memory usage. For a typical 256 \times 256 gray-scale image, TSIHT only needs 26 K bytes to store four tag arrays for a 256 \times 256 gray scale image. TSIHT algorithm is implemented with PIE as core. The PIE core is successfully designed and results are analyzed by taking gray scale bird image of size 256 \times 256 as input both in MATLAB and VHDL. The results are simulated and synthesized for the PIE core of TSIHT.

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Mechanical Engineering

Session I

Poster No. 14

Vibration Energy Harvesting and Biomedical Application

Vibration energy harvesting is considered a promising alternative approach to power wireless sensors nets and ultra-low power microelectronics devices. Vibration energy is ubiquitous, and harvesting vibration energy to generate electrical power is well suited to power low-power electronic devices, wireless sensors, and their networks. This project mainly focus on a miniature hand wearable electromagnetic transduction mechanism for energy harvesting. The harvested energy may potentially be used to charge the hand wearable devices, such as an electronic watch or heath monitoring device. This project is completed in collaboration with research related to a wearable biomedical wrist tremor reduction device, another project in the Fresno State Mechanical Engineering Department. This energy harvesting project will investigate the potential to harvest energy from wrist tremors in a wearable device, which may then be incorporated into powering the tremor reducing mechanism. The tremor vibrations are simulated by oscillating rotary movement, which externally excites a set of magnets to oscillate through a set of coils, inducing current in the coils. The voltage readings from the harvested vibration energy are recorded. As more data is collected, adjustments to optimize the vibration and create a smaller, more efficient wearable design may be made.

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Nursing

Session I

Poster No. 15

Type II Diabetes Education for the Indian Population

Diabetes continues to grow worldwide despite the amount of research and educational efforts that have been put in place to prevent its prevalence. Current research shows that India and other countries in Asia are experiencing higher epidemics of diabetes and cardiovascular disease secondary to lack of education, sedentary lifestyle, and lack of physical activity. The objective of this project is to teach is to provide 30 middle-aged Indian patients between the ages of 40-65, with an educational tool in regards to diabetes management, lifestyle changes and the use of non-pharmacological techniques to properly manage diabetes.

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Department of Biology

Session I

Poster No. 16

The Critical Role of Glycine at Position 184 in the Transcriptional Activation Function of the cAMP Receptor Protein

The F-helix domain of *Escherichia coli* cAMP receptor protein (CRP) undergoes a conformational change as cAMP binds to the CRP's C-helix domain. CRP's F-helix domain is composed of six residues. Three of those residues, Arg180, Glu181, and Arg185, are known to directly communicate with DNA, but there is little information about the other three residues, Thr182, Val183, and Gly184. This project focuses on the role of glycine at position 184. To investigate the importance of Gly184, the Gly residue at position 184 was substituted with various amino acids via site-directed mutagenesis. None of the substitutions at position 184 conferred the high in vivo transcriptional activation activity to the wild type CRP level. This indicates that Gly184 plays an important role in the transcriptional activation activity of CRP. The gradual activity loss from G184A, G184V to G184L CRP suggests that the fact that glycine is the smallest amino acid is important for the phenotype. Nevertheless, the huge activity difference wild type CRP and G184A implies that there should be more than size that is critically important. We are currently testing a hypothesis that Gly at position 184 is important for CRP function because it uniquely provides flexibility to the F-helix.

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Communicative Sciences and Deaf Studies

Session I

Poster No. 17

Development of a Content Valid Interview Questionnaire for Hard of Hearing Adults and Their Communication Partners

This poster session describes the development and content validity index (CVI) analysis of an interview questionnaire employed to gather information regarding the experience of the hearing loss-specific quality of life for both persons with hearing loss and their communication partners. The questionnaire was organized into four sections with a total of 41 items. The first section assessed the person with hearing loss' experience of their hearing loss-specific quality of life and consisted of 16 items; the second section assessed the communication partner's experience of their hearing loss-specific quality of life and comprised 13 items; the third section assessed the person with hearing loss' experience of the communication partner's hearing loss-specific quality of life and included six items; and the fourth section surveyed the communication partner's experience of the person with hearing loss's hearing loss-specific quality of life and included six items. Sixteen researchers, clinicians, and professors in the fields of audiology, speech-language pathology, social work, deaf education, and rehabilitation counseling were contacted regarding the purpose of the investigation and invited to participate in the study. Each expert was instructed to evaluate the relevance and clarity of each of the 41 items in the questionnaire. There was 100% interrater reliability on the relevance for 37 questions and 93.3 % interrater reliability on the relevance for four questions. A content validity ratio was computed for the 41 items on the interview protocol. The CVI was .99, suggesting a high level of interrater agreement amongst the 41 questions rated for content relevance in the interview protocol. The number of relevant items on the questionnaire was reduced from 41 to 40 questions and used in the research study, "Role of communication self-efficacy training on the hearing loss-specific quality of life for both persons with hearing loss and their communication partners."

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Pharmaceutical and Biomedical Sciences

Session I

Poster No. 18

APIGENIN-LOADED PLURONIC MIXED MICELLES FOR BREAST CANCER THERAPY

Introduction: Apigenin (4',5,7-trihydroxy flavone) is a plant derived flavonoid that has been shown to possess anti-inflammatory, free radical scavenging and anticancer activities. However, apigenin is poorly water soluble and has low bioavailability. The objective of the present study was to formulate and evaluate a polymeric micellar delivery system of apigenin for improved drug delivery in breast cancer. Methods: Apigenin-loaded mixed polymeric micelles composed of Pluronic polymers were prepared by thin film hydration method. The micelles were characterized for particle size, zeta potential, critical micelle concentration (CMC), drug loading, encapsulation efficiency, in vitro release study. The in vitro cytotoxicity of the micelles were studied in MCF-7, an epithelial and MDA MB 231, a metastatic breast cancer cell lines. Results: The Pluronic polymers, P123 and P407 in the molar ratio of 9:1 gave an optimized micellar formulation containing apigenin. The average particle size of the micelles was 87.37 ± 6.75 nm with polydispersity index 0.305 ± 0.011 , and zeta potential was -18.19 ± 3.55 mV. The percentage drug loading and encapsulation efficiency were $1.84 \pm 0.06\%$ and $92.17 \pm 2.96\%$ respectively. The solubility of apigenin in micelles was 0.901 mg/mL, which was about 143 fold that of pure apigenin in water. The micelles had a low CMC indicating their stability in aqueous media. The micelles sustained the release of apigenin for more than 48 hrs. MTT assay for in vitro cytotoxicity assay showed that apigenin-loaded polymeric mixed micelles are more effective than the pure apigenin in both MCF-7 and MDA MB 231 cell lines. IC₅₀ of micelles was 4.5 and 1.55 fold less in MCF-7 and MDA MB 231 cell lines, respectively than the free drug. Conclusion: Apigenin-loaded Pluronic P123/P407 mixed micelles might be considered as an effective delivery system for treatment of breast cancer.

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Physical Therapy

Session II

Poster No. 1

Acute-Care Physical Therapy Proves Beneficial for a 73 y.o. male S/P CABG with Medical Complexity

Background and Purpose: A prolonged length of stay (LOS) in the acute care hospital following coronary artery bypass graft (CABG) surgery is associated with deconditioning. Deconditioning leads to decreased functional independence. The purpose of this case report is to document the successful treatment of a patient S/P CABG utilizing an individualized physical therapy (PT) program based on the tolerance and performance of the patient.

Case Description: The patient was a 73-year-old male who endured a 32 day LOS in the ICU following CABG surgery due to multiple complications. The patient was severely deconditioned at the time of the PT evaluation in the acute care hospital. The patient was assessed for his level of functional independence with several functional mobility tasks. He was moderate assist (Mod A) for ambulation 15 ft. and maximum assist (Max A) for all other functional tasks at the time of initial evaluation. Interventions were prescribed to address decreased strength, decreased endurance, and decreased functional mobility.

Outcomes: The goals for discharge were stand by assist (SBA) – minimal assist (Min A) for all functional activities in order for the patient to return home safely. The patient was able to achieve SBA for all functional mobility activities and ambulated 240 ft. at the time of discharge.

Discussion: The importance of an individualized PT intervention program was essential for this case as there were multiple factors that prevented a typical progression of exercises. Consistent monitoring of tolerance and performance ensured that the patient was working at the desired level of exertion to maximize efficacy and efficiency of treatment.

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Physical Therapy

Session II

Poster No. 2

Case Report – Conservative Management of Nerve Traction for a Construction Worker who had a Wrist Injury due to a Fall on an Outstretched Hand.

While falls on an outstretched hand (FOOSH) are typically associated with musculoskeletal injuries, they can also cause nerve traction injuries that are often obscured. The purpose of this case report is to present a successful intervention for a nerve traction injury due to a FOOSH injury that was initially treated as a wrist sprain injury. The patient was a 34-year-old construction worker who fell on an outstretched hand, resulting in 9/10 pain at the wrist and elbow. After he was treated for 4 weeks for his wrist injury, his pain had only decreased to a 6/10 pain level. Due to the slow progress in reducing his pain levels, the patient was re-evaluated and found to have a nerve traction injury. He was then treated for six weeks with an emphasis on mobilization of the affected nerves, patient education and therapeutic exercise to gently regain his range of motion and reduce pain. Ultimately, the patient met many of his therapy goals and his pain was reduced to 2/10. This case highlights the importance of revisiting a patient's history and making constant re-evaluations of the patient's progress if the patient is not progressing as expected.

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Session II

Poster No. 3

Computerized Dynamic Posturography Comparing the Bertec Balance Advantage™ and NeurocomR Equitest in Assessing Postural Stability in Healthy Adults

Purpose: The purpose of this study is to establish the validity of postural stability measures between a new computerized dynamic posturography (CDP) system Bertec™ using an immersive optic environment to the gold standard sway-referencing of NeurocomR. **Methods:** 50 healthy adults aged 20-69 years old were tested on the 3 protocols for CDP: Sensory Organization Test (SOT), Motor Control Test (MCT), and Adaptation Test (ADT). Concurrent validity of each measure was examined using Pearson's correlation coefficients and paired t-tests. **Results:** Strong to moderate correlation values between Bertec™ and NeurocomR for Conditions 1-6 and SOT Composite, MCT and ADT indicating good concurrent validity. Equilibrium SOT composite score was significantly lower in Bertec™ as well as, Conditions 1,4 and 6, MCT composite and ADT toes up and toes down. Somatosensory, preference and vestibular ratio scores were not clinically different while the visual ratio score was significantly different between the devices. The largest clinically important difference was found in Condition 4, visual ratio score and ADT. **Conclusion:** All 3 CDP tests showed high levels of concurrent reliability indicating that both Bertec™ and NeurocomR are valid measures of postural stability. With somatosensory and vestibular ratio cues comparable, it gives clinicians confident both devices are reliable in measuring vestibular cues for balance. Lower scores on Bertec™ as compared to NeurocomR suggest the more visually provoking environment of Bertec's™ optic dome. Bertec™ may provide a more sensitive analysis of postural stability in those impairments with visual input involvement including motion sensitivity, post-concussion and mild traumatic brain injury.

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Session II

Poster No. 4

Effects of a Multidimensional Program to Address the Fall Risks in a Community Dwelling Older Adult: A Case Report

Introduction. Falls in older adults aged 65 and older, is the leading cause of morbidity and mortality in the United States. The risk factors associated with falls are often modifiable; these include poor balance abilities, strength, and gait proficiency. As such, Physical Therapy (PT) can address the various risk factors contributing to falls in hopes of reducing injuries in older adults. Therefore, the purpose of this case report was to examine the effects of a rehabilitation program that addressed fall risk in a community dwelling older adult.

Methods. 88-year-old African-American male was admitted to skilled nursing facility for rehabilitation due to a functional decline, general weakness, and deconditioning putting him at risk for a fall. Functional outcome measures confirmed patient had a high risk for falls and was a candidate for a multidimensional rehabilitation program. PT emphasized strengthening exercises, balance, and gait to improve his independence with functional tasks.

Results. During the first 3 weeks of PT services, the patient demonstrated incremental improvements with his activity tolerance as reflected by his ability to meet the short-term goals established. However, a significant decline occurred 1-month post-admission to the skilled nursing facility due to cardiovascular impairments. Health decline restricted patient tolerance with physical activities limiting his ability to participate in PT and made long-term goals unachievable.

Conclusion. Although there is no ideal exercise intervention to prevent falls in older adults, research has shown that a multidimensional program yields the best results. The multidimensional program could have progressed to more dynamic balance and gait activities by changing the compliance of the surface, decreasing visual input, and utilizing PNF techniques. The patient may also benefit from treatment that entailed collaboration between physical, occupational, and speech therapy, to address additional impairments.

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Doctor of Physical Therapy

Session II

Poster No. 5

A Multi-Faceted Physical Therapy Intervention for a Chronic Stroke in a Middle Aged Male: A Case Report

Cerebrovascular accidents (strokes) can be an extremely debilitating condition that affect approximately 795,00 people each year. One of the most debilitating effects of stroke is extremity paralysis resulting in motor impairments, with walking and arm/hand function typically the most severely effected. While a good body of research exists pertaining to improving gait or upper limb function in individuals post stroke, there is minimal research addressing the efficacy of combined interventions when working with a patient who is in the chronic stage of stroke. The purpose of this case report was to investigate the benefits of a multi factorial physical therapy intervention program on improving functional abilities in a middle-aged male with chronic stroke.

Methods

A multi factorial program consisting of two visits weekly for eight weeks was created for the patient with the intent of progressively improving function in daily activities. Interventions consisted of lower extremity exercises to address muscular strength and endurance, over ground walking and treadmill training to enforce proper gait, and mirror therapy to aid in restoring function to the upper extremity.

Results

Upon discharge, the patient was walking confidently and comfortably while displaying a smooth functional gait. His preferred walking speed improved significantly, and performance of his upper limb also demonstrated marked improvements.

Conclusion

The results of selected outcomes measures pre and post intervention, as well as improvements in functional abilities, indicate that the intervention program was likely beneficial for the patient.

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Physical Therapy

Session II

Poster No. 6

Physical Therapy Interventions for an Elderly Male with a Chronic Multifactorial Balance Problem: A Case Report

Falling is estimated to impact nearly one third of the elderly population annually. Multiple factors contribute to falls, including gait and balance instability, diabetic complications, muscle weakness, and emotional trauma. Multifactorial fall prevention programs that include gait training, muscle strengthening, and education in fall prevention have been proven to reduce the psychological and physical trauma caused by falling. These intervention programs additionally allow the individual to be more functional with their daily roles. The purpose of this case report is to present an intervention program for an individual exhibiting a multifactorial balance problem with primary deficits in gait mechanics, muscle weakness, and neuropathy. The patient was a retired 68-year-old male who reported having a chronic history of falls, leg weakness, and fear of falling. An 8-week fall prevention program was established following an evaluation. Interventions, such as gait training and balance training, were incorporated in the physical therapy regimen along with a home exercise program that utilized therapeutic exercise. Results of the intervention program were measured using functional outcome measures such as the Tinetti Balance Assessment, 2 Minute Walk Test, 30-Foot Walk Test, and 5 Times Sit-To-Stand. The patient reported that he was walking better than he had in the past, unfortunately, the outcome measures used to assess improvement in gait and balance showed either little improvement or regression. This report describes the mixed results obtained by a physical therapy regimen focusing on therapeutic exercise, manual therapy, as well as gait and balance training to decrease the occurrence of falls.

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Physical Therapy

Session II

Poster No. 7

**The Effects of Therapeutic and Vestibular Exercises on Cervicogenic Dizziness and Pain:
A Case Report.**

Background and Purpose: Dizziness can be difficult to diagnose and treat due to the varying causes contributing to this symptom. The purpose of this case report is to look at how Physical Therapy interventions assisted a patient with cervicogenic dizziness and neck pain. Cervicogenic dizziness is defined as dizziness caused by pain, spasticity or stiffness from the neck that alters a person's ability to perceive where their head is in space and therefore causes them dizziness.

Case Description: This case involves a 48-year-old male who was experiencing dizziness and neck pain secondary to a facial fracture in the orbital floor and subsequent nerve injury.

Methods: The patient was treated twice a week for three weeks. Treatment consisted of pain control, active exercise and strengthening activities, and balance activities in combination with head movements to aid in reducing symptom frequency and duration.

Results: The patient reported a 6-point decrease in pain level after completing Physical Therapy. Dizziness was completely resolved based on post-test data from the Motion Sensitivity Quotient which causes symptom provocation. There was significant change across multiple outcome measures looking at mobility, coordination balance and strength, including Fullerton Advanced Balance Score (9-point change), and Functional Gait Assessment (9-point change).

Conclusion: Overall, Physical Therapy was successful for this patient. He achieved all goals and symptoms successfully resolved. Therapy specializing in vestibular rehabilitation demonstrated success in a patient with facial fracture and nerve injury.

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Session II

Poster No. 8

A COMPREHENSIVE PHYSICAL THERAPY APPROACH IN A YOUNG ADULT WITH SEVERE MUSCLE WEAKNESS FOLLOWING ORIF OF AN INTERTROCHANTERIC HIP FRACTURE

Introduction: Methods of open reduction internal fixation (ORIF) for stable and unstable intertrochanteric hip fractures have decreased the need for an extended non-weight bearing status after surgery allowing for early mobility. Pain and weakness are major limiting factors that impede patient progress. Therapeutic exercise has been widely established as an effective intervention for treating a variety of dysfunctions, yet very little is known about its effect on patient outcomes following hip fracture. The purpose of this case report is to describe a comprehensive physical therapy (PT) approach emphasizing the application of therapeutic exercise in a young adult with severe muscle weakness following ORIF of an intertrochanteric hip fracture. The patient was a 31-year-old male referred to outpatient PT for continued rehabilitation 2 weeks status post (s/p) ORIF. The patient utilized a wheelchair despite having full clearance to weight bear and ambulate without restrictions. Patient reported pain and muscle weakness were contributing to poor tolerance for weight acceptance.

Methods: The patient received 7 one hour-long PT sessions including gait and functional training along with a gradual increase in weight bearing, strengthening and balance exercises. A home exercise program (HEP) was also implemented using specificity, overload, and progression training principles.

Results: The patient demonstrated improvements in all outcomes. Pain scale reported a 4-point change. Mobility and strength in the involved lower limb increased by 2 to 3 points in all directions aiding in functional activity tolerance, except hip abduction with a 1-point increase. Upon interim of PT services (visit 7) the patient accepted 75% weight on the affected limb allowing him to ambulate and maneuver stairs with a single point cane.

Conclusion: Implementation and patient compliance of a comprehensive individualized PT program, including progressive resistive exercise and a home exercise program, improved mobility, mechanics with ambulation, and achieved patient-specific goals.

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Session II

Poster No. 9

PHYSICAL THERAPY TRAINING S/P SPINAL FUSION AND PARIETAL MENINGIOMA EXCISION: A CASE REPORT

Introduction

Brain tumors are a commonly seen diagnosis for physical therapists in a skilled nursing setting. However, despite this common occurrence, there is no established physical therapy treatment protocol and limited information on functional outcomes for individuals with this diagnosis. The purpose of this case report is to look at how a patient with recent brain surgery as well as an orthopedic injury would respond to multidisciplinary treatment intervention in a skilled nursing facility.

Methods

This case involved a 74-year-old male who had undergone two complex surgical procedures prior to admission to skilled nursing facility. He had a posterior lumbar spinal fusion and also received surgery for brain tumor excision from the parietal lobe. The patient would have spinal precautions including no bending, lifting or twisting. He also would be monitored for signs of intracranial pressure and infection throughout treatment. The patient was challenged by weakness and decreased coordination in bilateral lower extremities. The patient would be led in walking activity with cuing, balance exercises with increasing difficulty, and exercises to improve strength and coordination in his legs.

Results

Outcome measures include: restoration of independent ambulation at household distances, gait speed improved to 1.04 m/s, increased strength, improved coordination and minimal fall risk by time of discharge. Bed mobility and transfers improved by 3 levels each.

Conclusion

Use of multiple physical therapy interventions aided in achieving goals and preparing the patient to safely return home upon discharge.

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Physical Therapy

Session II

Poster No. 10

Acute Physical Therapy Interventions Improves Functional Endurance for an Elderly Male with COPD: A Case Report

Introduction:

Chronic obstructive pulmonary disease (COPD) is defined as a disease state characterized by airflow limitation that is usually progressive. It is associated with an abnormal inflammatory response of the lung leading to an increase risk of infection and progressive decline in activity secondary to pulmonary and cardiovascular distress. Ultimately, there is risk for decline in ability to perform activities of daily living and self-care which can impact the patient's activity level and participation in society.

Methods:

Physical therapy examination and interventions were performed in the acute-care setting emphasizing function, mobility, and management of symptoms. Prolonged bedrest due to hospitalization has led to a decline in independent performance of activities of daily living (ADLs) and greater exacerbation of respiratory distress symptoms. Education on management of respiratory distress symptoms in conjunction with regaining functional strength was required to return to prior level of function. Therefore, functional mobility and endurance training coordinated with proper breathing technique was the primary focus.

Results:

Physical therapy interventions were successful as patient was able to perform functional activities with reduction of respiratory symptoms. Education for self-management and functional mobility training appeared effective in producing favorable outcomes which contributed to his progression and eventual discharge.

Conclusion:

In patients with COPD, there is a greater risk of decline in the ability to perform activities of daily living. Limitations of self-care can impact the patient's activity level and participation in society. However, severe loss in functional independence is not obligatory as rehabilitation has potential to manage symptoms to allow greater activity level.

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Session II

Poster No. 11

**Conservative Treatment for a Torn Medial Meniscus Using the Movement System
Impairment Approach: A Case Report**

Introduction: Meniscal tears are the most common cause of mechanical symptoms of the knee. They can lead to increase in pressure and contact forces, potentially causing pain, swelling, and loss of range motion and strength. Research has shown that although operative treatment is available, majority of patients can recover to prior level of function with conservative treatment. Traditional conservative interventions focus solely on treating the knee locally. The Movement System Impairment (MSI) approach identifies a consistent abnormal pattern of movement associated with the patient's pain, and when corrected, decreases or eliminates the pain. The MSI approach for a meniscus pathology will assess and target the whole lower kinetic chain and correct abnormal movement that causes pain. The purpose of this case report is to explore a conservative physical therapy intervention strategy based on a MSI and demonstrate its effects on a patient with a medial meniscus pathology. Patient is a 51-year-old male with medial knee pain after falling off a ladder and twisting on a planted foot.

Methods: Patient received 6, hour long therapy sessions including pain management, patient education, and functional training with strengthening exercises that emphasized proper body mechanics. A home exercise program was also implemented to help supplement treatment interventions performed in clinic.

Results: After 4 weeks of treatment, the patient improved in pain, range of motion, and strength. He was also able to independently demonstrate proper body mechanics throughout functional tasks. However, the patient reinjured his knee in the third week of treatment after prematurely returning to full duty and was not able to achieve all his goals at his re-evaluation.

Conclusion: Although there is research to support the use of traditional conservative interventions for medical meniscus pathologies, the MSI approach provides an alternative intervention strategy that assesses the lower kinetic chain and its underlying impairments.

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Session II

Poster No. 12

**PHYSICAL THERAPY STATUS POST TOTAL HIP ARTHROPLASTY SECONDARY TO FEMORAL
NECK FRACTURE IN AN ELDERLY PATIENT WITH DEMENTIA: A CASE REPORT**

Introduction: Elderly adults with dementia are at high risk for fall-related hip fractures. Current research fails to indicate appropriate modifications for physical therapy intervention to address dementia-related prognosis delays for cases in which the patient's fracture requires surgical fixation. The purpose of this case report is to identify effective interventions and suggest areas of further study specific to physical therapy at a skilled nursing facility following a total hip arthroplasty for an elderly patient with dementia.

Methods: The subject of this case report was a 92-year-old male admitted to a skilled nursing facility after receiving a total hip arthroplasty due to a fall-related hip fracture. Postoperatively, the patient required assistance with basic self-care tasks, which he had been able to perform independently prior to injury. He also presented with multiple concurrent health conditions, including dementia. Physical therapy interventions were performed by a student physical therapist under direct supervision of a licensed clinician five times per week for six weeks as part of an interdisciplinary approach to rehabilitation. Interventions included assistive device prescription, functional training, neuromuscular reeducation, therapeutic exercises, manual techniques, gait training, and patient education.

Results: Dementia-related safety concerns ultimately hindered the patient's ability to meet all treatment goals. His prior level of function was not regained; however, at the time of discharge he required only minimal assistance with functional tasks and was less at risk for falls. Ultimately, the patient was able to return home after six weeks.

Conclusion: Special consideration for patient-specific physical therapy intervention, including the use of standardized outcome measures, are indicated to attain the best possible prognosis for a patient with dementia following a total hip arthroplasty. This case report suggests that further research regarding treatment modification for this population is warranted.

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Session II

Poster No. 13

A Conservative Intervention Program for an Obese 83-Year-Old Female with Severe Ankle Osteoarthritis: A Case Report

Introduction:

There is currently very little research available as it relates to the proper management of ankle osteoarthritis. This case report describes a comprehensive, conservative intervention program designed for an obese 83-year-old patient with severe ankle osteoarthritis, and its impact on balance, gait, pain and physical activity tolerance.

Methods:

The patient was treated twice a week, for 8 weeks at an outpatient physical therapy clinic. Interventions included manual therapy, therapeutic exercises, dynamic balance, single limb stability training, neuromuscular re-education, pre-gait training and patient education for posture and pain management.

Results:

Following 8 weeks of skilled intervention, the patient demonstrated significant improvements in balance, posture, and gait mechanics with moderate progress in ankle range of motion, strength, and a subjective decrease in ankle/foot pain during weight bearing. The biggest challenges throughout treatment were pain management and appropriate exercise selection tailored to minimize patient's pain.

Conclusions:

Eight weeks of skilled interventions proved to be beneficial for improving functional mobility and safety. However, subjective pain reports as measured by the national pain rating scale, were much less than expected. Therefore, a subjective measure for assessing pain as it relates to function and quality of life is necessary to demonstrate improvements in pain as it relates to function and physical activity tolerance.

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Session II

Poster No. 14

The Effectiveness of Multi-Dimensional Interventions to Improve Mobility for a 59 y.o. female with Multiple Sclerosis: A Case Report

Individuals with MS often present with impaired mobility such as gait disturbances which may indicate fall risk secondary to their medical diagnosis. In addition, exertional fatigue is experienced in 90% of patients with MS impacting their quality of life. The purpose of this case report is to explore physical therapy interventions for a female with secondary progressive MS and their effects on gait and balance.

The client was a 59-year-old Caucasian female with secondary progressive MS presenting to a university outpatient neurological clinic for physical therapy services. Her primary limitations were seen in gait, strength, and balance.

Focus of physical therapy interventions were to address underlying impairments affecting gait without over-exerting the client. Body weight supported treadmill training and backwards over ground training were utilized to both conserve energy and improve quality of gait.

After an 8-week intervention program, backwards over ground gait training demonstrated the greatest carry-over effects with the affected left lower extremity. Heel strike upon initial contact, dorsiflexion upon terminal stance, and knee flexion during mid swing of the gait cycle improved significantly. An improvement of 12 points in the Berg Balance Scale resulted in the patient no longer being categorized as a fall-risk. Her five times sit to stand score improved by 15 seconds and her gait velocity increased by nearly 1% which is significant for daily function.

Skilled physical therapy services are effective in the management of a chronic progressive disease like MS to decrease impairments affecting mobility.

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Session II

Poster No. 15

**A Comprehensive Physical Therapy Approach to Treating a Non-Compliant Patient
Following Subacromial Decompression Surgery: A Case Report**

Shoulder impingement syndrome (SIS) is the most common disorder of the shoulder. This disorder can present in many ways, ranging from inflammation to degeneration of the bursa and rotator cuff tendons in the subacromial space. A subacromial decompression is the surgery performed to relieve pressure on the structures in the subacromial space. The purpose of this case report is to determine a comprehensive physical therapy approach in treating a non-compliant patient who underwent surgery for subacromial decompression.

The patient was a 30-year-old male presenting to the outpatient clinic following subacromial decompression of the right shoulder. He was not able dress or groom himself as well as work due to loss of range of motion (ROM). Throughout the course of therapy, the patient exhibited behaviors that were not conducive to tissue healing and was in a constant state of pain and inflammation.

The use of interventions supported by current literature were utilized in the treatment of this patient, which included strengthening and range of motion exercises, pain management techniques and patient education. The patient required frequent instruction on the process of tissue healing and the need to refrain from behavior that would compromise his recovery.

Goals set prior to treatment were not met; however, the patient did regain some motion in his surgically repaired shoulder. The patient's non-compliance to therapy precautions and failure to allow his shoulder to heal negatively affected the outcome of his treatment. Out of frustration, the patient self-discharged from treatment to seek pain injections from his surgeon.

The patient's non-compliance negatively affected treatment, as much of the time was spent managing pain and educating him about tissue healing and the need to abstain from activities that would affect rehabilitation.

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Session II

Poster No. 16

**Physical Therapy Intervention for AMBRI Shoulder Instability Prior to Surgical Intervention:
A Case Report**

Introduction: AMBRI instability is Atraumatic onset, most often Multidirectional in nature, occurring in patients with Bilateral glenohumeral (GH) joint laxity or generalized joint laxity, who respond best to Rehabilitation and, if surgery is required, Inferior capsular shift. Treatment is typically initiated by exercised- based rehabilitation to strengthen and retrain rotator cuff and scapular stabilizing musculature in order to compensate for structural instability. If this is ineffective, surgery is indicated. Failure to correct impaired muscle patterning has been identified as a cause unsatisfactory results following surgery and It has been suggested that "preoperative rehabilitation should prepare for the postoperative phase by improving scapular control, rotator cuff strength, and flexibility." This case report describes physical therapy prior to a surgery for a 19-year-old male presenting with signs and symptoms of AMBRI instability.

Methods: The patient participated in physical therapy twice a week for five weeks to strengthen and retrain rotator cuff and scapular stabilizing musculature. This included patient education, modification of activity, and therapeutic exercises chosen to specifically address muscular recruiting impairments. In addition, he was referred to an orthopedic surgeon to address potential structural abnormalities.

Results: Following physical therapy intervention, the patient presented with increased strength, subjective and objective reports of stability, decreased symptoms, and improved GH and scapular movement. He then underwent surgery to improve ligamentous and capsular stability which enabled him to return to his hobbies of golfing and bowling.

Conclusion: This patient's satisfactory results following a physical therapy and surgical intervention show the necessity for more research to expose the potential short and long term benefits of rehabilitation in preparation for surgical intervention for patients with AMBRI instability.

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Poster No. 17

Acute Care Physical Therapy Management for a Multi-System Elderly Female with Osteoarthritis: A Case Report

Osteoarthritis (OA) is the most common form of arthritis, affecting 10-12% of adults and is a chronic degenerative disorder characterized by cartilage loss-causing joint pain, stiffness, and limitations of joint function. Research has been conducted on the effects of functional capabilities that diabetes mellitus type 2 and atherosclerosis have in conjunction with OA. The purpose of this case report is to examine how multiple impaired systems impact acute-care physical therapy treatment in an elderly female patient diagnosed with OA.

Physical Therapy examinations performed in the acute-care setting emphasize function and mobility. Therefore, this patient was screened for mobility and strength related to functional activities. Safety and patient education are a primary focus, as this patient required altered patterns of movement to adapt to her impairments during activities, due to weakness and pain related to OA of the shoulder and knee. Precautions due to this patient's other medical diagnoses, needed to be taken and monitored throughout treatments to ensure safety.

Limited changes were noted, however assessment of patient capabilities with basic movement patterns was identified to ensure that the patient was transferred safely to the next highest level of care based on her current restrictions. A focus of Physical Therapy in the acute-care setting is to support the multidisciplinary team with disposition and transfer. As the mobility expert, it is imperative Physical Therapists provide valued insight on patient movement abilities and consideration for adaptive equipment to ensure safety.

Multiple systems need to be evaluated and treated to thoroughly assess and treat a patient's impairments. Physical therapists need to advocate for early and continued mobility in all settings to decrease readmissions to the hospital and in maintaining patient's functional baseline.

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Physical Therapy

Session II

Poster No. 18

A Cupping Intervention For a Patient with Upper Extremity Neuropraxia: A Case Report

Cupping is a relatively new technique being integrated into treatments by physical therapists throughout the United States. Nerve compression is an increasingly prevalent disorder in the upper extremity that can have various causes and thus require various treatment regimens. There is currently limited research regarding the benefits of manual therapy or myofascial decompression in the reduction of nervous tissue compression.

The purpose of this case report is to discuss outcomes of the alternative intervention of dynamic cupping in a patient with severe paresthesia and anesthesia in his forearm and hand

This patient is a 39-year-old male referred to physical therapy with a diagnosis of left arm pain. He presented with severe paresthesia and anesthesia in his left hand and thumb in addition to strength limitations in his hand and wrist. He is an active illicit drug user.

Sensation in the patient's left hand and thumb was improved from absent to normal. The DASH score improved from 77.5% disability to a 33.9% disability. ROM and strength values also significantly improved. The FABQ physical activity score was reduced from 20/24 to 8/24

The integration of dynamic cupping in a manual therapy program to provide myofascial decompression elicited exceptional results in improving sensation and strength of the left upper extremity. It is difficult to isolate the improved function to the dynamic cupping due the multifaceted treatment approach, however, during the dynamic cupping there was immediate onset of sensation in thumb that was previously absent. The secondary effects of IV drug administration on underlying soft tissue is unknown and the lasting effects of the treatment cannot be determined.

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Physical Therapy

Session II

Poster No. 19

Sub-Acute Physical Therapy Intervention for a 92-year-old Female Following a C2 Posteriolateral Fusion: A Case Report

Introduction: The purpose of this case report is explore sub-acute physical therapy treatment that lead to a return of high level functioning for a 92 y.o. woman who sustained a cervical fracture due to a ground level fall requiring posteriolateral fusion of C2 vertebra. The Patient is a 92- year old Caucasian female with a posteriolateral C2 fusion and limitations in functional mobility due to weakness and deconditioning.

As age increases, fall risk increases. Falls can have major negative implications for the geriatric population. Falls can lead to injury such as fractures, increased hospitalization, loss of independence, decreased physical function and even mortality. Due to increased frailty with the older populations, serious injuries such as cervical fractures can occur from even minor trauma such as a ground-level fall from a standing or seated position. Unfortunately, research paints a grim outlook for those who do sustain cervical fractures. Mortality rates increase and reductions in physical function and activities of daily living are commonly seen in geriatric patients admitted for acute hospital care leading to poorer outcomes for this geriatric population.

Methods: Patient received 90 minutes of physical therapy treatment per day, 6 days a week including therapeutic activities, therapeutic exercises, neuromuscular re-education, gait training, patient education and family training.

Results: After 4 weeks of treatment the patient improved functional mobility to be safely discharged home with family support to continue physical therapy rehabilitation in an outpatient setting.

Conclusion: There is limited research on rehabilitation for those that have cervical fusions within the geriatric population especially for those 90 years old and above. Further insight on patients with multiple impairments and physical therapy rehabilitation may provide benefit to similar patients in the future.

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Session II

Poster No. 20

Improving Mobility in an Orthopedic Trauma Patient with Pulmonary and Cardiac Complications in an Acute Setting: A Case Report

Patients involved in motor vehicle accidents often experience physical as well as psychologic impairments that can cause complications with recovery. This mode of blunt force trauma may cause orthopedic impairments that lead to difficulty with functional activities. Additionally, these patients are at an increased risk for pulmonary and cardiovascular complications. The purpose of this case report was to explore an inpatient physical therapy intervention focused on early and continued mobilization of a patient with orthopedic trauma as well as implicated cardiac, pulmonary, and psychosocial systems.

The patient was a 25-year-old Hispanic male, following a motor vehicle accident, whose history of anxiety, pulmonary and cardiac complications, and multiple musculoskeletal injuries contributed to delayed outcomes in mobilization. His primary impairments were his reduced activity tolerance and decreased independence with all mobility. Focus of physical therapy intervention was to address activity limitation and mobility training while maintaining precautions.

Medical intervention for cardiac and pulmonary complications as well as continued mobility allowed the patient to be able to reach independence in bed mobility and modified independence with transfers as well as ambulation. Upon medical discharge, the patient had reached an ambulation distance of 150 feet with a front-wheeled walker with stand-by assist.

Early and continued mobilization was an effective treatment in battling hospital deconditioning and in improving mobilization despite anxiety and continued delays due to medical factors.

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Physical Therapy

Session II

Poster No. 21

Return to Weight Loss: Successful Interventions for an Overweight Patient with Low Back Pain - A Case Report

Introduction

Low back pain (LBP) is a prevalent diagnosis in health care. LBP affects as much as 84% of the general adult population at least once in their life, and is estimated to cost over \$100 billion per year in the United States in direct costs alone. There are numerous diagnoses for LBP which correlate with the plethora of affected anatomical structures. Despite the common prevalence of disk degeneration and protrusion as demonstrated by imaging, many individuals remain asymptomatic.

The purpose of this study is to present beneficial interventions for an obese patient with LBP. The patient was admitted to a hospital after injuring his back exiting a vehicle. Imaging conducted revealed a disk bulge with possible direct pressure onto the nerve roots. The patient demonstrated limited range of motion in the lumbar spine and decreased core stability.

Brief Summary of Methods

Interventions for this patient included stretches, core stabilization, patient education and functional movement training (FMT). The patient was instructed to walk twice daily-progressively increasing distance, perform his HEP, and integrate his FMT into his routine. Fear avoidance beliefs were addressed by providing the patient positive movement patterns and verbal reinforcement for beneficial activities.

Summary of Results

After twelve visits, the patient's pain was reduced from 3/10 at rest and 6/10 with activity to 0/10 at all times and his Oswestry Disability Questionnaire score reduced from 40% to 0%. Furthermore, he displayed improved movement strategies and confidence in managing his LBP.

Conclusion

Although this study should not be generalized to all patients, it indicates that impairment based intervention with core stabilization, patient education, positive reinforcement and FMT can be effective for some patients with LBP. In addition, research needs to be performed to investigate the benefits of FMT.

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Doctor of Physical Therapy Program

Session II

Poster No. 22

Physical Therapy Interventions for an Elderly Female S/P LE ORIF: A Case Report

Intro: One in five elderly falls result in a bone fracture or a head injury, along with psychological effects. The patient is a 61-year-old Caucasian female with an intraarticular fracture of the distal left femur after a ground fall. She underwent an open reduction internal fixation (ORIF) surgery and was discharged to the skilled nursing facility (SNF). The purpose of this case report is to explore interventions for a patient who sustained a distal femur fracture post-fall and underwent ORIF. Due to complexity of injury she was not discharged home postoperatively and was referred to SNF for short-term rehabilitation with a nine-week non-weight bearing restriction. This case report demonstrates interventions and outcomes related to skilled rehabilitation services based on her limitations and safety concerns. All interventions were done to improve overall functional mobility and provide education to return the patient to their prior level of function.

Methods: The patient participated in physical therapy at a SNF for 9 weeks, 5 times a week for 90 minutes. Treatment included wheelchair training, strength training, transfer training, therapeutic exercise, and patient education. A home exercise program was given to the patient at the end of her SNF stay and home health physical therapy was recommended.

Results: The patient grew stronger and her balance had also improved significantly during her 6 week stay at the SNF. The patient demonstrated a 3-point change in standing balance with assistive device. Due to limitations and precautions for weight bearing overall strength was much slower to improve, however carryover was demonstrated with adaptations to standard methods to ensure safety.

Conclusion: Physical Therapy supported recovery with limitations for weight bearing on the affected leg which impacted this patient's functional training. Achieving goals through adaptation of functional movements created motivation in this case report.

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Session II

Poster No. 23

**Interventions Associated With Recovery of Strength and Function Following ATL Surgery
in an Adult Male with Muscular Dystrophy: A Case Report**

Introduction: Muscular Dystrophy (MD) is a term used for a group of progressive myopathies associated with plantarflexion (PF) contractures that often lead to impairments and gait deviations. Persons with MD seek surgical intervention when contractures affect their activities of daily living and community ambulation. There is limited research involving MD effects on physical therapy outcomes or accepted interventions following Achilles Tendon Lengthening (ATL) surgery. The purpose of this case report is to discuss interventions associated with the recovery of strength and function following ATL surgery in an adult male with a medical diagnosis of MD.

Methods: The patient is a 40-year-old Caucasian male who was referred to outpatient physical therapy by his orthopedic surgeon six weeks postoperative Z-lengthening ATL surgery to his right ankle. He presented to the clinic in a boot with complaints of pain during prolonged standing and walking and loss of range of motion (ROM) and strength due to immobilization. The patient participated in a comprehensive therapy program two times a week for eight weeks consisting of manual therapy, therapeutic exercise, modalities, gait training and a home exercise program. Results: An immediate reduction of pain was reported during effleurage manual therapy technique and subtalar distraction technique. Resting pain decreased from 4/10 at initial evaluation to 0/10 at discharge. In phase one and two of therapy, 5° of dorsiflexion was achieved likely due to the combination of talocrural posterior glides, mobilization with movement and stretching. The patient elicited PF strength of 4/5 and 5/5 on all other ankle motions at discharge compared with 3+/5 at initial evaluation possibly due to functional strength and gait training, which included resisted backwards walking. Conclusion: This case supports the literature, to an extent, that a comprehensive intervention approach following ATL surgery can effectively increase ROM, strength, and function.

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Session II

Poster No. 24

**Acute Care Physical Therapy Management for a Medically Frail Elderly Female S/P AKA:
A Case Report**

Introduction: Delayed wound healing in lower limbs is often associated with coronary artery disease and chronic anemia, which can potentially lead to ischemia, gangrene and potential amputation. Rehabilitation of the frail elderly post-amputation in the acute care setting focuses on functional mobility training and safety education for proper discharge recommendations. The purposes of this case report is to: (1) describe Physical Therapy (PT) management of an elderly woman admitted into an acute care hospital with a diagnosis of ischemia and gangrene resulting in an above-knee amputation (2) provide an analysis of evidence and the clinical reasoning pertaining to PT interventions focused on early functional mobility activities.

Methods: The client was a 91 year-old female admitted into an acute care hospital, with medical complications associated with an ischemic and gangrenous lower limb requiring an above-knee amputation. Upon admission she was unable to perform daily activities and functional mobility without assistance.

Results: Interventions enabled the client to remain at her functional baseline. She demonstrated motivation and met her goal for compliance with home exercise program and safety while in the acute care hospital allowing for a safe discharge to a Skilled Nursing Facility.

Conclusion: Assessment of client's living conditions and functional abilities is the focus of hospital-based PT. Interventions in hospitals tend to focus on functional mobility training and safety education. This enables physical therapists to plan appropriate and safe discharge recommendations. Interventions for frail elderly and individuals post-amputation have focus on functional mobility to enable restoration of independence with daily activities. If this cannot be achieved then appropriate disposition or adaptive equipment recommendations are provided to ensure safe transition to next level of care.

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Session II

Poster No. 25

Physical Therapy Interventions for Functional Mobility Recovery of a Deconditioned 47 y.o Female Diagnosed with Lupus Nephritis: A Case Report

Introduction: This case report evaluates the effectiveness of inpatient rehabilitation interventions for functional mobility recovery of a deconditioned 47-year-old female diagnosed with Lupus Nephritis (LN). LN causes inflammation of the kidneys resulting in tissue damage, pain, and kidney failure. The client sustained a left thigh hematoma following a fall, which resulted in an inability to function independently due to pain with lower extremity movement. She remained sedentary for 10 days, which lead to severe deconditioning that was further exacerbated by her LN symptoms.

Methods: Upon admission to the rehabilitation hospital, her bed mobility and functional transfers required minimal assist, her Functional Gait Assessment (FGA) score was 18/30, she ambulated 100 ft. (30 m) with a front wheeled walker (FWW), and her gait velocity was 48% of normal walking speed for her age range. Her left lower extremity strength was limited by pain and she was unable to negotiate stairs. Gait training, therapeutic exercises, and manual therapy interventions focused on decreasing pain and improving functional mobility. These interventions included effleurage massage, lower extremity strengthening exercises, lower extremity gentle stretches, and ambulation for cardiovascular and muscular endurance.

Results: In 5 days, the client was independent with bed mobility, functional transfers and ambulation. Her FGA score was 27/30, she ambulated 350 ft. (107 m) without an assistive device and her gait velocity was 73% of normal walking speed for her age range. Her left lower extremity strength improved and was not limited by pain. She also negotiated stairs with bilateral upper extremity support. She was discharged home with a home program and recommendations for continued outpatient services.

Conclusion: The client's functional mobility gains were evidenced by post-outcome results following intensive inpatient physical therapy rehabilitation.

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Session II

Poster No. 26

Acute Rehabilitation of a 27-y.o. Male with Failure to Thrive - A Case Report

Introduction: Failure to thrive is a complex medical diagnosis that does not describe a single disease process, but rather describes a variety of symptoms associated with one or more possible underlying pathophysiological diseases or conditions. It is a diagnosis that is not well-documented outside of pediatric and geriatric populations. The purpose of this case report is to discuss the evaluation and treatment of a 27-year-old Hispanic male with a diagnosis of failure to thrive and a history of superior mesenteric artery syndrome, chronic malnutrition, insulin-dependent diabetes mellitus, and osteopenia, with vertebral fractures and multiple comorbidities impeding return to prior level of function.

Methods: Proprioceptive neuromuscular facilitation techniques, postural endurance and lower extremity strength exercises, and functional activity training were utilized to increase strength, endurance, mobility, and activity tolerance.

Results: Changes in the Numeric Pain Rating Scale, Modified Clinical Test of Sensory Interaction and Balance, and 30 Second Sit to Stand Test reflected decreased pain and improved functional strength over the course of the treatment period.

Conclusions: A lack of literature regarding effective interventions in middle-aged adults with failure to thrive necessitates the application of interventions proven to be effective in addressing the underlying impairments. Functional activity training and proprioceptive neuromuscular facilitation techniques may have a place in the successful rehabilitation of patients seen in an acute care setting with a diagnosis of failure to thrive.

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Session II

Poster No. 27

Utilizing Diaphragmatic Breathing in a 71-year-old Female Suffering Chronic Low Back Pain: a case report

Low back pain (LBP) is a prevalent condition treated in physical therapy clinics, but the variety of causes and complex biomechanical and psychosocial aspects of the condition make it difficult to treat effectively. This case report details the successful treatment of a 71-year-old female suffering LBP and demonstrates how diaphragmatic breathing is a simple intervention that can serve multiple purposes in the treatment of non-specific chronic LBP being managed per the American Physical Therapist Association's Treatment Based Classifications (TBCs) for LBP. Various treatments were utilized, with the key intervention being training in diaphragmatic breathing to manage acutely painful episodes and help retrain trunk stabilizing musculature. Following a course of 12 treatments the patient improved in all objective measures and presented with no pain. Diaphragmatic breathing was found to be a safe and likely effective treatment option for this patient. Recommendations for further research includes randomized control trials investigating the effectiveness of breathing training on patients with LBP being treated per each TBC.

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Session II

Poster No. 28

**Physical Therapy Intervention Develops Locus of Control During Prosthetic Training Post
Unilateral Below Knee Amputation: A Case Report**

Introduction: In the United States, around 185,000 amputations occur annually (1). Transtibial amputation are most common and often result from vascular disease (1-3). The course of care after amputation varies, increasing costs of medical care. It is important that care after an amputation be formalized into a common protocol, including the awareness and assessment of the internal locus of control (ILOC). ILOC is described as the feeling of having the ability to govern the events that occur in life (4,6). Psychosocial components of chronic illness are known to influence aspects of the therapeutic process (2). The purpose of this case report is to demonstrate the progression of PT interventions with the implementation of functional activity, gait training, and promotion of independence by establishing ILOC within each phase of prosthetic application, after a recent unilateral below knee amputation (BKA).

Case Description: The patient is a 71-year-old, Caucasian, female seen in a skilled nursing facility after a right leg BKA and 5th ray resection of left foot to remove a 6-month infection of cellulitis and osteomyelitis that was resistant to antibiotics. She had many body system impairments that required the administration of several medications, complicating improvements.

Methods: Interventions were divided into four stages based on level of function and achievement of goals within each stage. She was given daily graded tasks to encourage success and promote ILOC.

Results: Tests were used to demonstrate progress. Improvements occurred with: transfers, bed mobility, ambulation, timed up and go test, activities balance confidence scale, and locomotor capabilities index in amputees-5.

Conclusion: The success of daily interventions allowed her to believe she controlled outcomes suggesting the achievement of ILOC had positive effects on PT interventions (6). ILOC measurements should be implemented into all types of PT to understand if it will make differences in domains other than amputation.

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Session II

Poster No. 29

Physical Therapy Intervention Program for a 67-Year-Old Female Status Post Total Hip Replacement with Peripheral Vascular Disease: A Case Report

Introduction: Total hip replacement (THR) is a surgical procedure used to remove and replace damaged bone and cartilage at the hip joint. Peripheral vascular disease (PVD) is a circulation disorder that can affect the arteries and veins of the periphery of the body. PVD can impair gait function by increasing pain and swelling in the lower extremities during exercise and requires certain precautions to be monitored during treatment. There is limited research on physical therapy treatment protocols for treating patients that have undergone a THR with concurrent PVD. The purpose of this case report is to examine the effectiveness of one treatment design in improving functional ability of a patient 5 days status post THR with concurrent PVD. Methods: A physical therapy treatment intervention was implemented over 4 weeks at a skilled nursing facility to address the impairments associated with one patient that had undergone a THR and was suffering from PVD. Results: After 4 weeks of physical therapy the patient substantially improved in all outcome measures including: increased gait distance from 0 feet to 200 feet with a front wheeled walker and improved balance as assessed by the Modified Functional Reach test with an 11-inch improvement. Conclusion: There is an appropriate balance that needs to be found when treating patients with these two co-occurring disorders which primarily focuses on treating the gait impairments associated with both diagnoses. More research should be conducted to determine the most effective treatment available for treating these two conditions concurrently.

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Session II

Poster No. 30

**Multi-Systems Approach to Therapeutic Treatment and Interventions Post Distal Tibia Fracture Reduction and Distal Fibula Fracture in the Acute Care Setting: A Case Report
Poster**

Tibia fractures are the most commonly fractured long bone in the body. Annual estimations show that 11.5 per 100,000 persons have fractures that are open or erupt through the skin. This case report explores how impaired hematological and muscular systems can affect acute-care physical therapy plan of care and treatment in a post-surgical reduction of a tibia-fibula fracture.

A main concern in acute care physical therapy is to measure current functional mobility and compare it to prior level of function to determine if the patient can return home without additional assistance. Along with mobility assessments, vitals were monitored to follow up on subjective feedback to ensure safety. Use of assistive device and mobility techniques were determined to increase safety and independence during tasks. Incorporating a multi-disciplinary approach was required to manage the patient's pain to tolerate movement.

An increase in the number of mobility tasks was observed. However, level of assistance to aid in limb management and technique for mobility was maintained at minimal assist throughout course of care. An alternative pain management option was supported by the many disciplines involved in the case and allowed the patient to tolerate physical therapy treatment in the acute-care setting. Based on performance, discharge destination was chosen accordingly and the patient was moved to post-acute rehabilitation to continue her goals of attaining functional independence.

To be the most efficient in acute-care physical therapy, all systems involved need to be considered when making a patient treatment plan as they can result in modifications. Early mobilization can reduce occurrence of acquired weakness and help a patient return to their prior level of function sooner.