37th Annual Central California Research Symposium

Proceedings of the 2016 Symposium

Convened on

Wednesday, April 20, 2016

in the

University Business Center

California State University, Fresno

37th Annual

Central California Research Symposium

Sponsoring Institutions

California State University, Fresno

University of California, San Francisco
Fresno Medical Education Program

California School of Professional Psychology at Alliant International University

Fresno City College

American Chemical Society
San Joaquin Valley Section

Convened in the *University Business Center*

on the campus of

California State University, Fresno

Wednesday, April 20, 2016

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PREFACE

Welcome to the *37th Annual Central California Research Symposium*.

From its inception, the purpose of this symposium has been to bring together investigators, students, and faculty from a variety of disciplines to share the results of their scholarly work. The continuation of these activities in the Central Valley is encouraged by this opportunity for exchange. 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. In this review, the committee looked for a well-written abstract on a topic of scholarly merit.

This year *UCSF Fresno* has provided two cash awards for the best 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 best undergraduate poster and best undergraduate oral presentation. The *Craig School of Business* has provided a cash award for best poster presentation. 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 *Office of Research and Sponsored Programs* at *California State University, Fresno*, is awarded to the presenter who best addresses a community issue with use of sophisticated and sound research methods. In addition to providing three cash awards, the *Office of Research and Sponsored Programs* at *California State University, Fresno* has planned and administered the symposium in cooperation with these institutions.

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.

PLANNING COMMITTEE

California State University, Fresno

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Alejandro Calderon-Urrea, Ph.D.
Brian Tsukimura, Ph.D.
Department of Biology

Saeed Attar, Ph.D.
Alam Hasson, Ph.D.
Department of Chemistry

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Department of Plant Science

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Department of Surgery

Fresno City College
Carl Johansson
Department of Life Science

Rick Stewart
Department of Biology

CALIFORNIA
STATE
UNIVERSITY,
FRESNO

April 12, 2016

MESSAGE TO ALL RESEARCH SYMPOSIUM PARTICIPANTS

California State University, Fresno is pleased to serve as the host campus for the 37th 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,

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

Office of the President

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University of California
San Francisco
UCSF
Fresno Medical Education Program

WELCOME

37th Annual Central California Research Symposium
April 20, 2016

It is my pleasure to welcome each of you to the 37th Annual 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,

Michael W. Peterson, M.D.

Michael Peterson, MD
Associate Dean
UCSF Fresno

37TH Annual Central California Research Symposium Program

Concurrent Session A University Business Center

Auditorium 191

9:00 a.m. ***7-O-Aminoalkyl-2,3-Dehydrosilibinins: Synthesis and In Vitro Evaluation in Prostate Cancer Cell Models***

Sheng Zhang, Bao Vue, Xiaojie Zhang, Timmy Lee, and Qiao-Hong Chen

9:15 a.m. ***Chemical Modifications of 3-OH in 3',4'-Dimethoxyflavonol Attenuate Prostate Cancer Cell Proliferation***

Xiang Li, Guanglin Chen, Xiaojie Zhang, and Qiao-Hong Chen

9:30 a.m. ***1,9-Diarylnona-1,3,6,8-tetraen-5-ones: A New Class of Anti-Prostate Cancer Agents***

Xiaojie Zhang, Rubing Wang, German Ruiz, Guanglin Chen, and Qiao-Hong Chen

9:45 a.m. ***Synthesis of Potential Metabolic Products of 1,5-bis(1-alkyl-1himidazol-2-yl) or (1-alkyl-1H-benzo[d]imidazol-2-yl)penta-1,4-diene-3-ones***

Manee Patanapongpibul, Xiaojie Zhang, and Qiao-Hong Chen

10:00 a.m. ***Structural Study of Antifreeze Glycoproteins (AFGP) using High-Resolution Nuclear Magnetic Resonance (NMR) Spectroscopy***

Cheenou Her1, Yin Yeh, and Krish Krishnan

10:15 a.m. Break—University Business Center, Gottschalks Gallery
10:30 a.m. Concurrent Session Resume

Concurrent Session B

University Business Center
Room 192

9:00 a.m. ***Statistical Models for Prediction of Fantasy Football Points***

Adam Jauregui, Steve Chung

9:15 a.m. ***An Analysis of a Point Mass Problem***

David Wu

9:30 a.m. ***Location of Zeros of the Sequence of Polynomials Defined Recursively by P_{n}(z)=-P_{n-2}(z)-zP_{n-3}(z)***

Andres Zumba Quezada

9:45 a.m. ***Investigation of the Topological Interpretation of Modal Logics***

Bing Xu

10:00 a.m. ***On a Generalized Paley-Wiener Theorem and its Implication***

Marat Markin

10:15 a.m. Break – University Business Center, Gottschalks Gallery
10:30 a.m. Concurrent Session Resume

Concurrent Session C

University Business Center

Room 194

9:00 a.m. ***Democratic vs. Authoritarian History Texts and Education for Peace or War***

Andrea N. Wilson

9:15 a.m. ***Homo Cinematicus: Self-Perpetuating Alienated Ideological and Cognitive Restructures***

Phillip Unruh

9:30 a.m. ***Anti-Semitism in American Sports***

Thomas Miller

9:45 a.m. ***Dasam Granth: A Closer Examination of the Saint-Soldier Complex***

Kiranjit Kaur Dhanjan

10:00 a.m. ***Expulsion of the Jews from England 1190 to 1290***

Cory Chapman

10:15 a.m. Break – University Business Center, Gottschalks Gallery
10:30 a.m. Concurrent Session Resume

Concurrent Session D — University Business Center

Auditorium, 191

10:30 a.m. ***Apparatus for the Measurement of Thermoelectric Power***

Shoji Hishida and Pei-Chun Ho

10:45 a.m. ***Synthesis of Organic Molecules for APOE Inhibition in Alzheimer's Disease***

Amanda Voigt, Irina Boginski, Nisha John, Rafael Remotigue, Jaekwang Kim, Jung su Kim, and Santanu Maitra

11:00 a.m. ***Biochemical Characterization of Three Glutaredoxins and a Glutathione-Dependent Formaldehyde Dehydrogenase from Synechococcus PCC 7942***

Samantha Hartanto and Mamta Rawat

11:15 a.m. ***Mycobacterium Smegmatis Transposon Mutants and Disrupted Genes***

Brittney Shelley, Katherine Ross, Mamta Rawat

11:30 a.m. ***Thermal Properties Extracted from Specific Heat of Nd-Doped PrOs4Sb12***

Taylor McCullough-Hunter, Shoji Hishida, Pei-Chun Ho, Tatsuya Yanagisawa, and Brian Maple

11:45 a.m. ***Distributed Charging through Tabletop Wireless Power Transfer System***

Abhijit Suprem, and Woonki Na

12:00 p.m. **Break – University Business Center, Gottschalks Gallery**

12:15 p.m. **Plenary Session**

Concurrent Session E — University Business Center

Room 192

10:30 a.m. ***Determining Reasons and Barriers of Employee Participation in Fitness Classes Provided by Fresno State's Worksite Wellness Program***

Ashley Gardea

10:45 a.m. ***A Comparison between the Efficacy of Automated Thinners and Hand Thinning of Lettuce***

Elizabeth Mosqueda, Richard Smith, and Anil Shrestha

11:00 a.m. ***Access to Higher Education for Migrant High School Students***

Natthalie M. Gomez

11:15 a.m. ***Comparing the Effectiveness of EMDR & TF-CBT for Children with Posttraumatic Stress: A Meta-Analysis***

Brandi Burcham, Christopher L. Smith, Nia L. Saunders, Dina Elfallal, Jennifer H. Lewey, and Siobhan K. O'Toole

11:30 a.m. ***Preliminary Results from an I.M.P.A.C.T. Model Implementation in a Four Specialty Training Clinic***

Shawn B. Hersevoort and Andrew W. Goddard,

12:00 p.m. **Break – University Business Center, Gottschalks Gallery**

12:15 p.m. **Plenary Session**

Concurrent Session F — University Business Center

Room 194

10:30 a.m. ***Consumer Willingness to Pay for the Fresno State Wine Brand: A Case Study of Wine***

Lindsey Anderson, Hannah Rocha, and Todd Lone

10:45 a.m. ***Analysis of Competition among Input Suppliers in the Cotton Sector of California***

Srini Konduru and Kelsie Raulino

11:00 a.m. ***Hyperloop Schedule Design: Fleet Size and Traveler Delay Tradeoffs for 2 Case Studies***

Annemarie Schwanz and Sally Thor

11:15 a.m. ***Effects of Grape Juice Concentrate on the Microbial Load in Fresh Ground Beef***

Marco Camarena, Erica Hau, Sarah Laughlin, and Kelli Williamson

11:30 a.m. ***Establishing the Microbial Profile of Restaurant Menus***

Kady Francone, Alejandro Madrigal, Mario Navarrete, and Tukta Phetasa

11:45 a.m. ***Establishing the Microbial Profile of Tables in a University Library***

Penny Lor, Shanon Range, Shengchuan Peter Tan, and Mai Yang

12:00 p.m. **Break – University Business Center, Gottschalks Gallery**

12:15 p.m. **Plenary Session**

Plenary Session — University Business Center

Auditorium, 191

12:15 p.m. Opening Remarks and Welcome

Dr. Donna Hudson, University of California, San Francisco Fresno Medical Education Program

12:25 p.m. ***Generalizing the Futurama Theorem***

Jennifer Elder, Oscar Vega, Ph.D.

12:40 p.m. ***Intergenerational and Cultural Perceptions of Buddhist Practices and Beliefs in Northern Thailand: A Dyadic, Multi-Sited Study***

Sarah Tsutsui, Seema Prakash, Jessica McKenzie, Ph.D.

12:55 p.m. ***The Effects of Water Availability and Landscaping Practices on Bird Communities in the Central Valley of California***

Stephanie Slonka, Madhusudan Katti, Ph.D., Pedro Garcia, and Bradley Schleder

1:15 p.m. Break – University Business Center, Gottschalks Gallery

1:30 p.m. Concurrent Session Resume

Concurrent Session G — University Business Center

Auditorium, 191

1:30 p.m. ***Synthesis of Isoprene Peroxide Derivatives***

Dylan Manning, Vinay Kumar, Alam Hasson, and Santanu Maitra

1:45 p.m. ***p-Nitrophenolate Colorimetric Assay: A Tool for the Study of Light-Driven P450 Enzymes***

Quan Lam and Lionel Cheruzel

2:00 p.m. ***Determination of the Aβ1-42 Structure in the Presence of β-Methylamino-L-Alanine***

Benjamin Tanielian and Joy J. Goto

2:15 p.m. ***Investigation of BMAA on Metal- Aβ Toxicity***

Alexandra D. Saxberg, Joy J. Goto, and Peter Faller

2:30 p.m. ***Synthesis and Cell-Based Evaluation of 1,7-Diarylheptatrien-3-ones with Different Terminal Aromatic Rings***

Rubing Wang, Chengsheng Chen, Cristian Sarabia, Xiaojie Zhang, and Qiao-Hong Chen

2:45 p.m. Break – University Business Center, Gottschalks Gallery

3:00 p.m. Concurrent Session Resume

Concurrent Session H

University Business Center
Room 192

1:30 p.m. ***Does Traffic Congestion Prevent Us from Making Trips?***

Peyvand Hajian and Aly Tawfik,

1:45 p.m. ***Time-Dependent Electromagnetic Fields and 4-Dimensional Stokes' Theorem***

Ryan Andosca

2:00 p.m. ***Vacuum States in Quantum Field Theory***

Alaric Doria and Gerardo Munoz

2:15 p.m. ***A.S.A.P.: Automated System for Accurate Parking***

Harleen Gulati

2:30 p.m. ***Littlest Higgs Model with T-Parity***

Marijus Brazickas

2:45 p.m. Break – University Business Center, Gottschalks Gallery
3:00 p.m. Concurrent Session Resume

Concurrent Session I University Business Center

Room 194

1:30 p.m. ***Nature's Influence on Perceptions of Control over One's Life and Overall Well-Being***

Veronica Martinez and Jenna Kieckhaefer

1:45 p.m. ***"He Said, She [May Not Have] Said": Examining the Impact of Gender on the Self-Reporting of Transgressions***

Samantha Luna and Jenna Kieckhaefer

2:00 p.m. ***Your Life is Our Business: An Aircrew Flight Equipment Airman's Look at Language in the Workplace***

Felicia Avendano

2:15 p.m. ***She Calls Me Her Lost Lamb***

Christina Martinez and Kathleen Dyer

2:30 p.m. ***Microbial Profile of Ketchup Bottles in Restaurants***

Joseph Artellan, Xiaotong Amber Chen, and Marcos Ponce

2:45 p.m. Break – University Business Center, Gottschalks Gallery
3:00 p.m. Concurrent Session Resume

Concurrent Session J — University Business Center, Auditorium 191

3:00 p.m.	***Effect of Thermal Stress on Reproduction in P. Cinctipes***
	Hailey Salas, Robert Delmanowski, and Brian Tsukimura
3:15 p.m.	***Occupancy, Habitat Use, and Seasonal Fluctuations of Medium to Large Mammalian Predators and Omnivores in Sierra Nevada Foothill Oak Woodland***
	Ryan M. Smith and Paul R. Crosbie
3:30 p.m.	***Suction Trap Capture Efficiency of Utricularia Vulgaris, a Carnivorous Plant***
	Maxwell Hall, Otto Berg, and Ulrike Müller
3:45 p.m.	***The Effect of Local Flower Distribution on the Foraging and Communication Behavior of the Common Eastern Bumblebee, Bombus Impatiens***
	AP Lange, P Yang, E Arteaga, NK Bains, A Mohamed, C Morazan, and DD Lent
4:00 p.m.	***Genetic Analysis of Persister Cell Formation in Pseudomonas Aeruginosa***
	Saika Esani and Tricia Van Laar
4:15 p.m.	***A Study on Microbial Contamination of Telivision Remote Controls***
	Teddy J. Alvarado, Nathan Anderson, Brandon Goeppner, and Emily Thompson
4:45 p.m.	Concluding Session
	University Business Center, Auditorium 191
	Playing a Rigged Game: Effects of Inequality on Physiological Stress Responses
	Rhanda Rylant, Dr. Martin Shapiro, Department of Psychology

Proceed to Student Award Presentations and Reception

Concurrent Session K — University Business Center

Room 192

3:00 p.m. ***The Potential of Silibinin Derivatives in Prostate Cancer Managements***

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

3:15 p.m. ***Building Rapport in a Witness Interview: Investigating Whether or Not Rapport Influences Interviewee Behaviors and Accuracy***

Jenna Kieckhaefer

3:30 p.m. ***Computational Fluid Dynamics (CFD) Analysis of a Drip Line Hydrocyclone***

Deify Law

3:45 p.m. ***Relationship Between Perceived Social Work Students' Statistics Anxiety and Instructor's Immediacy: Implications for Teaching***

Martha Vungkhanching

4:00 p.m. ***Correlating Morphology and Genetic Assessment for Embryo Selection in Art***

Mai Tran and Carlos Sueldo

4:15 p.m. ***Payer Mix of Patients Transferred to a Level I Trauma Center: A Multidisciplinary Comparison***

Cody Pehrson and Eric Lindvall

4:45 p.m. Concluding Session

University Business Center, Auditorium 191

Playing a Rigged Game: Effects of Inequality on Physiological Stress Responses

Rhanda Rylant, Dr. Martin Shapiro, Department of Psychology

Proceed to Student Award Presentations and Reception

Concurrent Session L — University Business Center

Room 194

3:00 p.m. ***Dynamic Radiography Acquisition Software System for Computed Tomography Applications***

Rahul Nunna, Ismael Perez, Edward S. Jimenez, and Kyle R. Thompson

3:15 p.m. ***LGBTQ Identity and Religious Identity***

Jose Leanos

3:30 p.m. ***How Latina Lesbian Mothers are Parenting their Children in Relation to Religion***

Cecilia E. Knadler

3:45 p.m. ***An Anthropological Perspective of Multicultural Aspects in Autism Spectrum Disorders***

Jennifer Marie Davis

4:00 p.m. ***Booty, Beauty, & Fame: Media Protrayals of Jennifer Lopez and Sofia Vergara***

Maria Villanueva

4:15 p.m. ***Childhood Obesity Prevention Ads: Then and Now***

Elba Scherer

4:45 p.m. Concluding Session

University Business Center, Auditorium 191

Playing a Rigged Game: Effects of Inequality on Physiological Stress Responses

Rhanda Rylant, Dr. Martin Shapiro, Department of Psychology

Proceed to Student Award Presentations and Reception

Poster Session I — University Business Center

9:00 a.m. until 10:30.a.m. — Gottschalks Gallery

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

1 ***The Feared Complication: Naloxone-Induced Flash Pulmonary Edema***

Abbas Hasnain

2 ***Demographic, Clinical, and Cognitive Characteristics Among Civilly Committed Sexually Violent Predators***

Ryan Ditchfield and Laura Echevarria

3 ***Discovering the Microbiome and Resistome of Crows Across the Rural-Urban Gradient***

Lee Nelson and Tricia Van Laar

4 ***Kinetic and Product Yields of the Gas-Phase Reactions of Isoprene Hydroperoxides with Atmospheric Oxidants***

Vinay Kumar, Edwin Lozano, Dylan Manning, Santanu Maitra, and Alam Hasson

5 ***Nematicidal Activity of Pryoligneous Acid from Softwood and Almond Shell on C. elegans***

Shoghig Stanboulian, Sosse Kendoyan, and Alejandro Calderón-Urrea

6 ***Laser Capture Microdissection and Mass Spectrometry: A Novel Method to Study the Proteome of Cell Projections***

Shravan Kannan and Karine Gousset

7 ***Single-Domain Antibody that Neutralize Listeria Invasion***

Moeko Toride, Teresa Brooks, Ian Huh, and Cory L. Brooks

8 ***Distribution of Nanoparticles in Food and Effects on Behavioral Responses and Biology of Solenopsis Xyloni (Hymenoptera: Formicidae) Colonies***

Julie J. Pedraza, Jorge M. Gonzalez, Yunyun Chen, and Hong Liang

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

Alyssa Anrig, David Jones, Michael Lazernik, Traci Leung, Eric McIntosh, Patrick Myers, Jackson Xiong, Michael Yang, Brian Shamp and Derek Dormedy

10 ***Dispositional and Situational Correlates of Success in Residential Substance Abuse Treatment***

Keith Edmonds, Danielle Baker, Spee Kosloff, and Jennifer C. Veilleux

11 ***Testing the Efficacy of Bio-Insecticides to Control Lygus Bugs (Hemiptera: Miridae) in Alfalfa Seed Production***

Francisco Llamas-Gonzales, Bruce Roberts, Antonino Cusumano, and Jorge M. González

Poster Session I continued — University Business Center

9:00 a.m. until 10:30.a.m. — Gottschalks Gallery

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

12 ***Impacts of Atmospheric Oxidation on the Cellular Toxicity of Cigarette Smoke***

Robyn Verhalen and Arjun Mann

13 ***Patient Satisfaction and Factors Related to Patient-Doctor Relationships***

Satjit Sanghera, Alex Soto, Mary Fraijo, Susan Hughes, and Judy Ikawa

14 ***Dynamically Scaled Model of the Bladderwort***

Hidalgo, F., Munoz-Ruiz, E.F., Müller, U.K., and Berg O.

15 ***Mediated Realities: Identifying Themes in Digital Parenting News Magazine Content***

Alecia Ram, Alexus Seiler, and Aimee Rickman

16 ***Implementation of Practices and Technology to Reduce Air Emissions***

Frank Baggiolini

17 ***The Effects of Early Exposure of Caffeine in the Diet of Drosophila Expressing Tau Pathology***

April Booth, Ashley Her, Damaris Lambrecht, Meganne Weissenfels, Haley Chapman and David Lent

18 ***Gathering Qualitative Data From Hispanic Families Concerning Eating, Exercising Habits and Frequency of Shared Family Mealtimes***

Danae Dubberke, Sara Rima, Jasmine Mahfound, Karina Ortega, Maribel Barragan, William Evans, Skylar Nguyen, Tayler Kelley, and Amber Hammons

19 ***The Hidden Bell-Weather: An Examination of Political Ideology in the Filipino-American Community***

Edward Berdan

20 ***Development of a Prosthetic Knee with Magnetorheological Fluid***

Alan Suarez, Saurabh Bapat, and The Nguyen

21 ***Age Classification Using Feature Selection***

Nidhi Arora

22 ***A Study to Identify Disrupted Genes in Mycobacterium Smegmatis Transposon Mutants***

Jennifer Espinoza, Natsinet Ghebrendrias, and Mamta Rawat

23 ***Differential Urban Biotic Filtering in Three Desert Cities in the USA***

Chris Hensley and Madhu Katti

Poster Session II University Business Center

11:00 a.m. until 12:30 p.m. Gottschalks Gallery

Authors will be available for questions from 11:00 a.m. until 12:30 p.m.

1 ***Synthesis and Anti-Proliferative Effects of 3-O-Alkylquercetins and Benzophenone Quercetin-3',4'-O-Ketals***

Kevin Yu, Xiaojie Zhang, and Qiao-Hong Chen

2 ***20-O-Alkyl-2,3-Dehydrosilibinins: Synthesis and Anti-Proliferative Effects Toward Prostate Cancer Cells***

Bao Vue, Timmy Lee, Sheng Zhang, Xiaojie Zhang, and Qiao-Hong Chen

3 ***Rescuing Behavioral Effects Caused by the Homozygous White Background (w1118) Commonly used in Drosophila melanogaster***

Priyanka Lakkaraju

4 ***The Effects of a-synuclein on Behavioral Dysfunction in the Parkinson's Disease Model Drosophila Melanogaster***

Daeun D. Hwang, Maineng Thao, Maram Copper, Mnal Hussein, and David D. Lent

5 ***Synthesis of Asymmetric 1,5-Diheteroarylpentadien-3-ones as Anti-Prostate Cancer Agents***

German Ruiz, Xiaojie Zhang, Chengsheng Chen, Rubing Wang, and Qiao-Hong Chen

6 ***Introgression of the him5 mutation into the GFP strains ST65 and PD4251 of Caenorhabditis elegans***

Shoghig Stanboulian, Sosse Kendoyan, Joseph Ross, and Alejandro Calderón-Urrea

7 ***A Potential Impact of Climate Change on Fitness in Caenorhabditis Briggsae***
Atahualpa Contreras

8 ***Does Maternal Obesity Predict Increased Risk of Cesarean Section at Community Regional Medical Center (CRMC)?***
Marian Pak and Sharon Buzi

9 ***A Pilot Study: A Comparison of Therapeutic Exercise with Remote Trigger Switch Electrical Stimulation Cueing, and Therapeutic Exercise with a Sham Cue, for a Motor Learning Effect in Scapular Dyskinesis***

Walker DL, Hickey CJ, and Tregoning MB

10 ***Evaluation of the Effects of Controlled Burning in the Sierra Nevada Forests on Erosion and Forest Restoration***

Kaitlyn Willems, Micheale Easley, Alan Gallegos, and Zhi (Luke) Wang

11 ***Carnivorous Plants Show that the Size of Suction Feeders is Limited by Fluid Mechanics***

Nolan Avery, Rayhan Kabir, Maxwell Hall, Ulrike Muller, Otto Berg, Juan Villalobos, Magaly Herrera, and Ricardo Ramirez

Poster Session II continued — University Business Center

11:00 a.m. until 12:30 p.m. — Gottschalks Gallery

Authors will be available for questions from 11:00 a.m. until 12:30 p.m.

12 ***Smart Farming***

Nikhil Shinde

13 ***Simple Systems for Learning Analytical Laser Spectroscopy***

Jackson Wagner, Nelson Ayala, and Omar Hernandez

14 ***Capture Success of Utricularia Vulgaris, a Carnivorous Plant***

Eduardo Meza, Ronnie Odia, Cory Mayfield, Maxwell Hall, and Ulrike Müller

15 ***Implementation of State-of-the-Art Drip Irrigation Technology in California Table Grape Vineyards: An Economic Analysis***

Salvador Mariscal

16 ***ZOMBY (An Unmanned Ground Vehicle): Remote-Controlled Retrofitted with Thermal Camera and Made Autonomous***

Arthish Bhaskar

17 ***The Effects of Choice on Exercise Contingencies for Children***

Heather Waldron and Marianne Jackson

18 ***Healthy Diet in Action Workshops for Latino Families***

Maribel Barragan, William Evans, Skylar Nguyen, Tayler Kelley, Danae Dubberke, Sara Rima, Jasmin Mahfoud, Karina Ortega, and Amber Hammons

19 ***Effects of Forest Fire on Soil Water Repellency***

Micheale Easley, Kaitlyn Willems, Alan Gallegos, and Zhi "Luke"Wang

20 ***Screening of Transgenic Dunaliella Primolecta for Wastewater Treatment***

Chirag Vazirani, Alejandro Hernandez, Yadira Andrade, and Alejandro Calderon-Urrea

21 ***Prey Selectivity in Utricularia vulgaris***

Rayhan Kabir, Nolan Avery, Maxwell Hall, Ulrike Muller, and Otto Berg

Poster Session III — University Business Center

1:00 p.m. until 2:30 p.m. — Gottschalks Gallery

Authors will be available for questions from 1:00 p.m. until 2:30 p.m.

1 ***Examining Biomarkers in Aggressive Tumor Types of Thyroid Cancer***

Jazmin Cheatham

2 ***Correlating the Expression of Tau and Ptau with Behavioral Dysfunction in Drosophila Melanogaster***

Joy Aparicio Valenzuela, Amanda C. Olvera, Kumsu Hwang, and David D Lent.

3 ***Split-Brain Spatial Learning and the Flexibility of the Learned Antenna Projection Response to Natural Contexts in Periplaneta Americana***

Matthew Pomaville and David D. Lent

4 ***A Method to Assess the Reactive Oxygen Species (ROS) Formation Induced by Particulate Matter (PM) Samples in Alveolar Macrophages***

Clarissa Niino, Anthony Waterston, Geil Merana, Joel Castillo, Annabelle Lolinco, Kimberly Flores, Ben jamin Tanielian, Laurent Dejean, and Alam Hasson

5 ***The Effect of Local Flower Distribution on the Foraging and Communication Behavior of the Common Eastern Bumblebee, Bombus impatiens***

P Yang, E Arteaga, NK Bains, A Mohamed, C Morazan, AP Lange, and DD Lent

6 ***Analyzing Temperature Effects on Juvenile Chinook Salmon Growth***

Akusha Kaur, Steve Blumenshine, and Taylor Spaulding

7 ***Comparative Analysis of Clp (CRP-like protein) from Xanthomonas axonopodis, Xylella Fastidiosa and Stenotrophomonas Maltophilia***

Lauren Chardukian, Joel Curiel, Noor Al-Qaysi, Rafal Al-Qaysi, and Hwan Youn

8 ***Reactive Oxygen Species in Caenorhabditis briggsae Mitochondria***

Marisol Lauri and Joseph Ross

9 ***Use of Stable Isotopes of Oxygen and Hydrogen to Trace Water in the San Joaquin River***

Monet Gomes and Steve Blumenshine

10 ***Examining the Hydration and Mechanical Properties of Cement Paste Containing Cellulose Nanocrys-tals***

Yvette Valadez-Carranza, C. Chui, P. Zavattieri, W.J. Weiss, and J. Youngblood

11 ***Role of Enzyme Kinetics on the Anomerization of Glucose Using Real Time Quantitative NMR (qNMR) Spectroscopy***

Jaideep Singh, Cheenou Her and V.V. Krishnan

Poster Session III continued — University Business Center

1:00 p.m. until 2:30 p.m. — Gottschalks Gallery

Authors will be available for questions from 1:00 p.m. until 2:30 p.m.

12 ***A Statistical Approach to Analyze Engineering Estimates and Bids***

Roshanak Farshidpour

13 ***Reaction-Wheel Based CubeSat Spin Stabilization and Control Test Bed***

Fadi Bakour

14 ***Studying the Effects of Bcl-2 Family Proteins on Oxidative Phosphorylation***

Nawras Samaan, Preet Kaur, and Laurent Dejean

15 ***Detecting Food Borne Pathogens: Using qPCR to Detect B. Cereus and L. Monocytogenes***

Emeline Pano, Alexa Lopez, and Alejandro Calderon-Urrea

16 ***Synthesis of Gadolinium Nanoparticles Using the Inverse Micelle Method***

Adan Prado, Alexandre Ly, and Patrick Talbot

17 ***Stratigraphy and Transmissivity of the Kaweah River Fan, Visalia, California***

Dustin White and Zhi Wang

18 ***Common Core: The New Labyrinth***

Erik Ugalde

19 ***Impact of Acculturation on Immigrants' Dental Health***

Jaspinder Kaur

20 ***Marijuana Attitudes, Perceptions, Use, and Academic Achievement***

Kristi Sadler

21 ***Rating RateMyProfessors.com: A Comparative Analysis of Official Student Evaluations and Unofficial Online Comments***

Anna Santana

Poster Session IV — University Business Center

3:00 p.m. until 4:30 p.m. — Gottschalks Gallery

Authors will be available for questions from 3:00 p.m. until 4:30 p.m.

1 ***Nanoparticle Delivery of Curcumin and Chemotherapeutics for theTreatment of Drug-Resistant Pan creatic Cancer***

Matthew Ogbuehi, Delwar Hussain, and Jason Bush

2 ***Simulation of Scene Perception and Navigation of Wood Ants in Naturalistic Environments***

Erik Arevalo, Austin Mendoza, and David D Lent

3 ***Variation in Daily Growth Rates in Juvenile Chinook Salmon***

Matthew J. Cavaletto and Taylor J. Spaulding

4 ***Identification of Mutants Involved in Chalcone Degradation in Caenorhabditis Elegans***

Rachel Tamayo and Alejandro Calderòn-Urrea

5 ***Characterization of a Novel cGMP-Sensing CRP from Rhodospirillum Centenum***

Yue Zhou, Sanjiva Gunasekara, and Hwan Youn

6 ***Analysis of Residues Critical for the Constitutive Activity of Clp from the Pathogen Xanthomonas Axonopodis***

Joel Curiel, Lauren Chardukian and Hwan Youn

7 ***Identifying Genes of Interest Disrupted in Transposon Mutants in Mycobaterium Smegmatis***

Omoshola Aleru, Leslie Dominguez, and M. Rawat

8 ***A Fruit Fly Model of the Neurodegenerative Disease, ALS-PDC, Induced by Exposure to an Environmental Neurotoxin***

Richard Moua, Shayan Zoghi, Harmala Singh, Dureshika Ranasinghe, and Joy J. Goto

9 ***Identifying Gene Disrupted in Mycobacterium Smegmatis Transposon Mutants***

Amorette Guzman, Gabbie Hernandez, and Mamta Rawat

10 ***Affects of Gender, Need for Leadership and Positive Affect Between Transformational and Transactional Leadership Styles***

Tanjit Singh

11 ***Social Anxiety and Values in Relation to Acceptance and Commitment Therapy***

Soultana Mpoulkoura

Poster Session IV — University Business Center

3:00 p.m. until 4:30 p.m. — Gottschalks Gallery

Authors will be available for questions from 3:00 p.m. until 4:30 p.m.

12 ***Neurotoxic Effects of BMAA on Human Neuroglioma Cells to Investigate Amyloid Beta Formation***

Jazmin Arias, Swetha Satyanarayana Reddi, and Joy Goto

13 ***Synthesis and Structure Activity Effects on the Cytotoxicity of Asymetric Curcumin Analogues towards Prostate Cancer Cells***

Kevin Muthima, Rubing Wang, and Cecee

14 ***Small Molecule Binding Sites Explored in Camelid Variable Heavy Chain Antibodies***

Brandy White, Brandy R. White, Shirley J. Gee, Bruce D. Hammock, and Cory L. Brooks

15 ***Keto-Enol Tautomerization Equilibrium of Acetylacetone in Mixed Solvents. Does Meyer's Rule Still Apply?***

Candice Cortney and V.V. Krishnan

16 ***Private Embarrassment: An Empirically Informed Philosophical Analysis***

Kalahan Stoker

17 ***Characterization of Potential Oomycete Pathogens Present at California State University, Fresno Farm Laboratory***

Holly Deniston-Sheets, John Bushoven, and Margaret L. Ellis

18 ***Oxidation of 3-OH in Silibinin and Derivatives***

Samantha Mallory, Bao Vue, Hualia Yang and Qiao-Hong Chen

19 ***Sequencing of Farnesoic Acid O-methyltransferase in Triops longicaudatus***

Matthew Merritt and Brian Tsukimura

Judges for Undergraduate and Graduate Oral and Poster Presentations

Dr. Loren Alving	University of California, San Francisco
Dr. Jason Bush	California State University, Fresno
Dr. Alejandro Calderon-Urrea	California State University, Fresno
Mr. Doug Carey	California State University, Fresno
Dr. Steve Chung	California State University, Fresno
Dr. Paul Crosbie	California State University, Fresno
Dr. Kathleen Dyer	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. Alam Hasson	California State University, Fresno
Dr. Howard Hendrix	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. Kin Ng	California State University, Fresno
Dr. Maria Nogin	California State University, Fresno
Ms. Iris Price	University of California, San Francisco
Dr. Adnan Sabuwala	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
Dr. Carmen Caprau	California State University, Fresno
Dr. Howard Hendrix	California State University, Fresno
Ms. Grace Liu	California State University, Fresno
Ms. Debbie Neufeld	California State University, Fresno

Presentations will be judged based on the following criteria and considerations:

- Merit, creativity, timeliness, and value to an audience of scholars not necessarily from the same discipline
- Authors are encouraged to present their work using terminology suitable for a multi-disciplinary audience
- Results of completed work, as well as work-in-progress, for which there is preliminary data

Event and Proceedings Coordinators

Millie C. Byers & Maral Kismetian
California State University, Fresno

37TH Annual Central California Research Symposium Oral Presentations

Teddy Alvarado, Dr. Erin Dormedy
Teddy J. Alvarado, Nathan Anderson, Brandon Goeppner, and Emily Thompson
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Department of Food Science and Nutrition

A Study on Microbial Contamination of Television Remote Controls

Many household objects such as television remotes are commonly overlooked when cleaning. Most people eat food while watching TV making remotes a food contact surface. Published research testing TV remotes is limited to hospitals and hotels. Hospital TV remotes were found to contain over three times the amount of bacteria compared to hospital hand rails, tray tables, door knobs, bathroom door handles, and toilet flush handles. Alarmingly, they also contained MRSA (Methyl-resistant Staphylococcus aureus) which is a leading cause of death in hospitals. Hotel remotes were found to be dirtier than hotel toilets, sink handles and bedspreads, including evidence of urine, semen or feces. This study was conducted to determine the amount of bacteria present on household television remotes. It is interesting to note that in 2011, DIRECTV started testing the industry's first anti-microbial remote with a germ-resistant coating with few crevices and cracks that is said to be 99.99% effective.

Twenty residences were visited and household TV remotes were sampled using standard procedures for food contact surfaces. Samples were evaluated for mesophilic aerobic bacteria (total microbial load), generic coliforms (indication of fecal contamination), and Escherichia coli (subset of the coliform family, some of which are pathogenic for humans).

Results showed less contamination than previously published research. When comparing averages for (1) households with pets, (2) households without pets, (3) all female households, and (4) all male households, three out of four of our groups didn't fall within the FDA recommendation of less than 12.5 aerobic bacteria per square inch of food contact surface, showing that there is some area of concern. Statistical analysis of the data shows that remote controls sampled in homes containing pets had a significantly higher level of aerobic bacteria than homes without pets. None of the remotes tested were contaminated with coliforms or Escherichia coli.

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Time-Dependent Electromagnetic Fields and 4-Dimensional Stokes' Theorem

Stokes' theorem is central to many aspects of physics – electromagnetism, the Aharonov-Bohm effect, and Wilson loops to name a few. However, the pedagogical examples and research work almost exclusively focus on situations where the fields are time-independent so that one need only deal with purely spatial line integrals and purely spatial area integrals. Here we address this gap in the literature by giving some explicit examples of how Stokes' theorem plays out with time-dependent fields in a fully 4-dimensional space-time context. We also present a puzzle that arises when applying Stokes' theorem to a loop enclosing an infinite solenoid with time-varying flux.

Felicia Avendano, Dr. James Mullooly
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Your Life is Our Business: An Aircrew Flight Equipment Airman's Look at Language in the Workplace

This paper illustrates how non-aircrew airmen and aircrew in the United States Air Force use customs and courtesies to interact with each other in a training environment. The research was completed through an ethnographic study of Air Force rank structure and how one's rank influences certain speech events. Participant observation and informal interviews with aircrew and non-aircrew members of my squadron were used at my job as an aircrew flight equipment journeyman stationed at a California Air National Guard Base in 2013. The research illustrates how formal and informal speech acts occur naturally and how politeness comes into play when dealing with airmen of various ranks. An observer can notice this when an enlisted airman talks to an officer or much higher ranking sergeant. The speech tends to be more formal and direct with the proper use of rank and customs and courtesies, this is in fact a form of negative politeness. Yet when enlisted airmen of about the same rank talk to each other it is informal and positive politeness can be seen. However, with aircrew and aircrew flight equipment airmen, it does not tend to follow the usual pattern of speech. When a person studies the relationship between aircrew and "their" aircrew flight equipment airmen, the use of proper rank is still being used, however the politeness is not negative. This is significant because the study showed how even training environments depict how important speech acts are between two different career fields, especially since one relies on the other one to make sure their flight is a safe one.

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Littlest Higgs Model with T-Parity

Littlest Higgs model with T parity is an extension of the Standard model at TeV scale. This model offers the solution to the naturalness problem in the Standard Model by introducing new particles, T-odd heavy quarks. In addition littlest Higgs with T parity model predicts a stable particle, heavy photon which is a good candidate for dark matter. The considered signature of the production of heavy T-odd quarks at LHC is consequential final state consisting of pair of jets associating with massive stable particles and missing transverse momentum which is associated with the decay of heavy T-odd quark to heavy photon and SM quark.

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Comparing the Effectiveness of EMDR & TF-CBT for Children with Posttraumatic Stress: A Meta-Analysis

Eye Movement Desensitization and Reprocessing (EMDR) and Trauma-Focused Cognitive-Behavioral Therapy (TF-CBT) are established evidence-based methods for treating traumatized adults. Studies examining treatment of traumatized children have found positive results for both of these treatments. However, there is a critical need for meta-analytic reviews of this research, and the present study is the first to directly compare these two treatments for this vulnerable population.

Type of treatment and presence of a PTSD diagnosis were explored as moderators. Inclusion criteria specified children under age 18 who experienced a traumatic event, self-reported posttraumatic stress symptoms (PTSS), and received either TF-CBT or EMDR treatment. Studies written in English using an outcome measure of PTSS were included for analysis. All articles were coded by trained researchers. To ensure interrater reliability, all articles were blind coded and discrepancies were discussed until resolved.

Results were computed using Comprehensive Meta-Analysis software from Biostat. A random effects model demonstrated a significant overall effect size, indicating EMDR and TF-CBT are effective treatments; though, multiple indices indicated heterogeneity in the effect size. Type of treatment as a moderator variable demonstrated a significant difference between the treatments delivered. Specifically, TF-CBT was related to a greater reduction in PTSS in children than EMDR. It is hypothesized that greater efficacy of TF-CBT may be related to the psychoeducation utilized to teach clients and family about trauma symptoms. Moderator analysis of diagnosis demonstrated children with PTSS showed a greater reduction in symptomatology than children with a diagnosis of PTSD. Given that PTSS develop as soon as three months following a traumatic event, and that full criteria for PTSD may not be met for months or even years, these results suggest that children do benefit from early intervention. The implications and limitations of these findings will be further discussed.

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Expulsion of the Jews from England 1190 to 1290

Throughout the centuries, Jews had been outcasts and their diaspora has spread to all parts of the world. In Europe by the Middle Ages they were the scapegoat that medieval kings, lords, and even the peasantry would attack. Jews of the period were blamed for many things from well- poisoning to the desecration of the host. The desecration of the host is a sacrilege practice against the Catholic Church committed by a Rabbi. The ultimate expulsion of the Jews from England would not come from King Richard I and his failed Crusade but from Edward I, when a combination of greed and Blood Libels would lead to the expulsion of the Jews from England in 1290. Blood Libels are accusations that Jews use the blood of Christians in their religious rituals. Richard I used the Jews to finance his crusade to the Holy Land. By the time Edward I came to power there would be a complete change. Edward I, was himself accused of being Jewish, later the life style in England would change not only for the Jews but for England. Due to greed and corruption, the Jews would ultimately be expelled from England in 1290. This paper will explore the circumstances leading to the expulsion of Jews from England to argue that the main reasons were persecution, greed, and corruption not just the ideas of Blood Libels and host desecration.

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Microbial Profile of Ketchup Bottles in Restaurants

Today, people are more concerned about the safety and cleanliness when they go to restaurants. Many customers will use the ketchup bottles placed on the table in most restaurants. However, the ketchup bottles are handled with hands that may not have been washed; the mouth of the ketchup bottle is likely to be dipped into the food on customer plates, and many restaurants refill table ketchup bottles. These practices can lead to cross-contamination and increase the number of microbial growth on bottles.

In this experiment, 10 restaurants were visited randomly, and the inside neck of three separate ketchup bottles at each establishment was swabbed for microbial analysis. Samples were evaluated for mesophilic aerobic bacteria, generic coliforms, Escherichia coli, yeast and mold. These selective groups of bacteria will give some indication of the source of contamination. An aerobic bacteria count will indicate the total microbial load; however coliforms are an indication of fecal contamination. An Escherichia coli population will be a subset of the coliform family, some of which are pathogenic for humans.

According to Food and Drug Administration's (FDA) recommendation for food contact surface, 8 of the 10 restaurants failed the standard of an aerobic bacteria count of less than 1.9 bacteria per square centimeter. The low incidence of E. coli demonstrates the source of bacteria is not enteric microorganisms (most foodborne pathogens are enteric or fecal organisms) and that servers might wash their hands before refill the ketchup bottles, or restaurants use the new bottles rather than refilling.

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An Anthropological Perspective of Multicultural Aspects in Autism Spectrum Disorders

Purpose is to examine the attitudes and viewpoints regarding Autism in Brazil, Canada, The United States and France, to discover whether countries view Autism Spectrum Disorders (ASD) as psychosis or behavior disorders, and which causes or correlations are prominent of ASD.

Summary of Methods include a lit review of ten peer-reviewed articles cited throughout my presentation is a secondary qualitative analysis of data provided.

Summary of Results include an understanding of ASD as a disorder of brain physiology and chemistry, and not psychosis. I find that many in the ASD community, despite current ethnic/cultural influences, view ASD as a biological disorder, and not a psychosis. Parents correlated with a belief in ABA therapy, while those with only a medical link (such as physicians or therapists) thought of ASD in a more pathological view, readily prescribing medication rather than utilizing ABA therapy instead or with medication.

Statement of conclusions: Parental involvement in ASD children's therapy and diagnosis impact which interventions are implemented in the treatment and alleviation of symptoms of ASD. It is cross-cultural that parents simply wanted the least medical/pathological treatment available to their children. I hope to work with the ASD community alongside the medical/therapeutical community to bridge the gap in differing views. While there did seem to be a discrepancy in how the medical staff treats ASD, there was no evidence of a change in viewpoint of parents due to ethnic or cultural differences (in different countries).

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Dasam Granth: A Closer Examination of the Saint-Soldier Complex

Sikhism, the fifth largest religious tradition in the world, has over 27 million followers. All Sikhs surrender themselves to the last remaining living Guru, the Sri Guru Granth Sahib. Even so, an even smaller fraction of these followers practice the concept of Saint-Soldier or "Sant-Sipahi" that is embedded in Sikhism. This concept is outlined in the Dasam Granth, the words from the tenth Guru as well. This paper will aim to address the origins of this concept and whether or not being a saint-soldier is a Sikh dharmic goal or not.

My methods include a historical time frame based on Sikh literature and historians from the 16 century to now. I am also utilizing the religious texts, Sri Guru Granth Sahib and the Dasam Granth, to better understand the religious and historical context as well as the psyche of the saint-soldier.

My findings have reached two main conclusions; one being that due to the lack of awareness and fully defined contexts behind the ways of the saint-soldier's actions, the Sikh population is losing its acceptance of this small proportion of Sikhs in the world and shunning it off as a cult or yogic sect.

Secondly, the erroneous eyewitness accounts of Sikh ceremonies from the birth of the Khalsa (the body of these Sikhs as a community) have led to further research which proves that these very same ideals of a saint-soldier are not backed by the times they were supposedly created. It has led to the findings that this concept of a saint-soldier is older than the Khalsa order created in 1699, to a concept highlighted by the founder of Sikhism, Guru Nanak Dev Ji.

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Vacuum States in Quantum Field Theory

The observer dependence of vacuum states in quantum field theory has long been an area of interest. We show that the vacuum state of a quantum field theory depends on the motion of the one who observes it. This leads to a classification of motions for which the vacuum state is seen as a thermal bath of radiation with an associated temperature, or a pure quantum state with non-thermal radiation.

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Generalizing the Futurama Theorem

The 2010 episode of Futurama titled The Prisoner of Benda centers around a machine that swaps the brains of any two people who use it. The problem is, once two people use the machine to swap brains with each other, they cannot swap back.

The author of the episode, mathematician Ken Keeler, uses Abstract Algebra to take the problem containing a set of swapped brains, and translate it into a permutation in the Symmetric Group. The theorem and proof contained in this episode is known as The Futurama Theorem, or Keeler's Theorem. In 2014, it was proven that Keeler's method was the optimal solution to the Theorem.

In this work, we will present a new proof of Keeler's Theorem. We will also generalize the Theorem to products of larger cycles. That is, if the machine could swap three people at a time, how would you get everyone back where they belong? What about larger machines? The goal is to create general solutions for whatever sized machine we can think of.

We start with 3-cycles, and build up to our main result: a solution for p-cycles where p is a prime number. After this solution, we use the same general ideas to create a solution using products of 2j-cycles for machines that swap an even number of brains at a time.

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Genetic Analysis of Persister Cell Formation in Pseudomonas Aeruginosa

Persister cells are a small percentage (0.01-10%) of phenotypic variant cells that survive antibiotic therapy and other stressors. Persister cell formation is an inevitable situation even if antibiotic therapy is perfectly administered. However, indiscriminate use of antibiotics, incomplete courses, and self-medication contribute to increased risk of persister cell formation. The exact mechanisms of persister cell formation are still not completely understood. That said, the study of toxin-antitoxin (TA) complexes has begun to answer a lot of questions recently. In our lab, we are in the process of identifying genes important for persister cell formation in Pseudomonas aeruginosa. P. aeruginosa is a gram-negative, rod-shaped bacterium found abundantly in soil and water and is also highly associated with nosocomial, wound, and burn infections.

Our lab performed RNA sequencing (RNA-seq) of P. aeruginosa persister cells. We found upregulation of 99 open reading frames (ORFs) and downregulation of 13 ORFs. Quantitative real time PCR (qRT-PCR) supported trends from RNA-seq. Differential expression included categories like cell wall synthesis, stress response, and metabolism. Interestingly, more genes were upregulated than downregulated. These results indicate that previously held ideas about persister cell dormancy are debatable. We performed high-throughput screening of a P. aeruginosa transposon mutant library and analyzed growth curve patterns to select mutants that appear to form different numbers of persister cells compared to wild type. We further 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. 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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Establishing the Microbial Profile of Restaurant Menus

Background:

Direct food contact surfaces are often the main focal point when evaluating proper cleaning procedures. However, non-direct food contact surfaces such as restaurant menus are often overlooked. Inadequate sanitization of menus can lead to cross-contamination and could potentially be harmful to health. In this experiment, we determined the microbial load on 40 different restaurant menus to see if they met the standards established in the United States Public Health (USPH) Food Code guideline of the maximum level allowable bacterial count for food contact surfaces. The names of these establishments have been withheld for confidentiality purposes.

Methodology:

Two menus from each of twenty restaurants were swabbed using standard methodology for the swabbing of food contact surfaces. Samples were plated on selective media and enumerated for mesophilic aerobic bacteria, generic coliforms, and Escherichia coli. These selective groups of bacteria will give some indication of the source of contamination. An aerobic bacteria count will indicate the total microbial load; however coliforms are an indication of fecal contamination. An Escherichia coli population will be a subset of the coliform family, some of which are pathogenic for humans. After the plate counts were established, statistical analysis (ANOVA) was performed to determine if there was a significant difference between any of the samples.

Results:

The data showed a significantly higher count in one restaurant (sample D). In addition, 13 of the 20 restaurants tested had a bacterial load higher than the USPH guideline for food contact surfaces.

Conclusion:

Overall, there were only 7 samples out of 20 that met the standards set by the U.S Public Health Code. That is a 35% pass rate. It is suggested that the restaurants that failed to meet the standard do not follow proper cleaning procedures on their menus and need to reassess their sanitization methods.

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Determining Reasons and Barriers of Employee Participation in Fitness Classes Provided by Fresno State's Worksite Wellness Program

There is an ample amount of literature on the physical and mental benefits of exercise (Have, Graaf, & Monshouwer, 2011; Pederson & Saltin, 2006). Furthermore, physical fitness by worksite wellness programs has been implemented as a health promotion strategy (Gebhardt & Crump, 1990). The benefits for participation are immense; however research reveals that participation rates are constantly decreasing (Lovato & Green, 1990). The purpose of the project was to collect employee perceptions of Fresno State's worksite wellness activity classes including, Tai Chi, yoga, circuit training, water aerobics, swim for fitness, and a walking program known as Bulldog Trials. Reasons and barriers for participation were collected through a survey. The survey was emailed campus-wide via the Office of Organizational Excellence and was distributed three times over a period of two months. All employees (i.e., Staff, Faculty, and Administration) were encouraged to participate in the study. It is anticipated that employee feedback will directly help determine future changes of the campus' worksite wellness program and ultimately increase campus wide participation.

Project Chair: Dr. Jenelle N. Gilbert

Committee Members: Dr. Stephanie D. Moore-Reed, Katherine Williams

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Access to Higher Education for Migrant High School Students

"A HANDBOOK FOR EDUCATORS TO FACILITATE THE ACCESS TO HIGHER EDUCATION FOR MIGRANT HIGH SCHOOL STUDENTS"

The objective of this literature review project was to create a handbook that featured the current resources available for high school counselors to help migrant high school students overcome challenges when pursuing higher education. The major problem is that previous literature has only described the barriers migrant students face while accessing higher education and the lack of understanding from high school counselors about where to find resources. This project hopes to enhance counselors' multicultural awareness by merging culture understanding and college resources available all in one handbook.

The research for this project was gathered by utilizing search engines at the Henry Madden Library at California State University, Fresno. The search engines used included Education Research Complete (EBSCO), Education Research Information Center (ERIC), ProQuest, and Psych Info. Information that was not gathered through the Henry Madden Library was collected from online educational and governmental web pages. The search for this project was limited to mostly California information.

In order to best serve migrant students, counselors must become aware that interruption of schooling due to school mobility, negative political climate, and, financial hardships are major barriers that contributes to migrant students' lack of academic achievement (Nuñez, 2009; Ramirez, 2012). An understanding of available resources, in depth information, and advocacy is imperative (Vela-Gude, Cavazos, Johnson, Fielding, & Cavazos, Campos, & Rodriguez, 2009).

Bringing awareness to high school counselors in regards to meeting the demanding needs migrant high school students faced is crucial (Nuñez, 2009). The barriers migrant students face can be overcome through early college exposure in residential programs, becoming involved with the Migrant Educational Program and, experiencing career/college readiness workshops. The aforesaid are all efficient ways to develop a college-going behavior for this population, which can be facilitated by counselors having the knowledge of this resources (Granston-Gingras & Anderson, 1990: Nuñez, 2009).

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A.S.A.P.: Automated System for Accurate Parking

ASAP serves to manage the growing parking problems. Finding a parking spot quickly and closest to the destination is an everyday problem that each of us faces. This project is an attempt to find a solution to this problem by developing a parking management system that will help people find just the right parking spots swiftly.

The present market does not have any such up to date applications that can cater to the daily needs of finding a parking spot for people. State-of-the-art automatic parking management software or applications largely focus on automating the entry and exit of the parking lots, generating time stamps for paid parking or automation of payment at the exit of the parking area but do not help identify the specific parking spot. Therefore, ASAP draws its inspiration from the time wasted everyday just to find the closest parking.

The project has taken parking lots in California State University, Fresno as the primary subject and targets to design a flexible parking management system to help Fresno State employees and students minimize the time spent on finding the right parking spot. The project is a JAVA based application which will be targeted towards optimizing the time and enormous space that constitutes the university parking. ASAP uses Ultra Sonic sensor installation with Bluetooth Wi-Fi integrated chip to send sensor data over the university network and use SQL Server to update the user with knowledge of parking availability throughout campus indicating which spot in the respective parking lot is empty. The project also generates a 3D view of the parking lot to the user so as to make the interface more user-friendly and interactive. ASAP also defines trends (data analysis) in parking and making prediction for the expected availability of the parking.

ASAP is a fully interactive, easy to use and useful application that saves time and effort to get just the right parking spot!

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Does Traffic Congestion Prevent Us from Making Trips?

As the earth population becomes more urban, causing continuous growth of existing cities, it also increases urban travel demands and associated transportation challenges. While these challenges are numerous, traffic congestion has received particularly high attention – primarily due to its association with many of the other challenges.

Literature about impacts of traffic congestion is rich. These impacts include: increases in travel times and delays, deterioration of air quality, increases in energy consumption and foreign oil dependency, increases in noise pollution, increases in traveler stress, and increases in greenhouse gas emissions and climate change. Interestingly, the impact of traffic congestion on human travel activity has not received much attention. Since travel activity is directly associated with traffic congestion, a better understanding of this relationship could be particularly beneficial. While it may seem intuitive that increased travel activity leads to increased congestion, this research investigates the opposite. This work explores whether increased traffic congestion affects travel activity.

Two surrogate measures of traffic congestion are employed in this work: population density, and average travel time per trip. On the other hand, while the average number of trips per person per day was the measure chosen for travel activity, travel activity for each of five trip purposes (e.g. work, shopping, and recreation) was also investigated. Data was obtained for 50 different US cities. While the travel data (trip time, and trips per person per day) was calculated from the US DOT's National Household Travel Survey, the population density was obtained from the US Census Bureau. Linear regression models were estimated to investigate the existence of significant relationships between congestion and travel activity. Results of this research indicate that as traffic congestion increases, travel activity decreases. However, the impact of traffic congestion on essential trips (e.g. work) was less than on discretionary ones (e.g. recreation).

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Suction Trap Capture Efficiency of Utricularia Vulgaris, a Carnivorous Plant

Carnivory in plants should exert evolutionary pressure for greater prey capture efficiency: if a plant has a costly trapping mechanism, then this trapping mechanism must be highly effective to offset the cost of building and setting the trap. Utricularia vulgaris is a free-floating aquatic plant, which forms small bladder-shaped traps to capture zooplankton by suction. These traps are structurally intricate and energetically expensive to set: the plant pumps out the water in the bladder to create a sub-ambient pressure. When prey touches the trigger hairs on the trap door sealing the bladder, the door opens and prey is sucked in. We predict that the traps have a high capture efficiency (captures per feeding strike) and a low misfire rate (strikes triggered without prey). In this study, we focus on the effects of trap age and trap size. U. vulgaris grows in one direction, with leaves forming along the stem. These leaves stop growing and mature within 10 days, forming mature bladders. Mature bladders range in size from 0.5-4 mm. To determine capture efficiency, we record images of bladderwort strands before and after exposure to prey. We record capture events also acoustically (bladders make a popping sound when triggered). These data allow us to quantify which bladders caught how many prey items and how many trigger events occurred. From these data, we calculate capture efficiency as the ratio of capture success (total number of prey items captured in the bladders) to suction events (number of events in the sound recording). We can also relate capture success to bladder size and bladder age (position of the bladder along the strand). This study will lead to further studies of trap selectivity and prey preferences based on trap morphology and assists research on the lower size limit of suction feeding.

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Biochemical Characterization of Three Glutaredoxins and a Glutathione-Dependent Formaldehyde Dehydrogenase from Synechococcus PCC 7942

Glutaredoxins are disulfide oxidoreductases belonging to the thioredoxin superfamily. Using glutathione (GSH) as a reductant, they are able to catalyze thiol-disulfide redox reactions, including reduction of GSH mixed-disulfides, protein disulfides, and glutathionylation/deglutathionylation. Because of their involvement in several redox homeostasis pathways, glutaredoxins are important for stress adaptation in organisms. We have expressed and purified three glutaredoxins, GrxA, GrxB, and GrxC, from the cyanobacterium Synechococcus PCC 7942, a model strain used to study how photosynthetic microorganisms respond to changing stresses in the environment. We have conducted several enzyme activity assays featuring varied substrates to characterize the catalytic properties of glutaredoxin. GrxC, which contains a dithiol motif in its sequence, was found to behave similar to other previously-studied bacterial dithiol glutaredoxins. Specifically, it possesses GSH-mixed disulfide reductase activity, insulin disulfide reductase activity, and dehydroascorbate reductase activity. GrxB is also a dithiolic glutaredoxin, but it does not display any of the three activities shown by GrxC. GrxA, which contains a monothiol motif, does not possess any of these activities, making it similar to other previously-studied bacterial monothiol glutaredoxins. In addition to three glutaredoxins, we have also expressed and purified a glutathione-dependent formaldehyde dehydrogenase (GSH-FDH) from Synechococcus, GscR. GSH-FDHs play a role in formaldehyde metabolism, but they are also involved in the detoxification of S-nitrosothiols. We have confirmed both the formaldehyde dehydrogenase activity and S-nitrosoglutathione reductase activity of GscR, as well as determined kinetic constants for these activities.

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Structural Study of Antifreeze Glycoproteins (AFGP) using High-Resolution Nuclear Magnetic Resonance (NMR) Spectroscopy

Intrinsically disordered protein (IDP) is best described as an ensemble of rapidly inter-converting alternative structures, nevertheless, is their native, functional state. Antifreeze glycoproteins (AFGP) are considered intrinsically disordered. The ice-crystal growth inhibition property of AFGP is crucial for the survival of certain Arctic and Antarctic fishes in subzero temperature. The primary structure of AFGP consist of a number of repeating tri-peptide sequence of (Ala-Ala-Thr*)n in which the Thr* is glycosylated with the disaccharidebeta-D-galactopyranosyl-(1-3)-2-acetamido-2-deoxy-a-D-galactopyranose. We hypothesize that the inherent flexibility of AFGP to be disordered is closely coupled to its function.

Nuclear magnetic resonance (NMR) spectroscopy provides a powerful option to investigate the structure and dynamics of proteins in the solution state. As the AFGP behave as IDPs in the solution state, there is a significant overlap of resonance in the proton (1H) NMR spectrum even at high magnetic fields. One of the solutions to overcome this problem is using two dimensional (2D) NMR techniques. The 2D NMR techniques provide information on the primary structure through covalent bonds interaction and on the solution state conformation through space interaction of the amino acid residues. Another solution to the overlapping resonance is to isotopically modified AFGP with a NMR active nuclei, such as carbon-13 (13C) nuclei which increase the sensitivity of the carbon-13 spectrum about 100 folds (natural abundance of 13C is ~1%). AFGP were isotopically modified at the N-terminus of with two NMR active carbon-13 (13C) labeled methyl groups to increase the sensitivity of the carbon spectrum. Structural information of AFGP and the chemically modified AFGP were obtained in pure DMSO-d6 and pure D2O using modern NMR methods. The structural aspects of AFGP, as determined by the high-resolution NMR experiments in the above solvent conditions, will be presented and its implication to the overall function of AFGPs will be discussed.

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Preliminary Results from an I.M.P.A.C.T. Model Implementation in a Four Specialty Training Clinic

Background/Objectives: Between May 2013 and November 2014 the UCSF-Fresno department of psychiatry developed and implemented an integrated mental health service based on the highly successful University of Washington I.M.P.A.C.T. model of collaborative care. This developing interface between specialties is becoming increasingly important in the era of affordable and accountable care. Our application is unique in that we are working in four separate resident run clinics, internal medicine, family practice, OBGYN, and pediatrics, as well as with a severely socioeconomically disadvantaged patient population. The teaching program includes a didactic series geared to primary care residents, weekly supervision, and ongoing as needed on-call consultation. Our initial goals were to demonstrate participation from primary care by showing increased screening frequency, as well as program effectiveness by a positive trend in population-based improvement in depression scores.

Methods: Between May 1st 2013 and November 1st, 2014, all patients arriving for primary care provider visits were asked to fill out a PHQ-9 depression screening. A report was then generated by our business office providing us with total screenings done and average screening scores per clinic per month.

Results: Screening frequency increased from an average of 459 monthly at initiation (range 118-885) to 602 monthly at the time of study (range 185-992). Family medicine PHQ-9 scores improved from an average of 9.68 ± 7.88 to 5.41 ± 6.03, internal medicine from 11.55 ± 8.11 to 9.15 ± 7.43, OBGYN from 6.02 ± 6.53 to 5.37 ± 6.62, and pediatrics from 4.77 ± 5.32 to 4.02 ± 4.78. Scores in family and internal medicine are statistically significant (P values both < 0.0001) and pediatrics and OBGYN are not (P values 0.18 and 0.14).

Conclusions: Depression screenings have increased in all four clinics over the implementation period demonstrating increased participation from the primary care departments. Mean PHQ-9 depression scores have improved in all four clinics consistent with overall population-based improvement and initial program effectiveness. Lack of more robust improvement in pediatrics and OBGYN may be due to low initial screening values and less active mental health interventions in those departments.

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Apparatus for the Measurement of Thermoelectric Power

The Seebeck Effect refers to the electric potential that is established in a material under an imposed temperature gradient. As well as providing many potential applications, from waste heat recovery to refrigeration and heating, this effect provides a useful tool for characterizing the behavior of the charge carriers in a material. A measurement probe is being developed in order to measure the Seebeck Coefficient (Thermoelectric Power) of a sample over the temperature range from 10 - 300 K. The set-up is modeled after a design previously published by Pope, Littleton, and Tritt (Rev. Sci. Instrum., Vol. 72, Num. 7, 2001). The sample is mounted across two copper platforms: One that is thermally connected with the rest of the probe and one that is thermally isolated, referred to as the cold and hot platforms respectively. A 2 kilo-Ohm resistive heater is used to heat the hot platform, establishing a temperature difference between the ends of the sample. The resulting voltage across the sample, the temperature of the cold platform, and the temperature difference between the platforms are then measured in order to determine the Seebeck Coefficient, which is the ratio of the voltage to the temperature difference. The measurement probe was tested using a nickel sample and shows reasonable agreement with the literature in the range of 30 - 300 K, with approximately 5.6% error at room temperature. This represents a significant improvement over designs tested previously within the Strongly Correlated Electron Lab at CSU Fresno. The specifics of the set-up, the calculation of Seebeck Coefficient, and the results of the Nickel measurement will be presented. Further work will be done to continue to refine and improve the measurement of the Seebeck Coefficient.

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Statistical Models for Prediction of Fantasy Football Points

Fantasy football modeling has seen a sudden spike in interest during the past few years from academic researchers. The objective of this paper is to predict the National Football League

(NFL) quarterbacks' fantasy points. To this end, we consider three different models and evaluate their predictive potentials. We use the maximum likelihood method to estimate the parameters and the Gibbs sampler to draw predictive values. The dataset consists of the whole-career fantasy points for twenty chosen NFL quarterbacks. The 2014 NFL season was used as a testing period to validate our models. The results show that one model consistently outperformed the other two. Additional tests were performed with the inflation-adjusted fantasy point data to test the hypothesis

that we need to compensate for the fact that NFL quarterbacks average more fantasy points today than in years past.

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Building Rapport in a Witness Interview: Investigating Whether or Not Rapport Influences Interviewee Behaviors and Accuracy

Most investigative interviewing protocols recommend that interviewers build rapport with witnesses to increase the quality and quantity of information reported. While some studies have investigated rapport's effects on adult witness accuracy in investigative interviews, no known research used a behavioral coding system to record whether rapport-building translates into non-verbal behavior and witness accuracy. The objective of the study is to examine if building rapport creates observable nonverbal behavioral differences in interviewee behavior, and if these behaviors moderate rapport's effect on witness accuracy.

After consenting, 40 participants viewed a two and a half minute mock-crime video depicting a realistic convenience store robbery. Following the mock-crime video, interviewers either built rapport or no rapport with the witness (rapport manipulation). Interviewers in both conditions followed a structured rapport script that elicited participant self-disclosure using both open-ended and cued questions about personal information (crime-relevant details were not retrieved at this stage). Rapport was built by employing mostly verbal and some non-verbal rapport-building techniques as recommended by the Cognitive Interview (Fisher & Geiselman, 1992). The no rapport script was modeled after the opening portion of actual police interviews (Schreiber Compo et al., 2012).

Results of behavioral coding indicated that the interviewee gave significantly more head nods, eye contact, smiled more, and laughed more in the rapport than the no rapport condition. Mediation analyses couldn't be completed because there were no overall effects of rapport on accuracy.

The present data confirmed that rapport-building in witness interviews can yield observable differences in non-verbal behavior. To test whether this change in non-verbal behavior depending on rapport can translate into changes in witness accuracy and quantity of information, future studies are needed that can successfully test for mediation.

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How Latina Lesbian Mothers are Parenting their Children in Relation to Religion

This paper explores the contradictions Latina lesbian mothers face as they raise their children in the Catholic & Christian faith. Alienated from their religious upbringings because of their sexuality, Latina lesbian mothers find themselves marginalized in the church but still drawn to the practice of religion because of its cultural importance, especially as it relates to child rearing.

Due to scarcity of literature in this area, I've used the perspectives of culture and religious faith from the Latino culture as a whole. I used secondary sources, which included information from peer reviewed articles, scholarly journals, theses and dissertations, as well as trusted web information.

Based on interviews with 10 self-identified Latina lesbian mothers living in the Central Valley of California, I explored the meanings of motherhood, childhood, community, and family as they relate to religiosity. I argue that it is through the daily negotiation of religious practices within families that allow Latina lesbian mothers to create a sense of belonging within their faiths. The method I used is based on the snowball sampling method that began with referrals via friends, and they referred me to their friends or family members.

From my study, I have found that majority of these women follow their spirituality rather than a religious faith. Many of them have continued traditional religious practices with their children, but mainly to maintain community and family harmony, since that is strongly valued in their culture. There was one woman that expressed extreme contradictions between her Lesbian identity and religious faith; in consequence, she raised her children against homosexuality. Lastly, I interviewed a Lesbian woman that believes in her Christian faith and attends welcoming church, and has been able to blend both identities harmonically with her children.

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p-Nitrophenolate Colorimetric Assay: A Tool for the Study of Light-Driven P450 Enzymes

Industrial wastes produced by traditional synthetic processes are constant threats to the environment's biodiversity. Biocatalysis is a thriving field of research that seeks a solution to this problem using the natural ability of enzymes to perform green chemistry. The Cheruzel group is particularly interested in adapting Cytochrome P450s, a superfamily of heme-thiolate enzymes with important synthetic potential, for industrial applications. Currently, the use of these enzymes are industrially inapplicable as their electron transfer system requires a partnering protein and NAD(P)H, an expensive cofactor as its natural source of electron. Hence, our laboratory has engineered an alternative pathway where a ruthenium(II) diimine photosensitizer, covalently attached to the enzyme, can transfer electron from the inexpensive diethyldithiocarbamate (DTC) molecule upon light excitation. Having established a methodology to drive hybrid Cytochrome P450 enzymes with visible light and water, we are working to improve and expand our library of hybrid enzymes for biotechnological and synthetic applications. To aid in the screening process, we turned to the p-nitrophenolate colorimetric assay. A library of p-nitrophenolate derivatives was developed where different substrates are incorporated from the terminal end. Enzyme activity can be measured upon hydroxylation as the yellow chromophore, p-nitrophenolate, is released and can be easily detected with UV vis spectroscopy. Having established the sensitivity and reliability of the assay with 16-p-nitrophenoxycarboxylic acid, we utilized the assay for exploring the parameters of our light driven system as well as measuring the activity between different mutants generated in the laboratory. The library of p-nitrophenolate derivatives is now expanded towards non-natural substrates. We hope the information obtained from these assays will enhance our understanding about the light-driven system as well as to aid us in developing the next generation of light-driven enzymes.

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The Effect of Local Flower Distribution on the Foraging and Communication Behavior of the Common Eastern Bumblebee, Bombus Impatiens

Bumblebees are able to obtain information both through personal experience, i.e. personal information, and from their conspecifics, i.e. social information, however it is unknown if bees are capable of making the best decision when social information conflicts with personal information. This ability to weigh decisions and act on the one with the highest value would allow the bees to make the most of the resources within the territory of their colony, as they would not be wasting time and energy obtaining resources from less valuable sources. It has been generally assumed that insects are incapable of this kind of information evaluation, however recent research has suggested that bumblebees are capable of communicating complex information, a prerequisite for decision making in a social context. We created a foraging situation in which individual bumblebees are confronted with rapid changes in resource distribution. Following changes in resource distribution, the collective foraging behavior of the hive was monitored to evaluate the transmission of information. The change in behavior provides insight into what drives a bee's foraging choices following new information and provides a framework to investigate how bumblebees evaluate and utilize social information that may conflict with their personal information. Bees were presented with an arena where the values of food resources were controlled by altering the sugar concentration within artificial flowers and the pollen distribution of natural flowers. The foraging patches that bees chose, the behavior of the hive after the bees returned to the nest, and the subsequent foraging choices the bees made after social information was acquired was monitored.

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Computational Fluid Dynamics (CFD) Analysis of a Drip Line Hydrocyclone

In the present work, computational fluid dynamics (CFD) analysis of an existing drip line hydrocyclone is performed in order to improve the current design for agricultural irrigations by understanding the effect of water flowrate on pressure drop and head losses. When water flows through a pipe, the pressure continuously drops in the streamwise direction because of friction along the walls of the pipe. It is common to express this pressure drop in terms of an irreversible head loss. Numerical simulations are performed using the commercial CFD code ANSYS FLUENT with the finite volume method. The pressure drops of the hydrocyclone are computed numerically and they are in reasonable agreement with the experimental data provided by the Center for Irrigation Technology at Fresno State. For example, the measured pressure drop across the part is approximately 4 pounds per square inch (psi) at 3 gallons per minute (gpm) whereas the numerical pressure drop is roughly 3.8 psi at 3 gpm. Additionally, the present work shows improved flow efficiency (head loss reduction) by making changes to the existing hydrocyclone design such as the length and diameter of the cavity as well as the length of the outlet tube.

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LGBTQ Identity and Religious Identity

Heterosexuality is perceived as the norm in dominant religious sects; however, individuals whose sexualities fall outside of this norm often struggle with both sexual and religious identities. Rodriguez and Ouellette (2000) have cited four common strategies in which people who identify as LGBTQ resolve conflicts between their sexual and religious identities: rejecting religious identity; rejecting homosexual identity; compartmentalization; and identity integration. The literature that applies this framework focuses primarily on the experiences white Judeo-Christian homosexual men.

My research complicates this model, and explores whether these four categories apply to LGBTQ people from different religious traditions and ethnic backgrounds living in California's Central Valley. My research methods include formal and informal interviews, participant-observation, and critical race analysis of existing scholarly literature on homosexuality and religion. Formal interview topics included discussions of the evolution of the participants' religious beliefs, and participation from childhood to present and their views on their inclusion in church and mainstream white LGBTQ communities. Participant-observation at open and affirming congregations allowed me to observe services to note the levels participation amongst and engagement of LGBTQ members.

I informally interviewed members of these congregations to assess their involvement and engagement with the congregation and how they feel about the church's LGBTQ community. My research may be used improve the efforts of open and affirming congregations in doing outreach and engagement with LGBTQ members.

My research builds on the literature on intersectionality and identity by exploring inequalities and tensions between faith, sexuality, race, and space. It also challenges overly simplistic models of faith and sexuality that negate queer people's abilities to occupy multiple positionalities, especially with respect to religious beliefs. The data from the interviews has challenged the four common found strategies in the resolution of both identities. The results found that there are other strategies that members of the LGBTQ community practice. The strategies that fall outside of the ones cited in the literature and are specific to the individual.

To conclude, my findings challenge the notion that relies on the common strategies found in the literature. It complicates the four categories and transforms them as fluid states of being that a LGBTQ individual may go through instead of a category that is solid and not changing. It is clear through my research that there are other strategies that LGBTQ people utilize when dealing with their religious and sexual identities.

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Chemical Modifications of 3-OH in 3',4'-Dimethoxyflavonol Attenuate Prostate Cancer Cell Proliferation

Flavonoids are a class of polyphenolic compounds ubiquitously distributed in a variety of dietary plants with an array of biological activities. Flavonols are a sub-class of flavonoids featuring a hydroxyl group at C-3. Certain flavonols, such as quercetin and fisetin, have been evidenced by in vitro cell-based and in vivo animal experiments as potential anti-prostate cancer agents. The Achilles' heel of flavonols as drug candidates is their poor bioavailability and moderate potency. The objective of this study is to explore the possibility of enhancing both bioavailability and anti-proliferative potency by chemical manipulations of 3-OH in flavonols. 3', 4'-Dimethoxyflavonol, as our first model compound, and its fourteen derivatives have been synthesized through aldol condensation and Algar-Flynn-Oyamada(AFO) reaction. Their structures were characterized by interpreting the 1H and 13C NMR spectra. Their anti-proliferative activity towards three human prostate cancer cell lines has been assessed by WST-1 proliferation assay. Our findings indicate i) that alkylation of 3-OH attenuates the cell proliferation in the prostate cancer models and ii) that incorporation of a dibutylamine group to 3-OH through a three- to five-carbon linker leads to the optimal potency in inhibiting prostate cancer cell proliferation.

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"He Said, She [May Not Have] Said": Examining the Impact of Gender on the Self-Reporting of Transgressions

The presence of a gender gap in criminal offending, where males commit significantly more crimes than females, is a widely accepted phenomenon. The impact of gender on the self-reporting of crimes and transgressions however, has not been so readily accepted. Past studies have found conflicting results on the presence of significant gender differences in the self-reporting of crimes (Sampson et al. 1985, Maxfield et al. 2000). Sampson et al. (1985) found no significant differences between males and females in the self-reporting of crimes, while Maxfield et al. (2000) found that previously arrested males were significantly more likely than previously arrested females to report their offending.

This study examines the impact of gender on the self-reporting of transgressions, via three aims: (1) Examine the impact of gender on the number of transgressions shared, (2) Assess the role of gender on the type of transgression admitted, (3) Identify the gender differences associated with the consequences of shared transgressions (felony, misdemeanor, citation etc.). Three hundred and nineteen university students were interviewed and asked to share a transgression or wrongdoing that they had been a part of or carried out.

Results of the study indicated a significant difference between males and females in the self-reporting of transgressions. For study aim one results indicated that males were more likely to report a transgression than females. Significant differences were also found for study aim two among the categories of lying, battery, and moving violations between male and female participants. Finally study aim three found that the misdemeanor consequence showed significant differences between males and females; males on average reported more transgressions with a misdemeanor as a consequence than females. The presence of a gender-gap in the self-reporting of transgressions points to the need for separate techniques or strategies when interviewing female, as opposed to male, suspects or witnesses.

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Synthesis of Isoprene Peroxide Derivatives

Isoprene is a biogenically produced Volatile Organic Compound that is emitted on a significant scale across the globe. Once isoprene reaches the upper atmosphere, it is exposed to intense UV rays as it mixes with pollutants and ozone to produce peroxide derivatives. These derivatives are significant sources of pollutants that compound greenhouse effect and potentially have negative health effects.

This study pertains to the synthesis of these peroxide derivatives that have been identified in the atmosphere so they can be further studied in kinetic experiments and in the future, health effects.

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On a Generalized Paley-Wiener Theorem and its Implication

A known description of the entire vectors of exponential type of a normal operator in a complex Hilbert space in terms of its spectral measure is extended to the case of a scalar type spectral operator in a complex Banach space.

The result can be considered to be an operator analogue of the classical Paley-Wiener Theorem (R. Paley and N. Wiener, 1934) asserting that the entire functions of exponential type square-integrable on the real axis are precisely the Fourier transforms of square-integrable on the real axis functions with a compact support.

An immediate implication of the obtained description, important for approximation and qualitative theories, is the denseness of the exponential-type entire vectors in the space.

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Nature's Influence on Perceptions of Control over One's Life and Overall Well-Being

"Nature may heal and cheer and give strength to body and soul alike" (John Muir, 1912). For centuries people have believed that nature has restorative properties. The purpose of this study is to examine how physically engaging with nature impacts one's: (1) Locus of Control and (2) overall wellbeing.

Ninety-seven participants were categorized into two groups based on how often they reported going out into nature – more or less often than once a month in a one-year period. These groups were then compared to one another using independent samples t-test assessing differences in Locus of Control and wellbeing. The Locus of Control measure (Rotter, 1966) assessed if one believes events in their life originates primarily from their own actions, and the wellbeing measurement (Keyes, 2002) assessed aspects of psychological, emotional, and social wellness. There was a significant difference in Locus of Control, $t(95) = -2.12$, $p < .05$, indicating that the more one exposes him or herself to nature correlates with an increase in feelings of personal control over their own lives. There was a marginally significant difference in wellbeing, $t(95) = -1.6$, $p = .059$, such that those that expose themselves to nature at least once a month are more likely to indicate satisfaction with their lives.

It appears that those who physically engage in the natural world feel responsible and in more control over what's happening in their lives. More research is needed to explore this relationship, however if continually found we would like to explore how nature can help juvenile delinquents who come from impoverished neighborhoods. It's possible that exposure can increase their internal Locus of Control, perhaps leading them to realize that their future does not have to be decided by their upbringing.

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She Calls Me Her Lost Lamb

Young adulthood is a time of reduced religiosity for some, and increased religious identity for others. Among those who leave religion, and increasingly common trend, cognitions have been explored extensively, but emotions and family relationships have not. The purpose of the current study is to explore the emotions and family relationships of those who deconvert.

Structured interviews were conducted with 13 young adults who were raised in Christianity, Judaism, or Islam, and who have subsequently adopted an atheist identity. Recruited through social media.

Most participants (10/13) had primarily good experiences with religion; a few (n=3) experienced unwelcome expectations associated with religion. Experiences that led to deconversion included history and science classes, conflict over gay rays, and international travel. Most participants (9/13) discussed gay rights in their narratives, whether they declared it a causative agent or not. Most participants referred to disclosure of their beliefs as "coming out" and only two had not yet come out to family members. Emotional reactions to deconversion included sadness, a sense of loss, guilt, shame, fear, and anxiety. Most participants noted an overwhelming sense of relief associated with deconversion, and some reported being disappointed in family members regarding the way the deconversion was accepted. A majority (8/13) reported high levels of parent-child conflict. These parents were disappointed and often felt that they had failed. Many relationships were marred by distance that had not yet been repaired. Some participants were explicitly banned from communicating with siblings/nieces/nephews as a result of their unbelief. Other parents dismissed the deconversion as a "stage." Those who did not experience parent-child conflict either did not have close relationships to begin with, or the parent was non-religious. Sibling relationships were more varied. Some sibling pairs shared their unbelief and found allies in one another. Many others did not agree, but shared a conviction for unconditional love and acceptance of one another. A few sibling relationships were strained as seriously as parent-child relationships were. Among those who mentioned grandparents, those relationships often unconditionally loved and a great support to the young adult. But there were some extended families that seemed to stoke the conflict. There was no single pattern.

Emotional reactions of young adults who adopt atheism simultaneously contradictory feelings: loss and guilt, as well as relief. Family relationships are also contradictory. While parent-child relationships are highly conflictual, great solace is found in family relationships as well. Furthermore, disappointment seems to flow in both directions: parents are disappointed in their children, but children also notice their parents' flaws and inconsistencies. Similarities to the literature on coming out of LGBT youth are noted.

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Thermal Properties Extracted from Specific Heat of Nd-Doped PrOs4Sb12

Heavy fermion superconductor PrOs4Sb12 has attracted interest for displaying superconducting and ferromagnetic behavior simultaneously when doped with certain ratios of Neodymium. As this contradicts the prevailing scientific description of superconducting, which claims that ferromagnetic material like Neodymium should work to extinguish the occurrence of superconducting, let alone coexist at the same time, it is imperative to thoroughly characterized this doped system. Therefore, the molar specific heat of Pr1−xNdxOs4Sb12 is measured using finite heat pulse relaxation calorimetry. A curve-fit of the temperature-dependent molar specific heat allows an estimation of the Debye and Einstein temperatures, as well as the electronic specific heat coefficient. These properties allow a greater understanding to how the crystal lattice and conduction electrons change across Neodymium concentration x, and ultimately could held shed insight into the mechanisms governing the exotic, low temperature behavior. The results from the measurements will be discussed during the presentation.

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Anti-Semitism in American Sports

Antisemitism in American sports is still a problem today. Even before the first organized sport baseball started as unorganized leagues, antisemitism was a problem back then as it is today. Lipman Pike the first Jewish American baseball player that received anti-Semitic abuse. Hank Greenberg is probably the most recognized Jewish athlete to this day received anti-Semitic backlash for refusing to play on Yom Kippur. The NBA has been plagued with anti-Semitism. Tony Parker from the San Antonio Spurs made an insensitive gestures called the quenelle or reverse Nazi salute with the creator, French comedian Dieudonne M'bala. Recently the Cleveland Cavaliers fired their head coach David Blatt. Even though Cavaliers had a 30-11 record, he was fired for having been disconnected with the players. The NFL also has to deal with anti-Semitism. Daniel Snyder, the owner of the Washington Redskins, has come under scrutiny for not changing the name of his team because redskin is a derogatory term towards Native Americans has been called greedy and was even drawn as the devil in a Washington D.C. newspaper called City Paper. Hank Bauer, the announcer for the San Diego Chargers, said an anti-Semitic phrase towards his co-anchor Josh Lewin.

Looking at interviews and past articles and books written on the subject anti-Semitism was and still is a problem in American sports today. Sadly today the anti-Semitic remarks are still being used today in professional sports. Children watching their heroes using racial epitaphs will have greater consequences. This research will explore the history of anti-Semitism in American sports.

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A Comparison between the Efficacy of Automated Thinners and Hand Thinning of Lettuce

Severe labor shortages have impacted California's agriculture industry for the past several years. This problem is even more evident in vegetable crops, such as lettuce, which is a highly labor intensive commodity. Growers of the Salinas Valley, California's largest lettuce producing region, were recently introduced to automated lettuce thinners. These implements are designed to aid growers during these difficult times by thinning, or adequately spacing and weeding, a lettuce field. However, it is unknown how well these machines thin lettuce compared to a hand crew. Therefore, the objective of this study was to compare automated lettuce thinners with hand thin crews in the production of lettuce crop. Replicated field studies, consisting of treatment comparisons of automated thinning and hand thinning, were conducted during the 2014 and 2015 lettuce season in the Salinas Valley. During both seasons each treatment plot consisted of 5-10 randomly chosen sub-plots from which data were collected. Parameters measured were plant, weed and double (two closely spaced lettuce plants) counts, all done by taking data prior and after thinning, and plant spacing measurements performed after thinning. Time taken for the initial thinning process and the double/weed removal pass in each treatment plots were recorded. The average lettuce thinning time was 3 to 4 times quicker with the automated system than with the manual system. Although the automated system tended to leave more doubles than the manual system, the time required for removal of the doubles was similar between the two systems. Spacing of plants within rows was also similar between the two systems. In terms of weed removal, the automated system was as efficient as the manual system. Therefore, automated thinning holds great potential to aid lettuce growers in the Salinas Valley.

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Dynamic Radiography Acquisition Software System for Computed Tomography Applications

This work aims to deliver a hardware-specific image acquisition software environment for use in direct radiography and computed tomography applications. The goal of this project was to develop a dynamic control application that provides the necessary functionality relevant to industrial computed tomography applications, as well as full compatibility with many manufacturers of radiography and computed tomography system hardware currently available on the market. Several object oriented design patterns were adopted in order to develop a system capable of communicating not only with different manufacturers of hardware, but also communicating with various species of hardware (e.g. motor controllers, X-Ray detectors, X-Ray sources). The system also enabled a channel of communication between each of the various hardware systems. This was done by generalizing each of the hardware manufacturers' control libraries to a set of generic hardware control libraries. Because of this, new hardware control libraries can easily be imported into the system, with little to no adjustment in source code. The proposed software system will decrease the need for long term software maintenance, thereby lowering development costs. This system will in turn allow for the introduction of new innovative configurations of computed tomography scanning systems, which may open new possibilities for radiography research.

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Synthesis of Potential Metabolic Products of 1,5-bis(1-alkyl-1himidazol-2-yl) or (1-alkyl-1H-benzo[d]imidazol-2-yl)penta-1,4-diene-3-ones

Dietary curcumin has a high safety profile in humans and has been demonstrated to have anti-cancer potential in several cell culture systems and human xenograft mouse models, in particular against castration-resistant prostate cancer. Low bioavailability of curcumin together with moderate potency has hindered its clinical advancement. Our research group has been working to solve this problem since 2012 by chemical modifications. We have identified (1E, 4E)-1,5-bis(1-alkyl-1H-imidazol-2-yl)penta-1,4-diene-3-ones and (1E,4E)-1,5-bis(1-alkyl-1H-benzo[d] imidazol-2-yl)penta-1,4-dien-3-ones as impressive and promising curcumin mimics for the potential treatment of castration-resistant prostate cancer due to their superior in vitro potency in prostate cancer cell models. However, one (1E, 4E)-1,5-bis(1-alkyl-1H-imidazol-2-yl)penta-1,4-diene-3-one only exhibited slightly improved oral bioavailability showing 2-10 folds increase in plasma concentration than curcumin. This study aims to further optimize these lead compounds starting from synthesizing their potential metabolic products. After exploring several synthetic methods, we finally synthesized the potential metabolic products through a three-step procedure including trityl protection, Horner-Wadsworth Emmons reaction, and deprotection. Their structures have been confirmed by 1H NMR and 13C NMR. We will present the design, synthesis, structure determination, and the anti-proliferative effects against three prostate cancer cell lines.

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Payer Mix of Patients Transferred to a Level I Trauma Center: A Multidisciplinary Comparison

The level I trauma center was developed to more ideally care for the critically injured patient. The Emergency Medical Treatment and Active Labor Act (EMTALA) was developed to ensure that patients presenting to an emergency department would receive appropriate evaluation and management without regard to insurance status or ability to pay. Since its inception, there has been an increased proportion of transfers to these higher level facilities. Concerns for this system have been addressed in several studies spanning multiple specialty regarding disproportionate patient transferring based on insurance status. The purpose of this study is to identify any payer mix discrepancies that exist at a single busy level one trauma center.

This study retrospectively evaluated transfer requests received by Community Regional Medical Center (CRMC) in Fresno, California from January 1, 2014 to December 31, 2014. The patients accepted for transfer were broken down into groups based on accepting specialty service i.e., trauma, neurosurgery, orthopaedic surgery, and other surgical specialty. The primary outcome for the study was the identification of discrepancy of payer mixes (insured patients, underinsured/publically insured patients, workers compensation patients), between specialties at the receiving center. Secondary outcomes for the study were timing of transfers, need for surgical care of transferred patients, comparison of payer mix by transferring hospital.

Of the 2452 transfer requests received, 1798 were accepted. The percentage of insured patients was significantly higher for all specialties when compared to primary presenting patient population ($p<0.05$). There was no discrepancy when comparing payer mix by weekend versus weekday. Statistically more of the underinsured presented in the evening of early morning ($p<0.05$). There were statistically significant differences in the transfer payer mix from the primary presenter payer mix at several of the transferring hospitals ($p<0.05$).

The overall payer mix of transferred patients had significantly more insured individuals than CRMC's Level 1 Trauma Center. However, transferred patients had significantly more underinsured patients than their originating facility's emergency room.

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Analysis of Competition among Input Suppliers in the Cotton Sector of California

Have Input Prices Followed US Cotton Prices?

Cotton prices underwent lot of changes in the last ten years. Even though the price of cotton has been very good in some of those years, it may not lead to an improvement in the cotton farmer's profitability, especially if the prices of inputs have also increased to the same extent as that of cotton. The objective of this study is to evaluate the bargaining power of suppliers of inputs such as fertilizers, chemicals and seeds in the cotton sector and the associated impact on the profitability and competitiveness of the US cotton sector in the international markets. The input suppliers to cotton also can be a threat to the profitability of cotton sector as they can be a source of power over cotton sector if there are few substitutes to those inputs.

The methodology followed in this project includes the analysis of the trends in input prices for cotton cultivation in the US and examine if the profitability of cotton farmers has been eroded by rising input costs even in the face of increased cotton prices over the past twenty years. The study utilized multiple data sets for the empirical analysis: prices and price indices of cotton, fertilizers, chemicals and seeds. The study utilizes lagged correlation and regression analysis techniques to estimate the relationships between input prices and cotton prices. The preliminary results showed a strong relationship between cotton prices and prices of inputs like fertilizers and chemicals. Further analysis is being done to understand whether there is any time lag in the relationship and also establish causality. The preliminary results show that the increases in input prices does erode the advantage that the farmers enjoy due to higher cotton prices in most years.

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Consumer Willingness to Pay for the Fresno State Wine Brand: A Case Study of Wine

In order to secure additional funding for its educational mission, beyond that provided by the California State University system, Fresno State has relied on revenue from "student produced and marketed" goods. Despite the fact that it would provide insightful information to universities across the nation, consumer willingness to pay for university brands is an area that has received little attention. This study will analyze the impact of product attributes for wine (price, vintage, varietal, brand equity, etc.), as well as student involvement in the production, on derived utility and willingness to pay for Fresno State wines. In our findings, we hope to: 1) indicate which attributes affect wine purchases; 2) determine whether consumers are willing to pay a premium price to move from competing wines to Fresno State wine; and 3) determine the degree to which Fresno State Alumni contribute to the sale and success of university produced products.

We are currently in the process of collecting data. Over the next month we will conclude our collection and analyze our data by using a choice-based conjoint analysis. This analysis focuses on individual buyer behavior by mimicking the shopping experience and allows us to pose hypothetical and non-hypothetical questions. We will attempt to capture a variety of audiences by administering surveys both in front of stores that sell Fresno State wine and through an online Qualtrics survey. With the results of this study we hope to benefit Fresno State by aiding them in improving their marketing efforts and adding to the overall understanding of the local wine market. At the conclusion of this study, the results will be presented and discussed.

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Playing a Rigged Game: Effects of Inequality on Physiological Stress Responses

Income and wealth inequality have been increasing around the world and are currently at a 50-year high in the United States. Higher inequality corresponds with higher rates of mental illness, crime, and teenage pregnancy along with various other health problem. Some researchers implicate chronic stress induced by inequality as the primary mechanism for these health and social effects. It was the goal of the present experiment to investigate the stress effects of inequality. We hypothesized that experiencing inequality even in a short competitive computer game would produce behavioral and physiological stress responses especially in participants that competed with a disadvantage.

Participants (n = 96; men = women) were assigned to one of four groups and asked to play a memory game against a confederate opponent to earn "money" to spend in our lab market. The four groups depended on the difficulty of the problems (difficult or easy) and the fairness of the game (unfair and fair). In group Unfair/Hard, participants solved hard problems while they watched their opponent solve easy problems and so were disadvantaged. In group Unfair/Easy, participants solved easy problems while they watched their opponent solved hard problems and so were advantaged. In group Fair/Hard, both solved hard problems and tied and in group Fair/Easy, both solved easy problems and tied. We evaluated four measures associated with stress and arousal: Cortisol samples were taken before and after the game and facial corrugator muscle EMG, heart rate variability (HRV), and skin conductance levels (SCL) were measured during the game. The result found that Unfair/Hard showed the highest corrugator levels, which is linked to negative emotions. They also showed the lowest SCL, which has been associated with positive arousal. Cortisol levels ended the highest in both groups that experienced inequality compared to the fair conditions and this was supported by similar finding with HRV scores. These elevated stress responses of cortisol and HRV did not depend on whether participants had a disadvantage or an advantage. This could be due to the participant in Unfair/Hard feeling disadvantaged and those in Unfair/Easy feeling empathy for their opponent. The results of this experiment showed that experiencing inequality even for a short time in a simple game elicited several autonomic stress responses, even if one benefits from the inequality.

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Effect of Thermal Stress on Reproduction in P. Cinctipes

Climate change has imposed a number of environmental challenges that threaten the structure and function of coastal ecosystems. Organisms that reside in these sensitive ecosystems, like the porcelain crab, are faced with rising temperatures that approach their thermal maxima. In an attempt to escape thermal extremes, upper intertidal organisms may begin to encroach into areas inhabited by lower intertidal species. Subsequent increases in behavioral interactions may transduce a stress response to the lower intertidal species. Both environmental and behavioral related stressors have the potential to disrupt reproductive output of the porcelain crab, causing a decline in species abundance. Reproductive potential can be measured through the quantification of the protein vitellogenin (Vg), found in the hemolymph. An ELISA was developed with an effective range from 10-3000 µg/mL to measure Vg concentrations in hemolymph. Monthly quantification of Vg concentrations revealed that Vg levels ranged from 385 µg/mL (October 2014) to 10.4 µg/mL (July 2015). In addition, Petrolisthes cinctipes were collected and sampled for initial Vg concentrations in their hemolymph. Groups of P. cinctipes were then exposed to various thermal stress treatments, after which a final hemolymph sample was drawn to determine Vg concentrations after treatment. Final Vg concentrations were then compared to initial concentrations to observe significant differences. Thermal stress may cause reproductive decline in P. cinctipes, and thus it may begin to move lower in the intertidal zone as temperatures continue to increase, causing increased stressful interactions between P. cinctipes and P. manimaculus.

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Synthesis and Cell-Based Evaluation of 1,7-Diarylheptatrien-3-ones with Different Terminal Aromatic Rings

Thirty five 1,7-diarylhepta-1,4,6-trien-3-ones with different terminal aromatic rings have been designed as curcumin-based anti-prostate cancer agents. These target compounds have been successfully synthesized through a sequential of two Horner-Wadsworth-Emmons reactions starting from the appropriate aldehydes and tetraethyl (2-oxopropane-1,3-diyl)bis(phosphonate). Their chemical structures have been characterized by interpreting their NMR data. Their anti-proliferative activity in vitro toward both androgen-sensitive and androgen-insensitive human prostate cancer cell lines (PC-3, DU145, and LNCaP) has been evaluated by WST-1 cell proliferation assay. Our findings showed this group of curcumin-based analogs possesses promising antiproliferative activities toward the three prostate cancer cell lines. The IC50 values for the optimal analog against PC-3, DU-145 and LNCaP human prostate cancer cell lines are 0.31 μM, 0.39 μM, and 0.35 μM respectively. It is 82-, 67-, 39-fold more potent than curcumin. The design, synthesis, and capability of inhibiting prostate cancer cell proliferation will be presented.

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Investigation of BMAA on Metal- Aβ Toxicity

β-Methylamino-L-alanine (BMAA), an unnatural amino acid produced by cyanobacteria is hypothesized to contribute to neurotoxicity in neurodegenerative diseases such as, Alzheimer's disease (AD). BMAA was originally discovered in cycad seeds, located in Guam. The Chamorro people of Guam, use these seeds in many of their traditional foods1. Recent research has demonstrated that BMAA may be a potential factor contributing the neurodegenerative diseases. BMAA or the carbamylated BMAA species may act as a glutamate agonist to induce excitotoxicity resulting in neuronal cell death of specific types (e.g. glutamatergic, cholinergic, dopaminergic, etc.) of neurons.4 Few studies have noted that BMAA could form a complex with metals such as Zn and Cu in vitro. This fact is particularly interesting to us because Dr. Faller's research lab is interested in the interaction of Zn and Cu with Aβ, a key peptide in AD. Cu-Aβ in the presence of ascorbate can produce reactive oxygen species (ROS). These ROS can damage proteins, lipids etc. and could contribute to oxidative stress in AD. We are interested in the effects BMAA could have on Cu-Aβ and Zn-Aβ.2,3 Here we determined if ROS production produced by Cu or Cu-Aβ could be modulated by BMAA. We tested this hypothesis using UV-Vis spectroscopy. Using the absorption of ascorbate at 269 nm we calculated the consumption of ascorbate in the presence of Cu or Cu- Aβ as it produced ROS. To this mixture, increasing amounts of BMAA: 1 equivalent of BMAA to Cu, 2 equivalents of BMAA to Cu, 3 equivalents of BMAA to Cu, and 4 equivalents of BMAA to Cu was added. To further determine if BMAA could form a complex with metals such as Zn and Cu we performed two fluorescence studies: tyrosine quenching and Förster resonance energy transfer (FRET). For these studies titrated in BMAA and observed if any complexes formed, if so at what ratio.

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Childhood Obesity Prevention Ads: Then and Now

The objective of the study was to determine what messages childhood obesity prevention ads were sending to children over the last 10 years and their effectiveness.

The methodology used was textual analysis. Two media formats were reviewed: internet ad campaign materials and public service announcement videos aired during children's programming. Internet materials were chosen for their prevalence on Google as the most searched. Public service videos were chosen by a random capture of ads on children's networks during times when children are most likely to be watching. Material was then analyzed to identify trends and patterns.

The primary findings of the research indicate that earlier childhood prevention campaign ads were a spectrum of stigmatizing harmful messages to informational. Current ads have adopted simpler and more direct messages that avoid stigmatizing messages and deliver simple ways to help combat childhood obesity. Trends found in childhood obesity materials is that print and internet ads tend to target parents as their audience where as video public service announcements tend to target children directly.

Statistics from the Center for Disease Control indicate that childhood obesity rates in the United States are declining. This would indicate that the simpler clearer and less stigmatizing messages of later ads are working. Indications for future research should try to understand how children are internalizing these messages and if they are affecting their decision process on whether to incorporate the advice given in the ads.

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Hyperloop Schedule Design: Fleet Size and Traveler DelayTradeoffs for 2 Case Studies

To alleviate congestion, air pollution, energy needs and other transportation challenges, cities are heavily investing in public transportation. Often described as the "fifth mode of transportation", the Hyperloop is a new transportation technology that provides passengers with faster, more economic means of travel. Design of a new transportation system, such as the Hyperloop, requires the consideration of many factors including both physical and operational. The objectives of this research involve investigating the impacts of vehicle size on optimal operation of the system. While optimal operation typically implies minimizing costs, vehicle size influences two conflicting cost components: fleet size and traveler costs. Larger vehicles result in larger headways that require smaller fleet size (lower fleet cost), yet result in longer wait and travel times (higher traveler costs). This research examines the impacts of three different combinations of vehicle sizes (small, large and mixed) on fleet size and traveler delay.

Two case studies are presented in this work: 1) intercity system connecting San Francisco and Los Angeles, and 2) urban system serving Quay Valley, California's future city. In addition, two scenarios were investigated for each case study: high and low ridership. Each of the case study-scenario combinations involved estimation of ridership, adoption of Time-Space Diagrams to calculate headways, and development of Queueing Diagrams to compute traveler delays.

Results of this work revealed that in the urban case, while vehicle size affected traveler delay, it had a minor impact on fleet size. On the other hand, in the intercity case, vehicle size affected both traveler delay and fleet size. Therefore, small and mixed-size vehicles were found to be more suitable for the urban and intercity cases, respectively. This can be attributed to the lower demand and shorter cycle times of the urban versus intercity case studies.

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Mycobacterium Smegmatis Transposon Mutants and Disrupted Genes

Transposons, or transposable elements, are highly mobile DNA sequences that can shift position within the genome and change their relative location. As a consequence transposons can be utilized to investigate functional genomics of microbes. Twelve mutants were obtained from a transposon mutant library of Mycobacterium smegmatis. M. smegmatis was chosen as the model organism for Mycobacterium tuberculosis due to its rapid growth rate and nonpathogenic nature. Genomic DNA was extracted from twelve mutants. Restriction enzymes: SalI, PstI, NarI, and MluI were used to digest the DNA. The digested DNA was subjected to self-ligation with T4 ligase. The ligated mixture was PCR amplified with Kan2R/Kan2F inverse primers. Four gel bands were obtained, so far, from Sal1 NG 11, 21, 23, and 25. After gel extraction, sequencing and in silico analysis were performed to identify the disrupted genes. NG 11 mutant is disrupted in glgX (MSMEG_3186), which may be a glycogen debranching enzyme involved in trehalose biosynthesis in M. tuberculosis. NG 21 mutant is disrupted in trpG (MSMEG_0029) and involved in tryptophan biosynthesis. NG 23 mutant is disrupted in (MSMEG_3641), a conserved hypothetical protein. NG 25 is disrupted in (MSMEG_4253) whose M. tuberculosis ortholog may be involved in lipoarabinomannan biosynthesis. Future experimentation is needed to confirm and validate function.

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The Effects of Water Availability and Landscaping Practices on Bird Communities in the Central Valley of California

Urban environments consist of a variety of landscapes which affect the amount of bird diversity present within a city. Often, ecological principles are not factored into urban residents' choice of landscape design, resulting in a mosaic of different habitat types within one city. This is true for the cities of Fresno and Clovis in California's Central Valley, where residential habitats are highly variable spatially and temporally. The ongoing drought, and water metering policies enforced since 2013, have forced residents to modify their landscaping practices. In the Urban Long-Term Research Area - Fresno And Clovis Ecosocial Study (ULTRA-FACES) we focus on the effects of changes in water use and landscaping on urban biodiversity. In 2010, using pre-metering data from 34 residential sites in the Fresno Bird Count (FBC), we showed that irrigation intensity, neighborhood poverty level, and grass height were key drivers of bird species richness. Here we focus on the post-metering years, and examine if 1) patterns of bird species richness have changed, and 2) the above factors continue to drive bird species richness five years later under significantly lower water use. We use FBC data from the same sites, along with measures of habitat cover and socioeconomics.

We used an information theoretic approach to compare multivariate models combining social-ecological variables hypothesized to drive bird species. We found strong support for a model combining mean tree height, percentage of bare dirt/mulch, understory shrub density, mean irrigation intensity, and property value as the best predictors of bird species richness ($R^2=0.45$, $F(27,7)= 3.7812$, $p=0.0073$). These results indicate that birds are responding to a different suite of variables after the implementation of water metering, with tree height and amount of bare dirt/mulch becoming more important than grass cover in determining species richness.

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Occupancy, Habitat Use, and Seasonal Fluctuations of Medium to Large Mammalian Predators and Omnivores in Sierra Nevada Foothill Oak Woodland

Mammalian predators are known to be sensitive to relatively low levels of habitat perturbations, and disturbances to these species are underway due anthropogenic development and climate change in the Sierra Nevada Foothills (SNF) of California. This was the first study to use motion-activated cameras to detect these target species in oak woodland habitat of the central SNF. From February 2014 to February 2015 seven mammalian predators were detected on the Sierra Foothill Conservancy's McKenzie Preserve at three different elevations: coyote (Canis latrans), gray fox (Urocyon cinereoargenteus), bobcat (Lynx Rufus), striped skunk (Mephitis mephitis), raccoon (Procyon lotor), American badger (Taxidea taxus), and black bear (Ursus americanus). Occupancy models indicated that the bobcat, coyote, gray fox, and raccoon were using the preserve with 100% probability, and were widely distributed throughout the preserve. Habitat use was patchy for the American badger, black bear, and striped skunk. Generalized linear models showed interactions between the gray fox, raccoon, bobcat and coyote to suggest coexistence on the preserve is being maintained through resource partitioning and not temporal or spatial separation. This newly established baseline of mammalian predators is informative for future monitoring, management, and development plans in the SNF.

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Distributed Charging through Tabletop Wireless Power Transfer System

Recently, strongly coupled magnetic resonant wireless power transfer (SCMR-WPT) has been a burgeoning research topic. The current state of the research is focused on increasing power transfer efficiency and device optimization. However, most work involves single transmitter to single receiver topologies. A more appropriate approach considers single transmitter to multiple receivers topologies. Such a topology uses distributed charging techniques to deliver power to multiple receiver units.

This research demonstrates a distributed systems approach to multi-device wireless power transfer. An end-to-end tabletop platform incorporating mathematical modeling, simulation, design analysis, prototyping, and design validation is built. The coil systems for the SCMR-WPT were modeled and their transfer capabilities optimized using a combination of stochastic and evolutionary algorithms. Simulation was conducted in MultiSim to determine appropriate design parameters for a high frequency oscillator and high efficiency power amplifier, and a regulated DC Buck-Boost converted to deliver required power to connected devices. The designed coils' inductance were compared to approximated inductance from the mathematical modeling and appropriate capacitances were chosen for the desired resonance frequency of 1MHz. A prototype coil platform was 3D printed to house the coil systems. Testing of the prototype shows that power can be transferred simultaneously to multiple receivers at high efficiency (~70% efficiency).

For distributed systems charging, a consensus algorithm approach may be useful to deliver power where needed. A variable capacitor can be used to adjust resonance frequencies of each receiver. Using consensus, devices that require more power due to critically low reserves can adjust their coils closer to the resonant frequencies while other devices adjust away from the resonant frequency. This allows the power transfer efficiency to be maximized for devices with lower reserves while lowering power delivered to devices with enough reserves. The applications of this research are tremendous. In addition to multi-device charging, the consensus approach can be applied to distributed robotics, where multi-agent systems with varying power reserves can modify the power flow of the SCMR-WPT network to maximize charging capabilities and device life.

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Determination of the Aβ1-42 Structure in the Presence of β-Methylamino-L-Alanine

Recent studies have shown that a possible cause for ALS/PDC is correlated to the environmental exposure or consumption of the cyanobacteria neurotoxin, β-Methylamino-L-alanine (BMAA). BMAA has been shown to misincorporate for serine (Dunlop, 2013). We hypothesize that misincorporation of BMAA in place of L-serine may cause misfolding of either the Amyloid Precursor Protein (APP) or potentially the Aβ1-42. There are two potential serine sites for potential BMAA misincorporation, at positions 8 and 26 in the amino acid sequence of Aβ1-42.

The E. coli were grown in lysogeny broth (LB) and minimum essential media (MEM) in order to determine the concentration of BMAA that would affect the growth of the bacteria. The LB culture and MEM culture grown in concentrations of 0, 5, 10, 50, 100, and 500μM BMAA which showed different effects on the growth of the E. coli.

In order to determine if BMAA is misincorporating for L-serine, an E. coli system using the pColdAβ expression vector has been used to express Aβ1-42 in the absence and presence of BMAA. The Aβ1-42 was grown in concentrations of 0μM BMAA in LB and 100μM BMAA in MEM, and purified by running the collected cell lysate through a Ni-His column. SDS-PAGE and Western Blot were performed on the samples to verify protein expression as well as to visually determine if there are differences in the migration patterns of the purified peptide in the presence or absence of BMAA. Circular dichroism (CD) and 2-D Correlation Spectroscopy (COSY) Nuclear Magnetic Resonance (NMR) was performed on the purified Aβ1-42 in order to determine if the presence of BMAA caused any changes to the helical structure of the protein.

R.A. Dunlop, P.A. Cox, S.A. Banack, J.K. Rodgers (2013), PLOS One 8(9) doi:10.1371/journal.pone.0075376.

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Correlating Morphology and Genetic Assessment for Embryo Selection in Art

Objectives: The purpose of our study was: A) To determine if there is a difference in the incidence of aneuploidy rates between blastocysts cultured in vitro during days 5 or 6 B) If there is a correlation between morphologic and genetic assessment among blastocysts cultured in vitro.
Design: Retrospective analysis performed at a University-affiliated Fertility Center.
Materials and Methods: We studied the most recent 100 blastocysts in our Program, which underwent preimplantation genetic screening (PGS) by laser-driven biopsies of the trophoblasts, on either days 5 or 6 of in vitro culture. This was performed by array-Comparative Genomic Hybridization (Fragouli, 2014). All these blastocysts subsequently were frozen by Vitrification (Mukaida, 2009). On biopsy day, all blastocysts were assessed morphologically under light microscopy and then "graded" based on the expansion of the blastocele, as well as the appearance of both, the inner cell mass and trophoblast.
Results: Three biopsies revealed no diagnosis, among the remaining 97 blastocysts: 1) There was no difference in the proportion of abnormal embryos by PGS, among blastocysts that were ready for biopsy on days 5 or 6 of in vitro culture (25/52 (48%) and 19/45 (42%) respectively, p= 0.639 by chi-square); 2) There was slight correlation between the morphologic score of the embryos and their genetic normality by PGS, but only among day 5 blastocysts (p=0.047, both by chi-square and Cramer's V test).
Conclusions: 1) Our results demonstrate that there is slight correlation between morphologic scoring and genetic make-up of blastocysts cultured in vitro for 5 days. This indicates that the "best" blastocyst selected for fresh embryo transfer on day 5 in ART cycles by morphology only, does not guarantee genetic normality.
2) Therefore the ART practice of elective fresh single embryo transfer (e-SET) in suitable candidates, will have a lower pregnancy rate compared to when two fresh embryos are transferred by morphology only, simply by decreasing the odds of selecting an euploid embryo for transfer; still the advantage of decreasing the rate of twin gestations by e-SET should not be underestimated.
3) Similar rates of aneuploidy in both day 5 and 6 blastocysts suggest that lower implantation rates observed with transfer of fresh day 6 blastocysts, could be related to a poorly receptive endometrium (as a result of delaying transfer) rather than a higher rate of aneuploidy, as initially hypothesized. On the contrary, transferring frozen – thawed days 5 or 6 blastocysts, should offer similar pregnancy rates.
4) Finally, the cost of PGS should be fully discussed prior to ART treatments, as this will allow couples to compare overall results, with or without PGS under different clinical circumstances, and help them make more informed and appropriate clinical decisions.

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Intergenerational and Cultural Perceptions of Buddhist Practices and Beliefs in Northern Thailand: A Dyadic, Multi-Sited Study

This study explores religious beliefs and perceptions of Buddhist monasticism among urban and rural Thai adolescents and parents. As Thailand is a country experiencing rapid cultural change, this study focuses on the effects of globalization on religious practices and perceptions in Thailand.

Semi-formal interviews with 80 participants, evenly divided by age group and cultural community, were conducted in both English and Thai dialects. Participants were asked detailed questions in three sections: daily life, morality, and globalization. These transcripts were then thematically analyzed to find patterns and nuances among the religious discourses discussed.

Across participant groups, a shared discourse emerged of Buddhist practices and beliefs while also revealing some divergences. A change in monks' moral misbehavior was acknowledged and yet perceived differently by all participant groups. Variances in perception were also examined when considering whether Buddhism is practiced in the form of physical rituals or a sincere divine self. There were also culturally and dyadically distinct framings of the relationship between religion and family, psychological well-being, and education. For example, urban parents stressed desires for their children to engage in traditional religious practices such as going to the temple; meanwhile, many urban adolescents expressed feeling religious pressure from parents and not themselves prioritizing religion. Rural adolescents, though, described internal gratification derived from their religious practices, and the importance of practicing with – or on behalf of – parents and ancestors.

This research suggests the critical importance of dyadic, multi-sited, and indigenous examinations when considering that globalization is not only changing people's lives, but their divinity and the way it is exercised among the rapidly changing cultures and generations of Thailand.

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Homo Cinematicus: Self-Perpetuating Alienated Ideological and Cognitive Restructures

I wanted to determine a theoretical connection between alienation in society and the prevalence of screen-based entertainment in same. Using Istvan Meszaros' explicative work on Karl Marx' theory of alienation, I then focused on two of the four types of alienation: that from self and from others. The methodology used was not inclusive of surveys or other inductive data, but deductive synthesis of the literature. Using the work of Habermas, Marcuse, Lecky, Mumford, Rousseau, Marx, Fromm, et al. I have reached the following conclusion: alienation, insofar as it is commonly produced and experienced, functions primarily as an ideology; it has always been held by artists and scientists to a degree, not since the advent of cinema has it been able to multiply so quickly and widely. Cinema does this through both form and content: the content aspect contains the depiction of human relationships with a skew towards alienated interpretation and portrayal (alienated individuals are more likely to be storytellers); the form aspect contains the alteration of how the brain discriminates between reality and cinematic reality, as the camera's point-of-view mimics eyesight and imposes itself as such on the brain's perception. Reality and cinematic reality are thus conflated, and real relationships are treated with distance, while relationships on screen are honored as being both real and realistic. This then creates a societal tendency toward introversion and artistry.

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Booty, Beauty, & Fame: Media Protrayals of Jennifer Lopez and Sofia Vergara

Through an analysis of the careers of Jennifer Lopez and Sofia Vergara between 2010 and 2015, this paper examines the ongoing misrepresentation of Latinas in films, primetime television shows, and the music industry. Latina celebrities like Jennifer Lopez and Sofia Vergara have risen to fame by characterizing Latina beauty as an unrealistic, hypersexualized, exotic otherness. Previous work has failed to address the impact of fame on these Latina entertainers in the 21st century. Through analysis of Latina racialization and Latina assimilation into American popular culture, I will demonstrate that celebrities like Jennifer Lopez and Sofia Vergara have skewed the societal perspective of Latinas. An examination of Lopez's musical career and Sofia Vergara's acting career reveals ongoing ideologies of Latina sexuality in American media. Current Latina celebrities are creating a two-dimensional portrayal of Latinas in the media that is limiting the opportunities, roles, and positions for other Latina entertainers.

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Synthesis of Organic Molecules for APOE Inhibition in Alzheimer's Disease

Alzheimer's Disease (AD) is a progressive neurodegenerative disease that leads to cognitive decline and dementia. It is the sixth leading cause of death in the United States and is abundant in individuals over the age of 65. This project revolves around the synthesis of small organic molecules that will assist in the degradation of amyloid-(A) plaques and neurofibrillary tangles in AD. In order to accomplish this goal, an array of molecules have been synthesized to act as an antagonist toward the Liver-X-Receptor (LXR) protein, which is involved in the initiation of transcription of apolipoprotein E-4 (APOE-4). APOE-4 is a lipid and cholesterol carrier protein and the biggest risk factor for familial AD. It has been associated with the propagation of A plaques and the prevention of these plaques' clearance in the brain. Furthermore, APOE-4 has been linked with an increase in the phosphorylation of tau proteins, which destabilizes the microtubules in neurons and leads to the formation of neurofibrillary tangles. It is the belief of our research group that the inhibition of LXR will reduce the propagation of APOE-4 and lead to the prevention of further progression of familial AD. After a biological assay, five lead molecules with a sulfonamide backbone were identified as inhibiting ApoE-4. These five lead molecules, along with some other molecules, are currently being screened for biological activity and in particular for APOE-4 inhibition in a mouse model.

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The Potential of Silibinin Derivatives in Prostate Cancer Managements

Silibinin, a flavonolignan extracted from a well-known traditional European medicine named as milk thistle, has been demonstrated to be a promising anti-prostate cancer lead compound. To potentiate its anti-proliferative effects in human prostate cancer cell lines, we systematically explored the chemical modifications on its phenolic hydroxyl groups and C2-C3 bond. So far, we have synthesized seven groups (over fifty silibinin derivatives) for the evaluation of their anti-proliferative activity toward prostate cancer cells. The WST-1 cell proliferation assay indicates that five out of seven groups including 7-O-alkylsilibinins, 3-O-alkyl-2,3-dehydrosilibinins, 7-O-alkyl-2,3-dehydrosilibinins, 20-O-alkyl-2,3-dehydrosilibinins, and 7-O-aminoalkyl-2,3-dehydrosilibinins can significantly and consistently increase the anti-proliferative potency against three human prostate cancer cells. However, 3,7-O-dialky-2,3-dehydrosilibinins and 5,20-O-dialkyl-2,3-dehydrosilibinins show similar or decreased potency. The cell proliferation inhibitory ability of 2,3-dehydrosilibinin and 7-O-alkyl-2,3-dehydrosilibins is associated with prostate cancer cell arrest at G0/G1 phase and cell apoptosis induction. Interestingly, the cell proliferation inhibitory ability of 3-O-alkyl-2,3-dehydrosilibins is linked with arresting prostate cancer cell at G0/G1 phase but not inducing cell apoptosis. The structure-activity relationships between seven groups of silibinin derivatives, as well as the action of mechanism, will be presented.

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Relationship Between Perceived Social Work Students' Statistics Anxiety and Instructor's Immediacy: Implications for Teaching

This cross-sectional study investigated social work students' perceived statistics anxiety and instructor's immediacy. The study hypothesized that students receiving immediacy would report lower ratings of statistics anxiety. Immediacy was measured using the Instructor Immediacy Scale and statistics anxiety was measured using the Statistics Anxiety Rating Scale (STARS). The STARS includes six sub-scales designed to assess anxiety in the areas of worth of statistics, interpretation anxiety, test and class anxiety, computation self-concept, fear of asking for help, and fear of statistics teachers. Sixty-four students enrolled in Social Work Research Methods at a large fully-accredited publicly-funded university in the United States participated in an online, voluntary and anonymous survey at the end of the 16-week semester. The respondents' mean age was 26 years (SD = 7.65). Respondents were mostly female (78%), single (59.4%), Mexican-American (63.2%), full-time students (98.4%), and employed (63.5%). Results indicated that students' perceived statistics anxiety and instructor's immediacy were associated. Research and teaching implications are discussed.

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Effects of Grape Juice Concentrate on the Microbial Load in Fresh Ground Beef

Providing a safe and wholesome meat product to consumers is very important to the meat industry. This study examined the antimicrobial effect of adding grape juice concentrate to fresh ground beef. By adding the grape concentrate it could not only help with the microbial load and shelf life, but also add value to the product. Grape concentrate is shown to have many other healthful benefits, such a phytochemical and antioxidant.

Rubired grape concentrate was added to ground beef at 0% (control), 1.5% and 3% by weight. The effect on the microbial load was evaluated. The samples were plated over a 16 day period. Statistical analysis of the results showed that both treatments with grape juice concentrate had significantly less microbial load than the control group for both aerobic bacteria and coliform plate counts. There was no significant difference between the 1.5% and 3% grape concentrates treatments. Generic Escherichia coli was not detected (<1 colony forming units per gram) on the coliform plates for any of the treatment groups.

The meat industry could use the data from this study for future product development. This study shows that 1.5% and 3% grape juice concentrate added to ground beef can help as an antimicrobial. Because grape concentrate has been shown to have many other benefits as a phytochemical and antioxidant, the addition of the concentrate could be beneficial for marketing of the product.

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Democratic vs. Authoritarian History Texts and Education for Peace or War

After World War I—a conflict blamed in large part on militaristic education—a popular notion proclaimed the existence of a relationship between history texts and the opinions students hold about war. This notion was never tested; nor was it considered in light of emerging research on authoritarianism. To fill the theoretical and methodological gaps, the present study brings together two hitherto distinct fields of research, provides needed empirical data, and casts critical insights on this enduring and relevant research question.

Twenty-one diverse undergraduates in Central California were exposed to historical texts presenting authoritarian or democratic narratives about the causes and effects of World War II to analyze their reactions. In follow-up interviews, participants were asked about reading salience, degree of awareness of economic globalization, personal feelings and policy solutions for a hypothetical international crisis, and whether war solves problems. Two distinct reactions were observed—what the literature refers to as an "authoritarian reaction" and what this study conceptualizes as a "democratic reaction." Readers of authoritarian narratives overwhelmingly reported heightened perceptions of threat and proposed aggressive policy solutions. By contrast, readers of democratic narratives emphasized the need to understand the perspectives of both sides of a conflict, the importance of dialogue to resolve conflict, the inappropriateness of war as an immediate response, and often downplayed the threat and/or declined to report perception of threat.

In effect, exposure to authoritarian or democratic narratives—more than previous political ideology or any other factor measured—emerged as the primary predictor of students' opinions. Thus, this research demonstrates support for the notion that had become popular following WWI. That is, the type of narrative contained in history texts utilized in classrooms and the extent or lack of context therein significantly influences individuals' orientation to conflict and their reactions regarding how conflict should be resolved.

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An Analysis of a Point Mass Problem

Famous constants in mathematics have a habit of showing up in unexpected locations. For instance, the irrational constant known as pi, a constant derived from circle geometry, finds itself in probability, infinite series, and other places seemingly unrelated to circles. Some well-known appearances of pi include Sterling's approximation, Euler's formula, and Buffon's needle problem. In this talk, we will analyze a physics point mass problem and apply a mathematical model showing a connection to pi. The physical model depicts two point masses on a ray starting from a wall and extending into infinity. Two masses, m and M where m<M are lined up with m being in between the wall and M. Mass m has initial velocity of zero and M is traveling towards the smaller mass m. The immediate result would become a scenario where the small mass m alternatively collides with the wall and then with the larger mass M. Some questions we will consider involve the positions of the masses, the collisions between the masses, and the velocities of the masses. Patterns we find in the behavior these point masses and the wall could lead to intriguing insights in the laws of physics.

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Investigation of the Topological Interpretation of Modal Logics

This talk is about interpretations of modal logics in topological spaces. It is well-known that S4 is sound and complete over all topological spaces. In this work we reserve the question and study the influence of modal axioms on topological properties. We show that given any set X and any interpretation of necessity (the box operator) in X that satisfies S4, the image of this interpretation is a topology on X. We also determine which modal axioms of S4 guarantee which topological properties of the image. In particular, we show that if any one axiom of S4 is dropped, then there exists an interpretation of necessity (the box operator) in some set X such that the image of this interpretation is not a topology.

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Establishing the Microbial Profile of Tables in a University Library

Students, how clean are the tables you are eating on? Every day the Fresno State Henry Madden Library is flooded with busy college students that multitask by studying and eating. This project determined whether or not the surfaces of the tables in the library are considered food contact safe according to the recommendations set by the FDA.

Random samplings of 5 tables on each floor of the library were swabbed for microbial analysis using standard methodology for the swabbing of food contact surfaces. Samples were plated on selective media and enumerated for mesophilic aerobic bacteria, generic coliforms, and Escherichia coli. These selective groups of bacteria will give some indication of the source of contamination. An aerobic bacteria count will indicate the total microbial load; however coliforms are an indication of fecal contamination. An Escherichia coli population will be a subset of the coliform family, some of which are pathogenic for humans.

The average mesophilic aerobic plate count (APC) for tables in the library ranged from 0.1 colony forming units (cfu) per square centimeter (3rd floor) to 3.6 cfu per square centimeter (1st floor). Results show coliform and Escherichia coli counts that were below detection (<1 cfu/per square centimeter) for all floors.

The acceptable microbial count of a food contact surface as recommended by the FDA is below 1.9 cfu per square centimeter. Tables in the basement, 2nd floor and 3rd floor meet this standard for food contact surfaces. However, the 1st floor would not meet the standards to be considered food contact safe. The encouraging news is that the source of bacteria is not enteric microorganisms (most foodborne pathogens are enteric or fecal organisms). However, the microbial count on the first floor of the library is 2-3 times higher than what is considered safe for a food contact surface.

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7-O-Aminoalkyl-2,3-Dehydrosilibinins: Synthesis and In Vitro Evaluation in Prostate Cancer Cell Models

The overarching goal of this biomedical project is to engineer more effective 2,3-dedydrosilibinin derivatives for potential clinical use to treat advanced castration-resistant prostate cancer (CRPC). Our previous research findings have established 7-O-alkyl-2,3-dehydrosilibinins as an optimal scaffold with improved anti-proliferative potency in prostate cancer cell models. As part of our ongoing silibinin project, the present study aims to introduce a basic nitrogen-containing group to 7-OH in 2,3-dehydrosilibinin via an appropriate linker in hope to enhance both potency and bioavailability. Over ten 7-O-aminoalkyl-2,3-dehydrosilibinins have been synthesized from silibinin via a six-step transformation in an approximate 5% overall yield. The synthetic sequence includes benzylation, aerobic oxidation, trimethylation, debenzylation, O-alkylation, and N-alkylation. These nitrogen-containing derivatives have been characterized by interpreting their NMR data. The WST-1 cell proliferation assay indicated that all of the synthesized 7-O-aminoalkyl-2,3-dehydrosilibinins are more potent than silibinin toward both androgen-sensitive (LNCaP) and androgen-insensitive prostate cancer cell lines (PC-3 and DU145). The flow cytometric analysis illustrates that the optimal derivative possesses capability of arresting PC-3 cell cycle in a G0/G1 phase and of inducing PC-3 cell apoptosis.

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1,9-Diarylnona-1,3,6,8-tetraen-5-ones: A New Class of Anti-Prostate Cancer Agents

In search of more effective chemotherapeutics for the treatment of advanced castration-resistant prostate cancer and inspired by curcumin, twenty five 1,9-diarylnona-1,3,6,8-tetraen-5-ones bearing two identical terminal heteroaromatic rings have been successfully synthesized through two Wittig reactions followed by Horner-Wadsworth-Emmons reactions. Their structures have been characterized by the 1H NMR and 13C NMR spectra, as well as high resolution mass spectroscopic data. WST-1 cell proliferation assay was employed to assess their anti-proliferative effects toward both androgen-sensitive and androgen-insensitive human prostate cancer cell lines. Eighteen out of twenty-five synthesized compounds possess significantly improved potency as compared with curcumin. The optimal compound is 12- to 22-fold more potent than curcumin in inhibiting prostate cancer cell proliferation. Our findings imply 1,9-diarylnona-1,3,6,8-tetraen-5-one as a new potent scaffold for the development of anti-prostate cancer agents. This poster will present the synthesis, anti-proliferative effects, and structure-activity relationships of this group of potential anti-prostate cancer agents.

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Location of Zeros of the Sequence of Polynomials Defined Recursively by P_{n}(z)=-P_{n-2}(z)-zP_{n-3}(z)

Finding the zeros of polynomials has been a difficult task throughout the history of Mathematics. Instead of finding the zeros explicitly, a preferable approach to this problem is describing the regions in the complex plane where these zeros lie.

In this presentation we study the complex zero distribution of the sequence of polynomials P_{n}(z) defined recursively by P_{n}(z)=-P_{n-2}(z)-zP_{n-3}(z) and A_{0}≡1, A_{1}≡0 , A_{2}≡-1.

Our methodology can be described as follows: We use the generating function ΣP_{n}(z)t^n=1/(P(t)+zt^3) with P(t)=1+t^2 to represent our recurrence relation. We use the elementary symmetric polynomials of P(t)+zt^3 in t to obtain a formula for z in terms of another variable we call θ which corresponds to the argument of the complex roots of P(t)+zt^3. By partial fractions we arrive to an equivalent expression for P_{n}(z)=0 but in terms of θ, namely f(θ)=0. By selecting a suitable interval for θ and invoking the basic Intermediate Value Theorem and the Fundamental Theorem of Algebra we can conclude that we have found the location of all the zeros of P_{n}(z).

Our result is that all the zeros of P_{n}(z) for all n are real. Furthermore the zeros are dense on the real line, meaning that this is the optimal interval; in other words, for any interval that we pick from the real line, we can find n such that P_{n}(z) has a zero in this interval.

In general, it is conjectured that if the zeros of P(t) are real and of the same sign, the zeros of P_{n}(z) are real. We have provided an example where the zeros of P(t) are complex, but the zeros of P_{n}(z) are still real.

37TH Annual Central California Research Symposium Poster Presentations

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Session 1
Poster Board No. 1

The Feared Complication: Naloxone-Induced Flash Pulmonary Edema

Naloxone (Narcan) is an effective agent when suspecting opioid overdose in various situations such as patients with altered mental status of unknown etiology. Although overall low incidence, naloxone has been known to cause pulmonary edema. This rare side effect is has been reported in those with even healthy backgrounds. A 39 year old male with unknown past medical history was brought in by ambulance for altered mental status. Pt was apparently found by EMS with GCS 3, with pinpoint pupils, and decreased RR of 6. Patient was given 2mg intranasal Naloxone by EMS with minimal improvement. Upon arrival in the ED, patient was given IV Naloxone 0.4mg and GCS improved to an eventual 15. About 30 minutes later, patient desaturated to Sp02 75% and was immediately placed on Bipap. After about 1.5 hours, patient was unwilling to stay on Bipap and placed on non-rebreather mask with an improved Sp02 of 97%. Patient remained GCS 15, yet refused to stay any longer in the ED and left AMA. Patient endorsed using IV heroin a few hours prior.

This case illustrates the unpredictable potential of flash pulmonary edema in any patient as its etiology could be either cardiogenic or non-cardiogenic. Further, studies have shown that both low or high dose rapidly infused naloxone can cause this feared complication.

Cognizance of this complication is vital when choosing to give a patient naloxone or not. Perhaps the most prudent assessment to make is whether the patient has a patent airway in case of possible rapid sequence intubation.

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Poster Board No. 2

Demographic, Clinical, and Cognitive Characteristics Among Civilly Committed Sexually Violent Predators

Sexually Violent Predators (SVPs) are previously convicted sex offenders who have been civilly committed to a state psychiatric facility because they have been diagnosed with a mental abnormality and pose a significant threat to society. Since 1990, twenty states, the District of Columbia and the federal government have adopted specialized civil commitment statutes for sex offenders. This study examined the following characteristics for 201 detained or civilly committed sexual offenders in a forensic state hospital: demographic characteristics, diagnosed mental disorders, cognitive functions, and risk for sexual and nonsexual violence. Cognitive functions were evaluated using results from the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) and Wechsler Abbreviated Scale of Intelligence (WASI). Sexual and nonsexual violence risk assessments were evaluated using results from the Static-99R and the HCR-20. Pedophilia and substance abuse were the most frequent diagnoses among sexual offenders. Other common diagnoses included Paraphilia Not Otherwise Specified (NOS), antisocial personality disorder, mood disorders, schizophrenia spectrum disorders and related psychotic disorders. When compared to mean scores for United States standardized norms, RBANS scores for sexual offenders were all significantly lower than average; Verbal, Performance, and Full Scale IQ scores on the WASI were slightly below average. Half of SVPs had Static-99R scores in the High Risk Category, with 14.6% in the Low Risk Category. However, only 3.2% of SVPs had HCR-20 scores in the High Risk Category, while 70.3% had HCR-20 scores in the Low Risk Category. Risk assessment scores on the Static-99R and HCR-20 were weakly correlated ($r = .267$, $p<0.01$). Overall, these results have implications for the effectiveness of cognitive-based treatment of SVPs and provide a foundation for future research on sexually violent predators in forensic psychiatric institutions.

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Session 1
Poster Board No. 3

Discovering the Microbiome and Resistome of Crows Across the Rural-Urban Gradient

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. Needless to say, antibiotic resistance is a cause for concern. Antibiotic resistance has been studied in abiotic systems such as rivers and fish farms as well as biotic reservoirs like gulls and rodents. This study focuses on the biotic reservoir Corvus branchyrhyncos, the American Crow. Crows are well adapted to living closely with humans in urban areas as well as rural ones. These corvids are well known scavengers which gives them ample opportunity to incorporate drug resistant bacteria into their microbiome. These bacteria can then be deposited into human living areas by dedicating birds, particularly during roosting times when their numbers can reach well into the hundreds. We hypothesize urban crow populations will display higher incidence of antibiotic resistance and pathogenic bacteria compared to the rural populations.

Fecal samples are collected from known roosts in urban and rural locations. Bacteria are isolated and grown on differential media with various antibiotics. Samples showing multi-drug resistances are sent for 16S sequencing to determine species identity. Whole microbiome analysis will be done using 16S sequencing of all bacteria (culturable and not) from feces.

We have used many drugs including vancomycin, meropenem, erythromycin, hygromycin at high concentrations to isolate antibiotic resistant bacteria. Based on 16s DNA sequencing these samples, we have identified the presence of genera associated with human disease, such as Enterococcus, Staphylococcus, and Pantoea.

Our preliminary data indicates the urban crow microbiome consists of pathogenic, antibiotic resistant bacteria, thus suggesting the potential for spread to humans. Collection of samples from additional locations will give us a more complete understanding of the American crow's microbiome.

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Poster Board No. 4

Kinetic and Product Yields of the Gas-Phase Reactions of Isoprene Hydroperoxides with Atmospheric Oxidants

Isoprene is a volatile organic compound (VOC) that is emitted into the atmosphere by plants and trees. It has the largest emission rate of any non-methane VOC and is very reactive, and therefore has a major impact on the chemical composition of the atmosphere. Isoprene Hydroperoxides (IHP) are formed in the atmosphere from the chemical degradation of isoprene. These compounds can then potentially react in the atmosphere with atmospheric oxidants (ozone, OH, NO3) to produce secondary products. This chemistry is potentially important as it may contribute to particle growth and to mediation of ozone concentrations. In this work, the kinetics and mechanisms of the reactions of two IHPs with ozone were investigated. IHPs were synthesized and purified, and were characterized by NMR and HPLC. The gas phase chemistry of these compounds was then studied in chamber experiments using PTRMS as the primary analytical tool. The rate coefficients for reaction with ozone were measured at room temperature and 1 atmosphere using the relative rate technique, and yields of major gas phase reaction products were measured. Implications of these results will be discussed.

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Session 1
Poster Board No. 5

Nematicidal Activity of Pryoligneous Acid from Softwood and Almond Shell on C. elegans

Plant parasitic nematodes are responsible for major crop losses worldwide. Finding an effective nematicite is a crucial endeavor since effective nematicides, such as methyl bromide, have been banned. In this study we tested the nematicidal activity of pyroligneous acid from softwood and almond shell on C. elegans. Pyroligneous acid, also known as wood vinegar, is made from distillation after pyrolysis from softwood and almond shell. The solutions were provided by Corigin, which didn't provide a chemical analysis.

Twelve different concentrations were made through the process of serial dilutions: from 10-1 to 10-12. Individual C. elegans nematodes from the strain PD4251, a GFP expressing strain, were placed in each well. The use of this strain allows for easily scoring dead nematode using fluorescence microscopy; if the nematode is alive a normal patter on GFP fluorescence will be visible and if the nematode is dead the fluorescence pattern will be diffused. After three days the nematodes were scored as dead or alive. The experiments were conducted in triplicates.

The pyroligneous solutions had a 100 percent death rate at 10-1 dilution. The following two dilutions also showed high death rates. The nematicidal effect decreased after the 10-4 dilution with a 50% death rate, in acid softwood solution, and a 54% death rate in almond shell 10-5 dilution. The death rate increased in concentrations 10-9, 10-8, to 71%, 70% in the pyroligneous acid softwood, and almond shell, respectively. The nematicidal activity in the acid softwood solution decreased to 30% death at 10-12.

The results indicated that the dilutions up to 10-3 are effective in killing C. elegans. Furthermore, dilutions of 10-9, 10-8 may prove effective when used in combination with other nematicides; although this has yet to be tested. Our results suggest the potential use of pyroligneous acid (softwood and almond shell) as effective to control plant parasitic nematodes.

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Laser Capture Microdissection and Mass Spectrometry: A Novel Method to Study the Proteome of Cell Projections

Tunneling nanotubes (TNTs) are actin rich intercellular membrane bridges that facilitate the intercellular transfer of endocytic vesicles, organelles (such as mitochondria), membrane components, and macromolecules, as well as viruses and virus-like particles. TNTs can form in several in vitro cell culture systems like macrophages, T-cells and neuronal cells as well as in tissue explants and in vivo systems. Despite being implicated in intercellular communication and disease, the proteins responsible for the formation and maintenance of TNTs are not well characterized.

Here, we used laser capture microdissection (LCM), to selectively dissect and enrich TNT-like structures in CAD cells. The proteins from these isolated TNTs were lysed, concentrated (~6 ug/ul proteins), and run on a Bis-Tris gel. The protein bands were stained using silver staining and the bands were excised for Orbitrap LC-MS/MS analysis to identify the key proteins within these structures.

From this sample, we obtained 132 protein hits (mostly single peptide matches owing to the low abundance of proteins in these structures). Protein localization and gene ontology (GO) term analysis, however, demonstrated a clear enrichment of the proteins expected to be found in such structures. Of those, 114 had a definite plasma membrane, cell projection, mitochondrial, or cytoskeletal localization. We also found known TNT/filopodia proteins, such as β-actin, WIPF2, ITFG3, and Myosin 1B in this sample. Moreover, while the expected distribution of plasma membrane proteins in a random whole cell sample is expected to be only 6%, our sample contained an enrichment of 62% (85 out of 132 proteins). Since mitochondria are a major cargo of TNTs, we also expected to see an enrichment of mitochondrial targeted proteins. Here too we found an almost 3 fold enrichment than what would normally be expected in a whole cell lysate. We also identified numerous interesting hits for TNT formation (e.g. protocadherin 19, cadherin19, and annexin 2) that we will test directly using traditional cell biology and biochemical approaches.

Overall, these results were remarkably accurate and suggest that it can be used to uncover the important proteins for TNT formation and function. Eventually, such a method may also be useful in the comparative analysis of different cell projections in order to help identify the divergent cargoes, methods of initiation, and function of these disparate structures.

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Single-Domain Antibody that Neutralize Listeria Invasion

Listeria monocytogenes (Listeria) is a human pathogen that causes serious food-borne disease, listeriosis. Its high mortality rate (20-30%) renders it one of the major food safety concerns in the United States. Listeria accomplishes cellular invasion by using its multi-domain surface protein, Internalin B (InlB). InlB contains leucine rich repeat (LRR) region where it binds to the surface receptor on epithelial cells to mediate cell entry.

Single-domain antibodies (VHH) are the antibody fragment derived from heavy-chain antibodies (VH) found in the sera of Camalidae species. We have found several VHH that bind the LRR region of InlB with high affinity. The objective of this research is to confirm the preliminary data that InlB specific VHH can neutralize Listeria invasion by fluorescent microscopy.

In order to perform fluorescent microscopy, GFP-Listeria was obtained by transforming a plasmid that encodes for GFP protein. GFP-Listeria is grown overnight and labeled with biotin. HeLa cells are passaged several times and stained with DAPI. The biotinylated GFP-Listeria is incubated with VHH and added to the HeLa cell culture. The biotinylated GFP-Listeria in HeLa cell culture are stained with DyLight 550. The Listeria invasion into HeLa cells is analyzed under the fluorescent microscope.

The experiment showed the significant decrease in Listeria invasion into HeLa cells when VHH is present. This further support our preliminary data of neutralization of Listeria by InlB specific VHH. We will continue our research on which VHH is most effective on blocking Listeria invasion.

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Distribution of Nanoparticles in Food and Effects on Behavioral Responses and Biology of Solenopsis Xyloni (Hymenoptera: Formicidae) Colonies

Solenopsis xyloni , commonly known as the Southern Fire Ant (SFA), is native to southern US and is an important urban and agricultural pest. SFA is an aggressive ant that causes crop damage, and possesses venom that causes human bite victims to suffer symptoms ranging from irritation to nausea. SFA builds colonies deep under the soil surface, and members of every colony, forage for hemipteran honeydew, sweet foods, seeds, seedlings, and other insects. This study was conducted to understand SFA feeding behavior and biology when exposed to presence of nanoparticles (NPs) in food sources. A first set of trials involved feeding SFA colonies with 10% honey-water (10HW) infused with nanoparticles. A second set of trials involved feeding SFA with mealworms [Tenebro molitor (Coleoptera: Tenebrionidae)] previously fed with 10HW+NPs and tested positive for NP's ingestion which were encapsulated inside the coelom. After tomographic observation no NPs were found inside SFA bodies from both trials

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Poster Board No. 9

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 as a way to deliver nicotine to a user. These have become popular with students at Clovis Community College. This project set out to create methods of analysis for ENDS liquids and vapor. The vapor drawn off the device and exhaled from the lungs of ENDS users were analyzed. Results were gathered to compare what is both in the room temperature liquid and after heating and vaporization, and what compounds are in the ENDS vapor and which are being retained in the lungs of a user. Methods of analysis include both Solid Phase Micro Extraction (SPME) and direct liquid injection and qualitative and quantitative analysis performed on an Agilent Gas Chromatograph Mass Spectrometer (GC-MS) 7890A-5975C, and liquid injection on an Agilent Liquid Chromatograph Mass Spectrometer (LC-MS) 1260-6120. Nicotine, propylene glycol, glycerin, menthol and carbon dioxide were identified in the samples with National Institute of Standards and Technology (NIST) mass spectral libraries and with direct comparison to neat samples. Samples of the vapor pulled out of the ENDS device and exhaled from the lungs of users were compared to quantify the percentage of the compounds that were retained and to identify which compounds were present. Compounds that have been identified as toxic were identified as being present in ENDS vapor and were shown to be retained in the bodies of users of ENDS products.

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Dispositional and Situational Correlates of Success in Residential Substance Abuse Treatment

Unsuccessful completion and drop-out rates among clients in residential substance abuse treatment are astoundingly high. It is therefore imperative to identify client vulnerabilities for those entering treatment, and to focus on the development and enhancement of skills that address these vulnerabilities. Prior research has identified the capacity to withstand psychological stress, how people perceive and experience relationships and emotions, and the reasons why people engage in rehabilitative efforts as components of addictive vulnerability, treatment outcomes, and relapse. The present research examined these constructs in an attempt predict client vulnerability upon entering treatment.

Participants were adults (N = 100) entering residential substance abuse treatment under 1 of 4 programs. The Therapeutic Community program encompasses the general population of adults seeking long-term residential alcohol and drug abuse treatment; the Residential Multi-Service program provides services to parolees who are at risk of homelessness; the Child Protective Services program provides services to parents who are currently amidst legal custody, reunification, or parental rights retention cases; the Behavioral Health program serves pregnant and parenting women (and their children). Within 1 week of entering treatment, clients completed well-validated measures of self-regulation, distress tolerance, attachment-related anxiety and avoidance, emotion and regulation beliefs, and perceived social support.

Results were that attachment-related anxiety predicted greater drug use in the 30 days prior to entering treatment, whereas distress tolerance and the belief that emotion regulation is worthwhile predicted alcohol use in the 30 days prior to treatment. The association between attachment-related anxiety and pre-treatment drug use was most pronounced among Residential Multi-Service and Behavioral Health clients. Pre-treatment alcohol use associations were strongest with emotion regulation worth for Therapeutic Community clients and distress tolerance for Behavioral Health clients. No significant relationships were found among clients in treatment under the Child Protective Services Program.

These findings suggest noteworthy individual differences between clients entering treatment under distinct programs, and indicate the importance of utilizing multiple methods in order to assess psychological vulnerabilities in parallel with substance abuse trends among individuals entering into drug rehabilitative treatment. The roles of deficits in distress tolerance, attachment security, and beliefs about emotion suggest that treatment planning may benefit from directed, applied efforts to address these vulnerabilities.

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Testing the Efficacy of Bio-Insecticides to Control Lygus Bugs (Hemiptera: Miridae) in Alfalfa Seed Production

Seed production of Alfalfa can be affected by damage from piercing sucking insects being Lygus bugs the pest of major concern for alfalfa seed growers. Considerable effort has been made to find insecticides that effectively control Lygus populations. The aim of our research was to test two biological pesticides (MBI-203, MBI-206) unregistered in seed alfalfa against two registered synthetic pesticides (Sivanto 200SL, and Beleaf 50 SG) for control of Lygus on Alfalfa seed production. A field trial was conducted on the College Farm at California State University, Fresno. The two biological pesticides (MBI-206, at .5 and 1 gal/Ac, MBI-203 at 2 lb/Ac) and the two commonly used synthetic pesticides (Beleaf 50 SG at 2.8 oz/Ac; Sivanto 200SL at 2 lb/Ac) were tested in a randomized block design with four replications. Sampling of Lygus populations were done for each block (and replications) prior to application then 5 and 10 days post application, and one day prior to the second application, plus 3 and 12 days post application. Analysis comparing populations of other piercing insects, predators and parasitoids were also done. Our preliminary assessments indicate that the experimental pesticides (MBI-206 at both rates) and Sivanto 200SL had the best effects in diminishing Lygus populations. Effects on other pests and on natural enemies will be presented. This project was supported by the California Seed Alfalfa Research Board.

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Impacts of Atmospheric Oxidation on the Cellular Toxicity of Cigarette Smoke

Numerous 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).1 When these particles linger, even in the absence of active smoking, humans may be exposed to these persistent ETS compounds—this has been termed third hand smoke.2 Third hand 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 third hand smoke is an emerging environmental health risk and may be more toxic than SHS. Our aim is to quantify the effect of third hand smoke residue exposure on various cell lines. More specifically, the goal is to evaluate potential cytotoxic effects of smoke residue when exposed to ozone.

Third hand 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 third hand 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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Poster Board No. 13

Patient Satisfaction and Factors Related to Patient-Doctor Relationships

Many factors influence the overall patient-doctor relationship, such as doctors' attire, time spent with the doctor, and communication. Electronic health record (EHR) makes past medical history readily available; however, use of EHR in the exam room could affect rapport and patients' overall satisfaction with their visit. We investigated the effect of these factors on patient satisfaction.

A patient satisfaction survey was distributed at Clinica Sierra Vista Elm and Deran Koligian Ambulatory Care Center Family Health Clinic in Fresno, and at Adventist Health Community Care in Selma for all UCSF Family and Community Medicine residents. The survey assessed preference for attire, time spent on the computer and in the exam room, and communication. Descriptive statistics and hierarchical multiple regression were used to determine independent factors that predict the overall patient-doctor relationship.

487 patients over the age of 18 completed the survey. Most were Hispanic ethnicity. Patient's preference for physician attire was 68% for dress clothes with white coat, 18% for dress clothes alone, 11% for scrubs with white coat, and 3% for scrubs only. In general, 38-44% patients thought the computer time, exam room time, and doctor communication were "very good" or "excellent." Overall, patient race, gender, age, and attire preference were not significant predictors of variance in patient-doctor relationship. Communication, exam room, and computer time were significant predictors of relationship ($p < 0.001$).

Patients were generally satisfied with the relationship with their doctor. Our results indicate a quality visit with the doctor and attention to computer use are important to positively impact the overall patient-doctor relationship.

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Dynamically Scaled Model of the Bladderwort

Body size has important consequences for motion in fluids, including feeding. Many aquatic organisms capture prey by suction, and the mechanics of suction feeding are well understood in large animals (> 10 cm). Yet the smallest suction feeders (≤ 3 mm) present a fluid-dynamic puzzle: current mathematical models predict that suction on this scale is ineffective. The Utricularia genus, commonly known as bladderworts, is a group of aquatic carnivorous plants that capture small organisms in small bladder-like traps, as small as 2.0 mm. Bladderworts generate very fast (up to 1.5 m/s) yet brief (2-3 ms) suction flow. The brevity of the event and the high flow speeds make studying these events difficult. To overcome these problems, we are building a dynamically scaled model that mimics the suction event. The robotic model will allow us to explore capture success and mechanics both inside and outside of the performance envelope of biological suction feeders. Within this project, we are developing the scaling rules for the model and are designing the robot. First, we determined the combination of size, flow speed, and fluid viscosity we want to use to build a dynamically scaled model of a bladder that allows us to explore suction flows on a larger, slower model bladder, helping us to visualize the flow and measure the forces generated during suction events. We then calculated the specifications required of the linear motor plus piston by this dynamically scaled model. We found that in order to build a dynamically scaled, robotic model of a bladderwort trap that 200 times larger, we need to operate at speeds that are 3 times lower and in a fluid that is 70 times more viscous than water, leading a suction event that last 200 times longer. This dynamically scaled model requires a motor that can generate 50 N of force and a controller that can achieve the sudden onset of flow observed in real bladderwort.

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Mediated Realities: Identifying Themes in Digital Parenting News Magazine Content

In this pilot study, we drew upon sociocultural theory to investigate new media journalism targeted at parents as a form of cultural language with the potential to inform understandings about youth. Researchers identified patterns in unsolicited parenting "news" articles disseminated by a mainstream digital magazine to identify themes within and across these texts.

Researchers performed thematic content analysis of unsolicited, or "pushed," parenting articles sent through email from the news magazine Yahoo Parenting between December 1, 2015 and January 31, 2016 (n=98). Each article was separately read by two researchers to identify those involving children or teens. Researchers compared findings and addressed discrepancies, creating a master list of articles used as data. Researchers used emergent, inductive, incident-by-incident coding to independently summarize articles and name provisional codes. Researchers employed constant comparison methods to synthesize codes, considering in vivo meanings within content. Coding differences were discussed and reconciled. Axial coding was used to further sort, collapse, and expand codes into final thematic categories with established reliability.

72% of parenting articles (70) in this study were found to contain content on children or teens. Analysis of these articles found three dominant themes: 1) Articles related to "children" involved a tone of fear, with specific focus upon acts parents were or were not doing to ensure children's safety. 2) Articles related to "teens" involved a tone of danger, with specific focus upon teens' own risky acts. 3) Articles involving celebrities as parents were overwhelmingly positive, depicting athletes, television stars, and the Royal Family as model parents. Additionally, analysis found none of these articles using research or empirical data to support claims.

Media and society are mutually constitutive. Media shapes and is shaped by cultural understandings. Further research is needed to consider the presence and implication of patterns in new media regarding parenting and youth.

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Implementation of Practices and Technology to Reduce Air Emissions

The objective is to develop best management practices for orchard farming operations to reduce unnecessary air pollution emissions. Making choices that can aid to the reduction of particulate airborne emissions helps the overall crop health and integrated pest management plans. Additionally, changes in practices by farmers can help the state comply with federal air pollution requirements, although it is not mandated by law, the voluntary reduction of particulate matter can enhance the image of farming.

Determining the sources of emissions that come from an orchard farming operation to identify, which may be reduced. The variable inputs and outputs of land management, crop management and mechanized implementation became the primary focus. Research involved in-field observation of equipment working in the orchards to study the visual effects of dust particle movement. Ranches were selected for various soil types with similar equipment used at each site during different times of the growing season. Ranches were located in Fresno, Kings, Tulare, Madera and Merced counties to further study variability in cultural practices.

Resulting information lead to two basic areas of operation; Orchard development and Harvesting. The practical changes to developing the floors and berms through simple implements helps to maintain the necessary characteristics needed for when trees reach maturity and harvest starts. The harvesting operation proves to be an area of needed future mechanized product development.

By bringing awareness to growers of areas in their operation which they may utilize practices to improve air quality is one way to improve. Design changes on harvesting equipment is also necessary to focus on methods, which continue the expected quality and speed of harvest. Also focusing on the mechanical disruption of soil particles, which are the main source of pollution, will help to develop better mechanical methods.

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The Effects of Early Exposure of Caffeine in the Diet of Drosophila Expressing Tau Pathology

Alzheimer's disease is the most frequently encountered form of dementia. Research indicates that the administration of caffeine to mice, rats, or rabbits expressing Alzheimer's symptoms reduces deficits in learning and memory and neuronal damage. There is also evidence that indicates that there is a negative correlation of the expression of Alzheimer's disease in aging patients with increasing caffeine consumption from beverages such as coffee. Such work has not been studied extensively in the simpler model organism Drosophila melanogaster. Studies in Drosophila could be a useful model to study the basic mechanisms of how caffeine could have an effect on Alzheimer's pathology. The genetic tools available in Drosophila permits for controlled expression of proteins associated with Alzheimer's disease. This can be done in large numbers of flies that can be tested simultaneously, providing a high throughput model system. In this study, the effects of caffeine on learning and memory in Drosophila expressing Tau pathology (a pathology common in Alzheimer's disease) in the mushroom bodies and the ellipsoid body was evaluated. The mushroom bodies and the ellipsoid body are thought to be the regions of the Drosophila brain responsible for learning and memory. The longevity of Drosophila expressing Tau pathology when exposed to caffeine as opposed to no caffeine was compared to test the overall health of the flies. Preliminary data indicates that caffeine exposure actually decreases the longevity of Tau expressing lines. Preliminary heat maze spatial memory experiments indicate that early exposure to 1mM caffeine in the diets of Drosophila expressing Tau in the ellipsoid body could aid in learning and short-term memory and in the short-term memory of Drosophila expressing Tau in the mushroom bodies.

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Gathering Qualitative Data from Hispanic Families Concerning Eating, Exercising Habits and Frequency of Shared Family Mealtimes

Hispanic families are at an increased risk for obesity and diabetes. There are many factors that contribute to this increased risk, including barriers to physical activity and healthy eating. One factor in designing an effective obesity prevention program is to assess the issue from the point of view of the families that one is working with. In this study, we conducted focus groups with Latino families in our community to assess the barriers and challenges to healthy living.

Three focus groups, with a total of ten mothers, took place at Fresno State. Eligibility criteria included Mexican or Puerto Rican heritage, having a child between the ages of 5-18, and Spanish as their first language. Mothers were given a $10 Walmart gift card for their participation. Questions were delivered verbally and answers were recorded.

One theme that emerged was that mothers talked about how "healthy" was sometimes seen as "dieting" and that they encountered resistance from their husbands and children when viewed in this way. Another theme across the groups was that mothers reported that family mealtimes during the week were difficult to organize, especially compared to the weekends. Eating traditional Hispanic foods during family mealtimes such as beans and tortillas was common. Mothers reported being open to making healthy changes regarding meals and lifestyle.

Researchers designing programs tailored for Latino families in our community should consider including the entire family, especially fathers. The focus groups demonstrated cultural commonalities in the family hierarchy, showing that the opinions of the husbands carried the most weight in mealtime. Including healthy traditional Hispanic foods in their program could potentially be an effective option that would not only respect culture but would minimize change while maximizing health benefits.

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The Hidden Bell-Weather: An Examination of Political Ideology in the Filipino-American Community

In the few studies that examine Asian American political participation, the primary ethnic groups examined are Chinese Americans and Japanese Americans. Filipinos are mentioned, although only briefly and there are no major studies on Filipino Americans and political participation.

The small amount of research that does exist finds that Filipino Americans are more likely to indicate a conservative political leaning than the most of their Asian American counterparts. I hypothesize that this is because there is a connection between Filipino Americans political attitudes and partisanship and their historical ties with U.S military service as a path to citizenship. Through my research project, I hope to learn how the Filipino Americans history with military service influence how they choose and reason their preference of political ideology.

My methodology will include two fundamental approaches: a survey and in-depth interviews with relevant sources (Filipino Americans who served in the U.S military or their families). I plan to arrange interview(s) in which a series of survey questions can be extrapolated from to add context and formulate theories about the results found in the survey. These interviews will take a considerable amount of time. This method should help cross-reference information gathered in order to provide a more detailed picture for the research.

This research is underway currently, although I believe the qualitative information I have obtained will be of interest, especially when mapping out a community that is neglected in terms of political research.

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Development of a Prosthetic Knee with Magnetorheological Fluid

Many current prosthetics rely on technology that is inefficient and require large amounts of power to operate. Prosthesis utilizing smart materials require less power to operate effectively, including those that utilize the smart material Magnetorheological (MR) fluid. During the current state of research, two prosthetic knees, Version 1 and Version 2, for trans-femoral amputees were designed, built, and tested. The design of both of the prosthetic knees was modeled after a drum brake and features a novel non-circular rotor. Inside the drum brake, three fourths of the rotor has the same radius and the remaining quarter has a varying radius to provide a variable gap size between the rotor and stator. Also, the torque generated by the MRF knee is highly dependent on the gap size, angle, and the applied current. When the MR knee is subjected to magnetic field, the MR fluid provides a frictional shear force between the two components due to which the braking torque is generated. Since the gap size is variable, the friction shear force is also variable and translates into variable braking torque. The first design, Version 1, was used as a proof of concept and was too large and bulky for commercial viability. However, the experimental and theoretical results of the first design proved that the knee provided significant improvement over conventional MR fluid knees. The second design, Version 2, is closer to what a patient might be able to acquire. The second generation design incorporates space for electronics, reduces weight significantly, and increases efficiency. The experimental and theoretical results again demonstrate improvement over conventional MR fluid knees at a lower cost of production.

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Age Classification Using Feature Selection

In the research of recognition, most facial variations such as identity, expression, emotions and gender has been extensively studied. However, automatic age estimation has been rarely explored. With age progression of a human, the features of the face changes.

So we need to address the issue of facial aging and come up with a mechanism that identifies a person's age. In my project, effective age group estimation using face features like texture and shape from human face image are proposed. This project will provide a new hybrid approach of classification by using fuzzy logic and neural network algorithm for the age classification.

Methodology

1. I have used Viola Jones face detection algorithm.

2. In feature extraction, I am using two important features of the face which is responsible in the case of age identification.

2.1 Geometrical features (e.g. face angle, left eye to right eye distance, eyeball, eye to nose distance, eye to chin distance and eye to lip distance are calculated by using the feature selection algorithm)

2.2 Wrinkle features

Based on the texture and shape information, age classification is done using the proposed hybrid algorithm of Fuzzy logic and neural network.

3. Haar feature extraction using viola Jones face co-ordinates.

4. Hybrid approach of fuzzy logic and neural network used for classification.

Language Used: Matlab 2015a

Conclusion

1. Perform feature selection and classification using the proposed algorithms to get the optimal result in the field of pattern recognition.

2. Will be able to provide the age estimation (Senior, Adult and Child)

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A Study to Identify Disrupted Genes in Mycobacterium Smegmatis Transposon Mutants

Mycobacterium tuberculosis (Mtb), the etiological agent of tuberculosis (TB) in humans, still claims around 1.5 million lives yearly. In fact, TB is among the three most deadly diseases due to a single infectious agent. It effectively attacks the lungs and causes it to deteriorate. In this study, transposon mutagenesis was utilized in order to generate insertional mutants in Mycobacterium smegmatis, which is a non-pathogenic model organism used for the study of Mtb. Experiments were conducted to identify the disrupted genes in the transposon mutants and characterize their potential function in the virulence of Mtb. Transposon mutants were created using the Ez:Tn transposome kit. The site of insertion of the transposon was identified by first purifying the genomic DNA and digesting it with restriction enzymes such as: Pst I, Sal I, and Nar I, self-ligating the digested fragments, and PCR amplifying the ligations with primers complementary to the transposon. Lastly, sequencing of the amplified fragments was performed in order to identify the site of transposon insertion. Our results show that in three transposon mutants (NG 1, NG 2, and NG 5), the genes were disrupted in MSMEG_0980, MSMEG_0315, MSMEG_4682, which are integral to membrane formation, play a key role in transmembrane transport and in cation transport. MSMEG_0315 also has a homolog present in Mycobacterium tuberculosis, Rv0226c, which is involved in the formation of probable conserved transmembrane proteins. A fourth transposon mutant (NG 4) was also sequenced and was found to be disrupted in MSMEG_4224, a hypothetical protein. Further experiments are needed in order to confirm and validate the function of the mutants and their potential roles as Mtb homologs.

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Session 1
Poster Board No. 23

Differential Urban Biotic Filtering in Three Desert Cities in the USA

Urbanization is a major driver of biodiversity loss, often favoring only a few native species and excluding others. Several studies have identified biological traits that enable species' persistence in urban environments, but mechanisms of this biotic filtering remain unclear. We take a comparative approach to this question, examining species pools and urban bird communities of Fresno, California, Tucson, Arizona, and Phoenix, Arizona. We ask if biotic filtering occurs similarly in these three cities.

Using data from point count projects, we have species checklists and site-specific bird counts. Preliminary analyses have focused on species lists, using Jaccard's index to assess similarity, and Chi-square tests for shifts in distributions of nominal traits, such as dietary guild and migratory status.

Jaccard's indices show that species pools of these cities are more similar than their urban bird communities. Indices comparing urban communities (Fresno-Phoenix: 0.376, Fresno-Tucson: 0.293, Tucson-Phoenix: 0.581) are lower than indices comparing species pools (F-P: 0.595, F-T: 0.532, T-P: 0.733) in every pairwise comparison. Fresno harbors the fewest native species, and exhibits the strongest trait-based filtering. The urban bird community differs in dietary traits from the species pool in Fresno (Chi-square $p=0.002$, $df=8$), but not in Phoenix ($p=0.65$, $df=8$), nor Tucson ($p=0.98$, $df=8$). A similar pattern emerges in migratory status.

Similarity between cities and their respective species pools follows a water use gradient; cities with lower water use levels harbor larger urban 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, than in Phoenix or Tucson. Results confirm recent findings that cities may not homogenize communities as suspected, and point to the potential for even large, dense cities to retain native species through careful water use and design of urban habitats.

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Poster Board No. 1

Synthesis and Anti-Proliferative Effects of 3-O-Alkylquercetins and Benzophenone Quercetin-3',4'-O-Ketals

Quercetin (3,3',4',5,7-pentahydroxyflavone) is a naturally occurring flavonol ubiquitously distributed in edible vegetables and fruits. Quercetin has been demonstrated to inhibit cell growth and induce cell death in five prostate cancer cell lines as well as mouse model without apparent effects on the normal epithelial cells. As part of our ongoing project in search of quercetin derivatives with enhanced potency and bioavailability, four 3-O-alkylquercetins and four corresponding benzophenone quercetin-3',4'-O-ketals have been semi-synthesized from quercetin for the evaluation of its anti-proliferative effects in three human prostate cancer cell models. Their chemical structures have been characterized by extensively analyzing their NMR spectra. The alkyl group was assigned to 3-OH on the basis of the critical HMBC correlations. The WST-1 cell proliferation assay data suggest i) all but one show greater potency than quercetin in inhibiting the cell proliferation in both androgen-sensitive and androgen-insensitive prostate cancer cells; and ii) ketals are 2- to 3-fold more potent than the corresponding 3-O-alkylquercetins, and 3- to 5-time greater than quercetin in alleviating prostate cancer cell proliferation.

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Poster Board No. 2

20-O-Alkyl-2,3-Dehydrosilibinins: Synthesis and Anti-Proliferative Effects Toward Prostate Cancer Cells

The dietary silibinin that was extracted from milk thistle has been demonstrated to have potential in treating prostate cancer by the in vitro cell-based and in vivo animal studies. As part of our ongoing project to engineer silibinin derivatives with enhanced potency and bioavailability, this study aims to investigate the effects of alkylation of 20-OH or of both 5-OH and 20-OH on prostate cancer cell proliferation. Eight 20-O-alkyl-2,3-dehydrosilibinins and eight 5,20-O-dialkyl-2,3-dehydrosilibinins have been successfully synthesized from commercially available silibinin through a four-step sequence, including benzylation, aerobic oxidation, alkylation, and debenzylation. The chemical structures of the synthesized derivatives have been determined based on their NMR data.

WST-1 cell proliferation assay was used to evaluate their in vitro antiproliferative effects toward both androgen-dependent (LNCaP) and androgen-independent prostate cancer cell lines (PC-3 and DU145). Our data showed that fourteen out of the sixteen synthesized 2,3-dehydrosilibinin derivatives possess significantly improved potency as compared with silibinin. The synthesis, structure characterization, and in vitro antiproliferative activity will be presented in this poster.

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Rescuing Behavioral Effects Caused by the Homozygous White Background (w1118) Commonly used in Drosophila melanogaster

The white gene coding for eye pigmentation in Drosophila melanogaster provides a background that is used to track genes of interest when generating experimental genetic crosses. This white background is due to mutations in the ABC transporters. These transporters have a role beyond transporting pigment in the eyes. The ABC transporters are also involved in behavioral processes and lack of these transporters results in undesirable behavioral issues such as changes in memory, visual performance, courtship behavior, and spatial conditioning. Therefore, there is a need to correct for these unintentional genetically induced behavioral deficits before the flies are put through protocols for testing more complex behaviors that an experimenter ultimately may want to examine in their particular genetic cross. Though a large body of research involves discovering the effects of the gene insertions on the fly behavior, very few attempts were made to rectify the issue with the white gene background before exploring the effects of other gene insertions. The focus of this research is to outcross the (GAL4 X GAL80ts) and (GAL80ts X UAS) fly lines to remove the homozygous white (w1118) allele mutation from their genetic background. Following the outcross experiments, the flies are then ready to be used to explore the genetics of behavior without the confound of the white background. When the unrelated, dominant wild-type Canton- S (w+) is introduced into the breeding line, genetic diversity increases, and abrogation of the expression of white mutated genes occurs, bringing their phenotype and behavior closer to the wild-type.

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Poster Board No. 4

The Effects of a-synuclein on Behavioral Dysfunction in the Parkinson's Disease Model Drosophila Melanogaster

Although Parkinson's Disease (PD) is the most common neurodegenerative movement disorder, the cause of PD is still unknown. Many researchers have found several factors that play an important role in PD, and one of the factors is protein called a-synuclein. Overexpression of A30P or A53T promotes the formation of toxic filamentous inclusions in neurons that mediate motor output, resulting in movement deficits, such as tremor, rigidity and bradykinesia. The present study involved using Drosophila melanogaster to examine the behavioral dysfunction associated with a-synuclein linked to PD. The specific aim of this study was to develop an obstacle avoidance behavioral assay to quantify motor control and movement planning deficits in flies. Using GAL4-UAS system, flies were genetically altered to carry A30P or A53T protein in specific brain regions known be associated with sensory integration and locomotor abilities in insects and their behavior assessed at different ages. The data presented herein suggested that Drosophila expressing a-synuclein exhibit significantly different locomotor responses in speed and distance of negotiating an obstacle. Specifically, Drosophila expressing a-synuclein in the central complex showed significantly altered movement patterns. Moreover, aged mutant flies had lower success rate in negotiating the obstacle than young flies. These findings suggest that flies expressing a-synuclein may have issues with coordinating and executing fine control of movement in the obstacle avoidance activity. We determined that using Drosophila model of PD could serve a better evaluation of PD neuropathology dysfunction. Therefore, this study can provide new insight into our understanding of the potential effects of a-synuclein in PD.

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Poster Board No. 5

Synthesis of Asymmetric 1,5-Diheteroarylpentadien-3-ones as Anti-Prostate Cancer Agents

The symmetric 1,5-diheteroaryl-1,4-pentadien-3-ones have been established by us as a promising class of curcumin-based anticancer agents, which has been recently published in the Journal of Medicinal Chemistry. To further explore the in-depth structure-activity relationships of this scaffold, we designed and synthesized 10 asymmetric 1,5-diheteroarylpenta-1,4-dien-3-ones for their evaluation of in vitro anti-proliferative activity towards both androgen-sensitive (LNCaP) and androgen-insensitive (DU145 and PC-3) prostate cancer cell lines. They were synthesized through two sequential Horner-Wadsworth-Emmons reactions of 1,3-bis(diethylphosphonato) acetone with two different appropriate heteroarylformaldehydes. The cell-based experimental data indicated that these asymmetric 1,5-diheteroarylpenta-1,4-dien-3-ones are 8- to 98-fold more potent than curcumin in inhibiting prostate cancer cell proliferation. The synthesis, and anti-proliferative and structure activity relationships of asymmetric 1,5-diheteroaryl-1,4-pentadien-3-ones will be the focus of this presentation.

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Poster Board No. 6

Introgression of the him5 mutation into the GFP strains ST65 and PD4251 of Caenorhabditis elegans

C. elegans are known as a popular model organism to be used in the laboratory for research and teaching purposes. C. elegans is sexually dimorphic: hermaphrodites and males. Hermaphrodites self-fertilize or mate with males, and they are also the most common sex. The frequency of males in a self-progeny of wild type C. elegans hermaphrodites is one in a thousand. This is a problem when making genetic crosses since hermaphrodites must be crossed with males. The objective of this project is to introgress the him5 mutation from the CB1467 strain into the GFP strains ST65 and PD4251. The him5 mutation is recessive and temperature sensitive; it increases the chances of producing males by 20% when incubated at 16 °C as a result of nondisjunction in the X chromosome. As for the PD4251 strain, it produces GFP in all the muscles of the body, whereas ST65 strain expresses GFP only in vulva and head. The new strains generated with this project can be used for research and in the teaching laboratories.

Two crosses of three sperm depleted hermaphrodites from the ST65 and PD4251 and 6 CB1467 males were made. The next day, the parents were removed and only the heterozygous F1 generation with the same genotype remained in the plates. Then, to increase the homozygous genotype for him mutation, a hermaphrodite from the F1 generation was test-crossed with a parental him mutant. Afterwards, 20 hermaphrodites from the test-crossed generation were allowed to self-cross providing what we are calling 20 families of F3 generation. This is the current generation we have and each family should segregate 50% him. Families containing the him5 phenotype will be allowed to self-cross and 10 individuals from each family will be monitor to determine the families in which 100% of the nematodes are GFP and have a higher ratio of male. The new strains will be named “him5; ST65” and “him5; PD4251”. The two new strains can be used for research purposes and also for teaching purposes in the Biology 104 course; a laboratory course in genetics and cell biology taken by 60 undergraduate students every semester.

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A Potential Impact of Climate Change on Fitness in Caenorhabditis Briggsae

The nematode C. briggsae is a useful model organism, particularly because wild isolates have been collected worldwide. With strains from temperate and tropical parts of the world, we study the genetic basis of adaptation to temperature. For this study, we focused on two strains of C. briggsae: HK104, a tropical strain from India, and AF16, a temperate strain from Japan. We hypothesize that these two strains have become genetically adapted to their native climate. We sought to answer the question whether fecundities of these two strains would be significantly different at various temperatures. To test this hypothesis, several C. briggsae hermaphrodite juveniles (L4 stage larvae) from both strains were each placed on its own individual petri dish containing agar medium and Eschericia coli (strain OP50) as a food source. The AF16 and HK104 specimens were then divided among three incubators set at 16, 20, and 25 degrees Celsius. Once the larvae reached adulthood, the number of embryos each individual produced through its lifetime was recorded. These data revealed little variation in total fecundity, but embryo production rate varied by strain and by temperature. Because reproduction rate impacts the ability of a population to compete with others for resources, our results do suggest an important impact of temperature adaptation on fitness. Future work includes identifying the genetic basis for adaptation to temperature in this species.

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Does Maternal Obesity Predict Increased Risk of Cesarean Section at Community Regional Medical Center (CRMC)?

OB GYNs are thought to be performing too many primary cesarean deliveries, leading to significant maternal morbidity and mortality. A national goal for 2020 is to decrease overall cesarean rates to 23.9%. At CRMC, yearly rates range from 29-36%. One challenge to decreasing cesarean deliveries is the obesity epidemic in the Central Valley, where 30% of adults are obese compared to 24% statewide. During pregnancy, studies have shown that obese women are more likely to experience adverse maternal and neonatal outcomes as well as increased risk of cesarean section and post-operative complications. The purpose of the study is to assess whether low risk, obese women with a term, singleton gestation are more likely to undergo cesarean section than non-obese women in our Fresno, CA population.

A retrospective cohort study was performed at CRMC. The electronic medical records of a random sample of 90 women who delivered in 2013 with low risk, full term (>37 weeks) singleton pregnancies were reviewed. Two cohorts were created based on body mass index (BMI) on admission for Normal (BMI<25) (n=44) and Obese (BMI >25) women (n=46). Women were equally matched based on age, and all medical comorbidities such as diabetes and hypertension were excluded. The primary outcome was mode of delivery (vaginal or cesarean), a secondary outcome was indication for cesarean. Continuous data was analyzed using ANOVA and categorical data analyzed using Chi-Square.

At CRMC, 6290 deliveries were performed in 2013 with a 36% cesarean section rate. In our cohorts, women with normal BMI had an 11% primary cesarean rate done for arrest of labor, while obese women had a 65% cesarean rate. In the obese women with cesarean section, the most common indication was arrest of labor, but malpresentation and suspected macrosomia were also listed. Women with normal BMI were 5x more likely to deliver vaginally than by cesarean section than their obese counterparts ($p<0.001$).

We found that obese nulliparous women are significantly more likely to undergo cesarean section than women with normal BMI. To make any significant inroads on decreasing our cesarean section rates in the Central Valley, the challenges posed by obesity will need to be addressed. In the future, we hope to further investigate ways to help our obese patients have more success achieving vaginal delivery and improve health outcomes.

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A Pilot Study: A Comparison of Therapeutic Exercise with Remote Trigger Switch Electrical Stimulation Cueing, and Therapeutic Exercise with a Sham Cue, for a Motor Learning Effect in Scapular Dyskinesis

Altered scapular motion and position, termed scapular dyskinesis, is commonly treated in physical therapy clinics and is often a component of shoulder pain. Conventional therapeutic exercise programs to treat dyskinesis address impaired muscle recruitment in an effort to normalize scapular-humoral rhythm. Treatment durations can range up to 12 visits with varying success. There are no studies that examine traditional therapeutic exercise programs with the addition of triggered electrical stimulation (ES) as a motor cue to relearn appropriate patterns of scapular movement. The purpose of this pilot study was to compare therapeutic exercise with an ES cue, to therapeutic exercise with a sham cue, to examine a motor learning effect in subjects with scapular dyskinesis. The hypothesis was that the ES group would be different in manual measures and in video inspection compared to the sham (non-stimulation) group.

12 subjects (representing 15 scapulae) from a university campus sample of convenience, who met the inclusion criteria, were randomized into the ES or sham groups. An expert clinician assessed for visual winging of the scapula at rest and during active flexion and abduction following an intake questionnaire. Subjects were video-taped and distance measurements were taken at (0°, 45°, 90° and 120° abduction) prior to treatment, referencing the ipsilateral-side of the thoracic spinous process and the medial aspect of the scapular inferior angle. Both ES and sham groups were given three exercises cited as having low upper trapezius/lower trapezius (UT/LT) ratios. Exercises were performed four times a week, two times independently and two times with the researchers using ES cueing or sham cueing. Electrical cueing was provided via a handheld switch. A biphasic-pulsatile current was used. The frequency and pulse-width were 25pps and 250usec, respectively. The intensity was comfortable and produced scapular retraction.

Results indicated manual measurements of the scapular distance were consistent and unchanged across ES and sham at 0° and 45° degrees when compared pre-test to post-test, respectively (sham 6.14cm and 6.25cm, ES 5.47cm and 5.50cm at 0°; sham 6.39cm and 6.44cm, ES 5.49cm and 5.57cm at 45°). However, at 120°, pre to post-test differences showed a mean difference of 2.76 cm for the ES compared to the sham group, despite the fact that the sham group started with 1.73cm less excursion (sham 8.44cm and 6.96cm, ES 10.17cm and 7.41cm). Although the ES group initially started with more scapular excursion their post-treatment excursion was much less than the control.

This quick, simple intervention (ES cue with three exercises) on subjects who started with poorer scapular positioning (at 120°), yielded larger mean changes compared to subjects who were not electrically cued. In addition, consistency was noted on pre and post-test measures at 0 and 45 between treatment groups.

Greater change in scapular distance pre-to-post-test, at 120 degrees, following six, 20 minute treatments with ES cueing, may provide, the busy clinician with a valuable means to facilitate improved motor learning in patients with scapular dyskinesis.

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Poster Board No. 10

Evaluation of the Effects of Controlled Burning in the Sierra Nevada Forests on Erosion and Forest Restoration

Forest fires can greatly impact soil hydraulic properties such as water infiltration rate, soil water repellency, surface run off, and sediment yield. Forest fires heat and burn soil and organic compounds in it, causing soil moisture to evaporate and soil particles below the surface layer to be coated by oil and wax. This creates a negatively charged hydrophobic soil layer (Ice et at. 2004). A hydrophobic soil layer will greatly reduce the amount of water that drains into the soil (Ice et al. 2004) creating higher amounts of surface and subsurface runoff (Kolka). The effects of controlled burning on soil infiltration rates and soil hydrophobicity were evaluated through experiments on soil from the French Fire Salvage which is located in the Sierra National Forest, south or the Mammoth Pool Reservoir. Soil infiltration and hydrophobicity experiments were conducted in the field and the laboratory. The areas of high burn severity did not allow any water but only ethanol to infiltrate into the burned soil. The samples were collected at different depths from various conditions which include high burned treatment, high burned control, moderate burned treatment, and moderate burned control. In order to assess soil erosion potentials due to forest fire and soil hydrophobicity, five sediment fences were setup on the selected dry channels of mountain streams to collect the annual amount of sediment runoff. The results will be used to calibrate the GIS-based models for soil erosion in the forested lands and to produce recommendations for future forest management.

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Carnivorous Plants Show that the Size of Suction Feeders is Limited by Fluid Mechanics

Suction feeding is the main feeding mode of aquatic organisms. It is well studied in large suction feeders, such as fish, but not small suction feeders. Hydrodynamic theory predicts that suction feeding is not effective below a certain size (mouth < ~200 microns) because the viscosity of water will prevent strong flows. To explore suction feeding in small predators, we study the carnivorous bladderwort Utricularia vulgaris. This plant captures microscopic prey in underwater bladder-shaped traps, which range in size over a factor of 3.If the lower limit is determined by hydrodynamics, then we expect smaller bladders to have relatively larger mouths (allometric scaling). Our null hypothesis is that bladders scale isometrically: gape-to-size ratio is independent of size. For this study, we measured the length of bladders and their gape diameter using a high resolution scanner. We then log-transformed the data to determine the scaling coefficient, which is the slope of the ratio of log(length) to log(gape). Isometric scaling would result in a slope of 1. If the bladders scale allometrically, with smaller bladders having a relatively larger mouth, then the slope would be less than 1. We measured 1241 U. vulgaris bladders and found that body length ranged from 0.7 to 2.5 mm, while gape diameter ranged from 0.3 mm to 0.9 mm. We observed a slope of 0.3 in the gape/length relationship, which is consistent with the hypothesis that mouth size is a limiting parameter. The fluid-mechanical origin of this allometry can be further tested by cross-species comparisons and detailed study of mouth morphology.

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Poster Board No. 12

Smart Farming

Looking forward on the current water issues across the globe and the never ending hunger of the growing population, it is very essential to implement technology in the fields which are considered as potential resources such as farming and irrigation. The main economy of United States is dependent on farming and considered as the backbone of nation. The growers of this nation act like role models for the growers across the globe. Whatever technology is implemented here will led the globe to stabilize the hunger demand and helping to reserve water for future generations. So, it is very essential for engineers like me to come up with efficient technologies in order to satisfy the above mentioned need.

This research is based on maximizing the efficiency of the sprinklers, especially center pivot sprinkler system, by using real time monitoring system. Irrigation zones will be mapped by using the EC (Electrical Conductivity) data, which shows the texture pattern of the soil in the field. Based on this texture pattern heavier and lighter soil types will be classified, which help in mapping/creating management zones for irrigation. As each soil type has its own capacity to hold water, this is the factor or crucial data that can be monitored by irrigating each type with pre-determined water. Now each of these zones have the coordinates, which can be used by the sprinklers to identify that particular zone while it is moving on center pivot system. As in center pivot system, the hinge to which all the sprinklers are attached, move from one zone to other zone, and depending on the size of the center pivot system, some set of sprinklers are in one zone and the rest in other zones. Each zone will be classified with one particular soil type and a set of coordinates covering the whole zone section. Now each sprinkler on the center pivot system will be controlled by separate microcontroller and a valve. The coordinate points of each zone will be fed to the microcontrollers of the sprinkler's. So, as the sprinkler moves from one zone to other zone, the coordinate points will change, and this will be sensed by the microcontroller which in return will adjust the valve opening of the sprinkler, to irrigate that particular zone with specified quantity of water. Esri ArcGIS software will be used to plot the zones and come up with the exact coordinates. Arduino and other same type of open source controllers will be used.

Now the question of irrigation time for each sprinkler to operate will depend on the real time data coming out of the soil moisture sensors. The microcontroller of the sprinkler will be designed in such a way, as when the sensor reads the predetermined volume of water in a zone the valve of the sprinkler will be adjusted (ON or OFF). Now the data coming from the sensors and sprinkler's valve position will be send to the open source cloud system. The proprietary cloud storage facility given by the sprinkler companies to growers will be eliminated. Google open source cloud storage system will be utilized to store the data and analyze it. The purpose of creating an open source platform, is to support average middle class farmers and to eliminate the discrimination created by the data logger and sensor companies. Such type of design will not only benefit United States but it will also help the developing and under developed countries across the world. This type of design will not only save the water but it will also save electricity. As one unit of electricity saved is two units of electricity generated. As the water in the field is managed through the electric pumps or gasoline pumps. Indirectly the resources required for generation of electricity will also be saved.

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Simple Systems for Learning Analytical Laser Spectroscopy

Spectroscopy is a very important instrumental technique in the identification and quantification of chemicals. Its applications can be found in nearly every scientific field. However, the cost of a basic unit that is capable of a single spectroscopic technique, such as Raman, absorbance, and infrared, can cost upwards of ten thousand dollars. Laser-based spectrometers cost even more. This high cost prevents students in primary education from being exposed to the various types of laser spectroscopy and learning the theory behind their application. One of our objectives is to manufacture an inexpensive adapter that will easily mount to an available spectrophotometer, converting it for use in different spectroscopic techniques. The major component for the adaptor to fit is a laser pointer that provides a radiation of interest. Another objective is to assemble a very simple optical spectroscope for Laser Absorption Spectroscopy.

Aim 1: Manufacture a simple adapter with the popular Spec-20 Spectrophotometer or an available spectrophotometer, for use in learning the technique of Laser-Excited Fluorescence Spectroscopy. Chlorophyll will be used as the model molecule for evaluation.

Aim 2: Manufacture a simple adapter that will accommodate three components: a laser pointer, a light meter, and a sample cuvette. This final configuration is a simple Laser Absorption Spectroscope. The performance of this spectroscope will be evaluated with a model chemical, permanganate.

The production of such adapters will give under-funded, primary education environments access to various spectroscopic techniques with the purchase/ construction of a single, inexpensive unit. Current versions of the adapter have proven inexpensive and accurate with subsequent version still being designed. With access to learning of multiple types of spectroscopy, students will be better prepared for their application in secondary education.

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Capture Success of Utricularia Vulgaris, a Carnivorous Plant

Utricularia vulgaris is an aquatic carnivorous plant: it has adapted to low-nutrient and acidic environments using carnivory, an adaptation which supplements nitrogen and phosphorus uptake. It lives as a free-floating, rootless plant just under water surface. It forms a 5 cm to 1 meter long strand that grows at a constant rate from one end (the terminal bud), and senesces (dies away) at the opposite end. This adaptation for carnivory is expected to exert evolutionary pressure for increased prey capture. U. vulgaris traps have a reported size variation of 0.5 to 4 mm. This variation may have been an adaptation to increase the range of prey sizes that can be captured, increasing the overall rate of capture. Additionally, as traps age, they begin to lose function and regulation of the trapping mechanism. This is expected to lead to distinct variation in trapping success (traps with prey divided by total traps). By measuring traps and the prey captured with high resolution images we are able to determine the range of trap sizes and capture success across sizes. Age of traps is determined based on their distance from the terminal bud. The results show a relationship between prey capture rates over the range of ages and sizes for traps. The combined effect of size and age on capture rates will assist in determination of the capture efficiency of traps and the plant as a whole. We can then ask questions about trap prey selectivity in relation to morphology and age.

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Implementation of State-of-the-Art Drip Irrigation Technology in California Table Grape Vineyards: An Economic Analysis

California is facing one of the main droughts in history. The Federal Central Valley project could not deliver any water for agricultural users and the State Water project delivered only 20% of its capacity to agricultural users in 2015. One of the commodities that have been affected by the drought are table grapes. California table grape growers are producing 97% of the table grapes grown in the United States and more than 10% of the world's production. Table grape growers have been changing their irrigation systems to a more efficient system in the last decades in order to reduce the amount of water use and increase the efficiency by irrigation. It is known that as the water becomes scarce, it tend to increase the price of water which eventually increases the production cost of the growers. Most of the vineyards in California uses drip irrigation in their vineyards, but many drip irrigation systems are not well maintained and/or efficient. Drought and scarcity of water pushes table grape growers to implement a more efficient irrigation systems in order to reduce the water use and the cost. Many farm chooses not to improve irrigation efficiency due to the expenses associated with it. This study addresses how long would it take to cover the expenses to improve the drip irrigation system and what would be the benefits of that improvement.

Net present value method on a representative farms model is constructed to examine the feasibility of this investment. Data was obtained from the USDA, expertise from the people in the field and Sample Cost of Production Studies from the University of California Cooperative Extension Service (UCCES). The preliminary results shows a positive net present value meaning that the grower was able to cover all the cost associated with on improving irrigation efficiency.

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Session 2
Poster Board No. 16

ZOMBY (An Unmanned Ground Vehicle): Remote-Controlled Retrofitted with Thermal Camera and Made Autonomous

In the present world, the need for autonomous vehicles has been on the rise since the advent of new technology. The scenario of using a Remote Control to operate a vehicle is slowly diminishing. Hence the idea of making an Unmanned Ground Vehicle autonomous is starting to take shape with the help of the endless technologies and also the need to make things easier for everyone without any hassle. And also I'm planning to attach a thermal camera on the surface of the Zomby to take pictures automatically while being connected to the laptop wirelessly.

The first part of this research is about connecting the software in the thermal camera to the controller in the ZOMBY. I'm going to use an Arduino UNO microcontroller chip. There are going to be two software's, one to take the picture and the other to scan the thermal picture. With the help of the Arduino chip, the zomby controller is connected with the thermal camera. Now, the pictures from the camera can be viewed on the laptop by using a coding language to retrieve the pictures from the camera. I'll be using the coding language known as C, an open-source programming language.

The next part of the project would be to make the Zomby autonomous. I will be using the Arduino 101 chip. I will be using the C programming language to program the chip on the Zomby and also the Arduino chip. By making it autonomous, I will create a Bluetooth connectivity between the Zomby and my Cellular phone. Therefore, I can handle the movements of the Zomby through my phone. The range of the Bluetooth will also be considered while programming.

By turning a remote controlled vehicle into an autonomous one, I'm decreasing the human work and increasing efficiency of the machine. Thus, it'll be used in the fields to capture pictures while not being driven by a remote control.

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Poster Board No. 17

The Effects of Choice on Exercise Contingencies for Children

The effects of children having a choice in physical activity on the duration they exercise will be examined. An alternating treatments design will be used. Opportunities for choice in physical activity will alternate throughout the intervention. Data will be collected on the duration of time participants engage in physical and leisure activities. It is predicted that the duration engaged in physical activities will be longer during conditions allowing for a choice than conditions without choice. Data will be analyzed using visual analysis and percentage of non-overlapping data points.

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Poster Board No. 18

Healthy Diet in Action Workshops for Latino Families

Culturally-sensitive prevention and intervention programs are essential in reducing health disparities. In this six-week workshop series we are using a culturally-sensitive curriculum to promote healthy eating habits and physical activity in Latino families. Increasing fruit and vegetable consumption and decreasing sugar-sweetened beverage consumption are prime goals of the program.

Fifteen families will be receiving nutritional and physical activity education based on the Abriendo Caminos curriculum. Eligibility criteria includes Mexican or Puerto Rican heritage, having a child between the ages of 5-18, and Spanish as their first language. In the first visit families will fill out questionnaires about their family's eating habits.

At the baseline (first visit will take place on April 2nd, 2016 and this data will be reported in the poster presentation) we will be looking at eating habits, specifically fruit and vegetable intake and sugar-sweetened beverage consumption in children. The baseline data will provide information about the average starting point of families and how much improvement can be made through participating in the workshops. We will focus heavily on increasing healthy eating. The Abriendo Caminos child nutrition unit focuses on age-appropriate basic nutrition education and emphasizes eating a balanced diet. It provides research-based information, in the form of visuals aids and activities, to assist in educating children and their families about ways to increase healthy eating.

Increasing fruit and vegetable consumption and reducing sugar-sweetened beverage consumption are two major components to maintaining a healthy weight. With nutritional and physical activity education, living a healthy lifestyle will be an obtainable and maintainable goal. Educational programs, such as Abriendo Caminos aim to increase healthy living in families.

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Poster Board No. 19

Effects of Forest Fire on Soil Water Repellency

Laboratory and field experiments were carried out to determine the effects of forest fires on soil water repellency or hydrophobicity in areas burned by forest fires in the Sierra Nevada Mountains. It was noticed in the field the surface soil was ashed and water-wettable, but just two inches below the surface, the soil was dry and hydrophobic. Soil samples from the surface and 2-inches below were collected from several locations within the boundaries of the French Fire in North Fork, CA, representing differing severities of fire damage (high burn and moderate burn). Scientific Water Drop Penetration Time (WDPT) tests were conducted on each of the soil samples collected. Results show that the WDPT ranged from 0.2 seconds in moderate burn areas to more than 60 minutes in high burn areas. The water ponding tests were then performed on all soils of severe repellency (WDPT > 30 Min) to determine the water-entry or hydrostatic pressure needed for water to start infiltrating. The water-entry pressure of severely burned soils reached 6.5 to 7.0 cm of water head. Mini-Disk infiltrometers were also used in the laboratory to determine the rate of infiltration of water and ethanol in the soils. We found that in the high burn areas there was no infiltration of water into the soil due to severe hydrophobicity. However, ethanol was able to infiltrate into the hydrohobic soil (two inches below the surface). Thus the ability of ethanol infiltration is an indication of soil hydrophobicity.

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Poster Board No. 20

Screening of Transgenic Dunaliella Primolecta for Wastewater Treatment

One of the challenges faced all over the world is the treatment of wastewater. A possible solution to overcome this challenge is the use of microalgae. Microalgae can treat wastewater (Decrease Chemical Oxygen Demand) as it contains organic (C- rich compounds), inorganic supplements (N, P & K), and high salt content. Some of these components have been shown to promote algal growth and the use of microalgae for wastewater treatment is less expensive compared to the conventional method of activated sludge process. The aim of this project is to genetically modify D. primolecta using an Agrobacterium tumefaciens mediated transformation method to generate a large number of mutants. These large number of mutant algae can be screened for their efficiency in reducing the chemical oxygen demand (COD) of wastewater. We hypothesize that a genetic transformation will cause a mutation in the genome of the algae such that, the mutant gene will code for an enzyme that is responsible for / or controls the algae's ability to increase/decrease the COD of wastewater.

Our preliminary experiments were designed to identify the most efficient species of microalgae which will cause highest COD reduction in wastewater. We tested three different species of algae (Scenedesmus dimorphus, Dunaliellia primolecta and Chlorella vulgaris) by growing them in 100%, 80%, and 50% dairy industry generated wastewater. Our results indicate that the best-suited algae for decreasing the COD of dairy wastewater is D. primolecta. Also, we have successfully developed a protocol to cryopreserve algae cells for long term storage using methanol.

Currently, we are focusing to generate maximum number of transformed cell lines of D. primolecta. The transformed lines will then be screened for their ability to reduce the COD in wastewater. The transformed line which causes greatest reduction in COD of wastewater will be cryopreserved and eventually scaled up.

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Poster Board No. 21

Prey Selectivity in Utricularia vulgaris

The freshwater carnivorous plant bladderwort (Utricularia vulgaris) captures microscopic prey in underwater bladders by a suction mechanism. Bladderwort traps are sealed by a door that collapses when prey touches trigger hairs on the door, causing the trap to inflate and suck in water plus prey. This project has two scientific questions: (1) Do smaller bladders select smaller prey than large bladders? (2) Are smaller bladders less successful than large bladders? Prey selectivity can occur at two stages of the capture process; when prey triggers the trapdoor, and when prey is captured in the trap. Smaller, slower prey may be too weak to trigger the trap door; larger prey may not fit through the trap's mouth. We found that U. vulgaris body size ranges from 0.7 to 2.5 mm in length, with trapdoor diameter ranging from 0.3 to 0.9 mm. The prey (ostracods) used for our experiments range from 0.06 mm to 0.76 mm with two peaks in prey size at 0.1 mm and at 0.6 mm body length. Prey size inside the traps has a single peak at 0.5 mm. This difference in size distribution between available and captured suggests that there's size selectivity: bladderwort traps select for larger prey. Bladderworts seem more likely to capture larger rather than smaller ostracods. The traps' selectivity against smaller ostracods suggests that smaller ostracods don't exert enough force to trigger the trap. Ostracods ranging from 0.2 mm to 0.65 mm are captured, but ostracods smaller than 0.2 mm and larger than 0.65 mm don't get captured. The traps' selectivity against large ostracods suggests that capture success is limited by the trapdoor diameter. We found that smaller bladders catch fewer prey than larger bladders. We conclude that bladder size effects capture success and that different size bladders capture different size prey.

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Poster Board No. 1

Examining Biomarkers in Aggressive Tumor Types of Thyroid Cancer

The thyroid is an important aspect of the endocrine system that is responsible for making hormones that regulate homeostasis and metabolism. Thyroid cancer disrupts these functions and can result in death if left untreated. The follicular variant of papillary thyroid cancer is one of the most common forms and this study is looking for markers within follicular variant papillary thyroid cancer that distinguishes it as aggressive or not. Clinical diagnoses of some thyroid cancers have resulted in a misdiagnosis leading to invasive surgeries that were not necessarily needed in certain patients. The biggest issue arising involves determining the distinguishing criteria for which lesion will behave as benign, and which have the potential to metastasize. My idea is that there are markers specific to each tumor type only, not just the ones known. To solve this problem, I want to look at tumor tissue under a laser dissection microscope which will allow the cutting of specific sites in the tissue in hopes of finding identifiable markers. The results of this study can effectively create easily distinguishable signatures of specific disease behaviors and aid in early detection and applicable therapies in a clinical setting. Prepared tissues will be sectioned for laser capture microdissection (LCM). DNA, RNA, and protein will be extracted from each sample. RT-PCR performed to determine RNA expression and comparison of markers (e.g. VEGF, HIF1a)

We have been able to successfully extract DNA and RNA from our thyroid tumor tissue samples. Next, RT-PCR was run on the RNA samples to see if we could find any markers associated with cancer in the tissues. RT-PCR revealed expression of VEGF(Vascular Endolithal Growth Factor), an angiogenic factor involved in acquiring blood vessels and H1F1 which activates proteins for cell proliferation, vascularization, and glucose metabolism.

Future tests need to be run in order to see if any other markers are found within the tissue that will indicate aggressive characteristics of thyroid cancer

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Poster Board No. 2

Correlating the Expression of Tau and Ptau with Behavioral Dysfunction in Drosophila Melanogaster

The fruit fly, Drosophila melanogaster, has proven to be a useful model organism in the study of many human disease processes and they are commonly used in both genetic experiments and neurological experiments. Our previous experiments quantified the behavior of flies in a place learning/spatial memory assays in order to elucidate cognitive traits associated with expression of human tau protein in specific brain regions associated with learning and memory. The ellipsoid body and the mushroom bodies were found to be individually important in certain elements of perception and learning. However, only when both regions were functionally intact was more complex spatial cognition revealed. Here we look to better understand how the expression levels of tau and the phosphorylation of tau impact spatial cognition. We used GAL4-UAS to express the human tau protein, which is associated with neurodegenerative diseases such as Alzheimer's disease, in circumscribed brain regions of the fruit fly. Adult females were tested in a place learning assay at multiple time points post-eclosion. Following learning trials and memory tests, flies were sacrificed and the brains were removed and the expression of tau and ptau were analyzed using immunoblot and SDS-PAGE. Flies show a decrease in learning and memory as well as a shortened lifespan and this correlates with the expression of tau in the nervous system in a time dependent manner. The phosphorylation of tau appears to also increase with time. However, the specific impact that the levels of tau vs. ptau are having on spatial cognition is unknown. It has been suggested that ptau leads to cytosolic toxicity in Drosophila, so this may be having an impact on spatial cognition. The results have allowed us to start looking at how the expression of the human tau protein in the fruit fly model is impacting learning and memory. By examining the limitations of the fruit fly model and investigating the molecular pathways and the quantitative expression levels of the disease associated protein tau in the nervous tissue of fruit flies and correlating that with a quantitative measure of spatial cognition, we can further enhance our understanding of neurodegenerative diseases in humans.

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Poster Board No. 3

Split-Brain Spatial Learning and the Flexibility of the Learned Antenna Projection Response to Natural Contexts in Periplaneta Americana

The American cockroach, Periplaneta Americana, with its large brain and demonstrated robustness to physiological manipulation, holds many advantages when exploring neural underpinnings of learning and memory. Understanding how neural circuits support various aspects and types of learning and memory is a tremendous challenge. It is often more efficient to experiment on animals such as cockroach, to gain a basic understanding of how form follows function in neural systems. These experiments examine the interaction of multi-modal sensory acquisition, motor control, learning and memory systems and how they are organized in the brain of the cockroach. The antennal projection response (APR) is an established paradigm to explore learning and memory in the cockroach. It has been used to explore the neural basis of associations between olfactory and visual space and how this spatial encoding is integrated with motor cues. A series of experiments were performed which examined the visual spatial learning abilities of the cockroach in environments with restrained and unrestrained mobility. These experiments were carried out on both intact brain animals and animals which had a procedure done to divide the halves of the brain by lesioning the central complex. This allowed for examination of the role of the central complex in spatial learning tasks. The ability of the cockroach to learn a simple association of a light paired with an odor with sensory stimuli has been demonstrated in the split-brain cockroach, but more complex forms of learning and memory have not. Lesioning of the central complex resulted in a variance of response rate between experimental and control groups. This data revealed multiple elements underlying complex spatial learning behavior, including, the role of unilateral and bilateral sensory acquisition and learning, memory localization within the brain hemispheres, memory transfer and interference, and the interaction of neural systems.

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A Method to Assess the Reactive Oxygen Species (ROS) Formation Induced by Particulate Matter (PM) Samples in Alveolar Macrophages

Exposure to atmospheric Particulate Matter (PM) has been shown to lead to both cardiovascular and respiratory disease, and respiratory effects of PM exposure are thought to be mediated by a ROS-driven inflammatory response[1]. PM are particles suspended in the air which have a complex and variable chemical composition that can include both quinones and metal species[2]. PM are also variable in size; and PM species with a diameter less than 2.5 μm (PM2.5) are small enough to enter the lungs. Once in the pulmonary cavity, PM2.5 can be phagocytized by alveolar macrophage cells. This event triggers the production of Reactive Oxygen Species (ROS) to break down the foreign material. Thus, the goal of this project is to evaluate the interdependence between the chemical composition of PM2.5, the total PM2.5 mass, and the ROS production triggering effect of PM2.5 in a model of alveolar macrophage cells in culture (NR8383 rat cell line).
PM2.5 collected in the Fresno and Claremont areas for a period of 6, 12, and 150 hours were selected on Teflon filters and extracted for four hours with a mixture of water and ethanol. The total amount of PM2.5 extracted from each sample filter was as follows: Fresno 1 (150 hours): 132 μg, Fresno 15 (12 hours): 59.3 μg, Claremont 12 (12 hours): 26.3 μg. These aqueous extracts are submitted to serial dilutions and the diluted samples are used to treat NR8383 cells for 1 hour. The intracellular amount of ROS in the treated cell samples is estimated with a DCF probe using a BioTek Synergy HT microplate reader at 485 ± 20 nm excitation and 528 ± 20 nm emission. Finally, the yeast derivative Zymosan is used as a positive control because of its known ability to produce an ROS response in macrophages.
Zymosan was first tested at various concentrations to validate this method. Because there was a positive fold increase of the DCF signal in response to an increasing amount of Zymosan, it can be concluded that our protocol was appropriate to observe and quantify intracellular ROS levels in alveolar macrophages. The three filters (Fresno 1, Fresno 15, and Claremont 12) were then tested in four independent experiments. The combined results show an increase of ROS levels in cells treated with the Fresno 1 and Claremont 12 samples. However, cells treated with Fresno 15 extracts show a lower ROS level vs. control cells. Our results indicate that the chemical composition of the particles present in the samples plays an important role in the modulation of ROS production in NR8383 cells. Therefore, future direction for our study aims to identify the specific chemical components of PM2.5 (such as quinones or metals), which are essential for the determination of ROS response in alveolar macrophages.
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Poster Board No. 5

The Effect of Local Flower Distribution on the Foraging and Communication Behavior of the Common Eastern Bumblebee, Bombus impatiens

Bumblebees are able to obtain information both through personal experience, i.e. personal information, and from their conspecifics, i.e. social information, however it is unknown how bumblebees weigh information to make the best decisions. This ability to weigh decisions and act on the one with the highest value would allow the bees to make the most of the resources within the territory of their colony, as they would not be wasting time and energy obtaining resources from less valuable sources. Foraging situations were created in which individual bumblebees were confronted with social information that conflicted with their personal information and their responses were monitor and analyzed. Bumblebees were presented with an arena where the values of food resources were controlled by altering the sugar concentration within artificial flowers and the number of fresh flowers present at the feeders. The foraging patches that bees choose, the behavior of the bees after they return to the nest and communicate with their nest mates, and the subsequent foraging choices bees made after social information was assessed was be monitored. Data suggests that the bees respond to the initial change in food distribution by increasing the number of foragers out at any one time. The foragers would consistently visit both feeders, but foraged at the feeder with the greater amount of food. The number of foragers decreased to control levels on the second day of uneven food distribution, but time spent foraging remained high. It is unknown 'if' or 'how' bumblebees are evaluating information and then acting upon this evaluation, but this assay provides a new way to study communication and information processing in bumblebees.

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Analyzing Temperature Effects on Juvenile Chinook Salmon Growth

The San Joaquin River has previously served as a diverse habitat for thousands of spawning salmon, other native fishes, and various wildlife. However irrigation, dam construction, and other water diversions have caused populations of salmon to significantly decrease. The aim of the San Joaquin River Restoration Program (SJRRP) is to restore flows into San Joaquin River from the Friant dam up to the confluence of the Merced River in order to reestablish 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. The current research question I am addressing is the extent to which water temperatures affect the growth rates of juvenile Chinook Salmon. I am conducting this study by performing literature meta-analysis of previous studies and comparing the growth rate values from these studies to our growth rate data from the San Joaquin River. The goal is to determine whether variation in the growth rates is in fact due to temperature change or other significant factors such as water velocity or prey abundance. We find that Chinook Salmon strains in the San Joaquin and Merced Rivers, have relatively high growth rates compared to those in northern California and other Pacific states. The results from this study will aid in determining the feasibility of SJRRP salmon restoration goals.

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Comparative Analysis of Clp (CRP-like protein) from Xanthomonas axonopodis, Xylella Fastidiosa and Stenotrophomonas Maltophilia

Clp is involved in the pathogenicity of Xanthomonas axonopodis, a plant pathogen causing citrus canker. Clp is a transcription factor belonging to the CRP/FNR superfamily of transcription factors, which are widespread throughout Eubacteria. The protein is transcriptionally active in its ligand-free form, and loses its DNA-binding activity upon binding to its ligand c-di-GMP, which is referred to as reversed allostery. In this comparative study, we characterize Clp proteins from X. axonopodis, X. fastidiosa, and S. maltophilia to identify similarities and differences in their allosteric transition mechanism. Experiments included the cloning and heterologous expression of the X. fastidiosa and S. maltophilia clp genes in E. coli using pBAD18-Amp (an expression plasmid) and subsequent measurement of in vivo transcriptional activity. Both activator-based and repressor-based transcriptional assays indicate that X. fastidiosa Clp is more active (both in expressing the lacZ reporter gene and in causing perturbed growth) than those of X. axonopodis and S. maltophilia. Furthermore, we measured in vivo c-di-GMP dependence in transcriptional activity for the three Clp proteins. The results revealed high c-di-GMP affinity for all of the proteins. Based on these results, we are currently planning to create X. fastidiosa Clp mutants via site-directed mutagenesis to identify residues critical for Clp function, specifically ligand-free activity and ligand response.

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Reactive Oxygen Species in Caenorhabditis briggsae Mitochondria

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 (often sterility or lethality) relative to the parents. Such effects suggest that a combination of genes inherited from the parents causes poor health in the hybrid offspring. I study this process in the nematode Caenorhabditis briggsae, a close relative to the more well-studied C. elegans. It is known that, when two particular strains of C. briggsae are crossed, they produce a hybrid F1 generation worm. When these particular F1 hermaphrodites are allowed to self-replicate, the F2 generation of nematodes exhibits developmental delay in about 20% of the progeny. Developmental delay is evident as this class of F2 individual takes about 33% longer to reach adulthood than their wild-type siblings. Developmental delay is a mild form of hybrid dysfunction; my project seeks to identify the molecular/cellular basis for why developmental delay occurs. The reason for exhibiting this delay is unknown; the hypothesis I am testing is that mitochondrial dysfunction causes reduced development rate. This hypothesis is founded upon the idea that detrimental genetic interactions in hybrids of other species are known to cause mitochondria to produce reduced amounts of chemical cellular energy in the form of adenosine triphosphate (ATP). Mutations in mitochondrial genes are known to 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 compared to their wild-type F2 siblings. As a proxy for mitochondrial dysfunction, I measure levels of reactive oxygen species (ROS) by feeding the worms a solution of MitoSOX Red, which is a dye that targets the mitochondria in live cells and fluoresces quantitatively depending on the levels of ROS present 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. At this point, I have conducted four rounds of this experiment and no differences between delayed and wild-type individuals have been observed. Thus, elevated levels of ROS have not yet been shown to correlate with developmental delay. However, this preliminary interpretation is based on a small sample size. I am currently refining the techniques and increasing replication of this experiment. In future, I intend to explore the developmental timeline of the delay in C. briggsae hybrids as well.

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Poster Board No. 9

Use of Stable Isotopes of Oxygen and Hydrogen to Trace Water in the San Joaquin River

Typically, flow on the San Joaquin River dramatically with season. There are also commensurate seasonal variations in water temperature, which affects the solubility of oxygen and its evaporation from the river. These dynamics between river flow, temperature, and oxygen are important for several reasons. First, oxygen is critical for organisms in the river such as fish. Second, oxygen solubility in water decreases with temperature, but ironically organisms' metabolic need for oxygen increases with temperature. Third, these dynamics can be revealed by examining the stable isotope ratios of oxygen and hydrogen in the water. Finally, these chemical 'signatures' (δ18O & δ2H) can be used to track fish movements and ranges. My research focuses on how flow rates can affect how dissolved oxygen concentrations and δ18O & δ2H levels differ over space and time.

Water was sampled during July, August, and December 2015 in order to obtain data to relate the effects of flow rates to the similarity of chemical tracers along the river course. Samples were taken from five different sites along ~25 miles of the San Joaquin River from just below Friant Dam. Water temperatures (°C) and oxygen concentrations (mg/L) were recorded using a dissolved oxygen (DO) meter. In July, water temperatures increased dramatically from 14.5 °C at the base of the dam to 29.8°C 25 miles downstream, and dissolved oxygen saturation decreased from 70.5% to 64.9%. Toward the end of July, large water releases from Friant Dam changed the characteristics of the river. Water ranged from 17.1°C at the base of the dam to 21.2°C downstream. Dissolved oxygen decreased from 103.7% at the base of the dam to 85.5% downstream. Sampling in December, with low flow rates and cold temperatures showed temperature changes of 14.97°C to 8.74°C and dissolved oxygen changed from 109.2% to 103.8% as water went downstream. Both water samples and tissue samples were analyzed for δ18O and δ2H at the UC Davis Stable Isotope Facility. These data show how water quality can dramatically change as it flows downstream, changing the stable isotope signatures of the stream. Fish tissue samples should reflect these differences.

These results can help us determine fish ranges by comparing stable isotope signatures in the tissues to the isotopes in the water. Additionally, stable isotope values in fish tissues are direct reflections of the water in their environment.

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Poster Board No. 10

Examining the Hydration and Mechanical Properties of Cement Paste Containing Cellulose Nanocrystals

Cellulose nanocrystals (CNCs) are a nano-scaled particulae material that has been shown to improve strength in cementitious pastes. One advantage of CNCs compared to other nano-materials is that CNCs are renewable and sustainable. The objective of this investigation is to investigate the influence of additional alkali content on the behavior of CNCs in cement paste. This work evaluates flexural and compressive strength as a function of heat of hydration—which measures the extent of reaction. Previous mechanical tests on cement paste containing cellulose nanocrystals (CNCs) have shown CNCs to improve the flexural strength of cement paste by approximately 30%. Isothermal calorimetry testing showed that degree of hydration of the cement paste containing CNCs increases compared to the plain system. Since properties of cement composites are time dependent, specimens were tested at degree of hydration. The hypothesis of this work is that CNC will improve the strength gain as a function of hydration. In addition, CNC will improve in the degree of hydration. To evaluate this hypothesis, cement paste samples were prepared using CNC of 0%, 0.2%, and 1.0% by volume and alkali content of 0.19%, 0.61%, and 1.01% by weight. Heat of hydration quantities was related to specimen ages and mechanical properties at given ages.

Results showed that specimens containing CNCs with additional alkali content greatly increased strength at the same degree of hydration. Results indicate that CNCs are improving the strength of the cement paste by mobility of the microstructure.

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Poster Board No. 11

Role of Enzyme Kinetics on the Anomerization of Glucose Using Real Time Quantitative NMR (qNMR) Spectroscopy

When α-D-glucose is dissolved in solution, it undergoes an anomerization process to form β-D-glucose until the equilibrium between the two anomers is reached. Although the anomeric equilibrium was discovered over a century ago, the mechanism that determines the kinetics of glucose anomerization is not fully understood. Traditionally, anomerization kinetics is performed by dissolving either the α- or β- form of glucose while monitoring the conversion process as it approaches equilibrium. In the traditional approach, the starting condition does not have 100% of either α- or β- form of glucose. This study proposes a new approach that uses the enzyme invertase to convert sucrose into α-D-glucose which is further converted to β-glucose. This ensures that the starting condition contains only α-D-glucose. Using real time quantitative NMR (qNMR), the kinetics and thermodynamics of the anomerization of glucose is monitored as a function of enzyme concentration. The results show that the anomerization depends on two independent events: the conversion of sucrose to α-D-glucose by the Michaelis–Menten mechanism and the anomerization of α- to β-glucose by a pseudo first order reaction. Although at low enzyme concentrations, the anomerization kinetics is rate limited by the enzyme action, it is independent of the enzyme kinetics at higher enzyme concentrations. The qNMR approach developed here demonstrates the capacity to determine both kinetic and thermodynamic parameters of the anomerization process in the presence of enzymes, thus being widely applicable to other carbohydrates and enzymes.

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A Statistical Approach to Analyze Engineering Estimates and Bids

A. The intent of this research is to develop a methodology to assess the accuracy in engineering estimates in relation to the final project cost.

B. In order to present a comprehensive approach towards obtaining a more reliable project estimate, a systematic review of previous data obtained as well as a synthesis of the literature review were employed. The literature review provides a basis for determining key components in the estimation for the capital cost of a project. Sample projects, advertised amongst a specific time period, were selected for this study. Statistical distribution were acquired for the initial project estimate and bids received for each project. Further analysis exhibited the significance of different strategies applied, including lowest bid, average bid, etc., in comparison with the engineer's estimate. In addition, analysis of the cost estimate amongst differing stages of the project was also presented. Ratios that were obtained comparing initial and final bids, as well as previous research in regards to this subject, both provide a basis for a preeminent methodology in estimating a final bid.

C. Presented data displayed a maximum 40 percent variation amongst the estimates provided by the engineer throughout the design stage. Further data relating the ratio of the bids with the frequency, show the lowest bid to be within the 0.004 to 4.237 percentile range.

D. The range of the project estimation exhibits the impact of inflation and unanticipated costs within the project cycle. In order to decrease the gap that exists between the predicted and final costs, different approaches are taken towards adjusting the initial estimate values. These adjustments aim to provide a range of estimates within the scope of the final project cost. Further studies are recommended to broaden the scope of the work and verify applicability of statistical methods in various projects and bidding environments.

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Reaction-Wheel Based CubeSat Spin Stabilization and Control Test Bed

This study presents a framework for the development and testing of a single axis attitude determination and control system (ADCS). The proposed system must be small enough to fit within the physical constructs of a standardized micro-satellite, called a CubeSat. This subsystem is intended to control the spin orientation of the sixth Technical and Educational Satellite, thereby allowing the transmitting antenna to aim towards Earth surface while the satellite is in orbit. Throughout the paper, the mathematical modeling of the CubeSat dynamics will be presented, along with the most efficient method of controlling the satellite's spin orientation. The prototype contains a steel fly wheel driven by a brushless DC motor. The motor-wheel assembly is mounted to an independent subsection of the satellite and is fully equipped with 'plug and play' capabilities. A PID controller has been designed and tuned to minimize power consumption while simultaneously ensuring pointing accuracy. In addition to that, a test bed was developed that can demonstrate the capabilities of the subsystem while still under the influences of Earth's gravitational pull.

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Studying the Effects of Bcl-2 Family Proteins on Oxidative Phosphorylation

B-cell lymphoma 2 (Bcl-2) family of proteins are important regulators of the intrinsic pathway of apoptosis. This pathway involves the release of cytochrome c from the mitochondria into the cytosol to activate caspases. The Bcl-2 family includes several pro-apoptotic and anti-apoptotic proteins. Overexpression of the latter, such as Bcl-2 and Bcl-xl, is associated with certain cancers. Our goal is to study the effect of Bcl-2 and Bcl-xl overexpression on tumor metabolism. Cancer cells tend to exhibit very high rates of lactic acid fermentation compared to normal cells. This has led to the assumption that cancer cells shift toward anaerobic respiration. 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.

We use fetal prolymphocytic murine cells (Fl5.12) in our study. We have different types of these cells. The wild type is the control to which our results can be compared. One of the cell lines overexpresses Bcl-2 and the other overexpresses Bcl-xL. Based on our hypothesis, we expect these two types to have higher rates of aerobic respiration since they represent our model of tumor cells.

Our first goal is to study oxidative phosphorylation in cells growing in IDMEM media with 25mM glucose (25IDMEM); and we use a Clark oxygen electrode to measure the respiratory activity of these cells. Our preliminary data suggest that Bcl-2 and Bcl-xL have different effects on oxidative phosphorylation of our prolymphocytic model: Bcl-2-overexpressing cells show an increased basal respiration vs. Parental; while the basal respiration of Bcl-xL-overexpressing cells is decreased. Future research will include pharmacology-based respiration studies on isolated mitochondria from the different cell lines to determine what respiratory complexes are more specifically targeted by Bcl-2 or Bcl-xL overexpression.

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Poster Board No. 15

Detecting Food Borne Pathogens: Using qPCR to Detect B. Cereus and L. Monocytogenes

Food borne illnesses is a major concern in the United States; there are 9.4 million incidents of food borne illness reported each year. Approximately 200 diseases are transmitted through food products causing around 9,000 deaths each year. A goal of health and associated industries is to discover pathogens in food samples in an effective and rapid method. Traditional methods for detecting cultures, extracting DNA, measuring concentrations of DNA, and the use of traditional polymerase chain reaction (PCR) have been published over the last few decades, which are effective, but when available they are highly expensive and time consuming. For this reason, real-time PCR will be used to detect B. cereus and L. monocytogenes DNA in the lowest concentration via fluorescent signals by amplifying a specific gene.

We first focused on a DNA extraction method: we modified the Wizard Genomic DNA Extraction protocol (Promega) for L. monocytogenes and B. Cereus. We attempted different techniques of extraction by using the Omni-Mixer, longer incubation of lysozyme, and using liquid nitrogen. We used the NanoDrop 2000 instrument to determine the nucleic concentrations to determine yield of DNA. A growth curve analysis provided us with an optical density, which can be used to create a standard curve to determine the number of cells in a sample. With real-time PCR, we were able to obtain a graph where the lowest dilution of bacterial DNA was observed via fluorescent signals. We determined that the optimal incubation for L. monocytogenes in lysozyme for 3 hours and B. cereus in lysozyme for 2 hours with a liquid nitrogen pretreatment yielded more DNA in comparison to the original DNA extraction protocol. The results from the graphs for qPCR confirmed that a dilution of 10 -9 was the lowest concentration that DNA can be seen by amplifying a specific gene in both samples. Our next step would be to run more trials to confirm our results.

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Synthesis of Gadolinium Nanoparticles Using the Inverse Micelle Method

The interest of nanoparticles in recent years has increased significantly because of their unique properties, such as UV prevention or superparamagnetism, compared to their bulk counterparts. These properties have become useful in biological as well as industrial researches. For example, they have been used in pathology detection, drug delivery, and sunscreens. Gadolinium is a rare earth metal that exhibits paramagnetic and ferromagnetic properties above and below 293K. To synthesize this rare earth metal at a much smaller scale, our laboratory has employed the inverse micelle technique followed by a reduction reaction. Inverse micelles were formed using didecyldimethylammonium bromide (DDAB) as the surfactant, methanol as the polar solvent, and heptane as the non-polar solvent based on a polar solvent-to-surfactant ratio of 2.5, and gadolinium chloride was reduced with sodium borohydride. Nucleopore vacuum filtration was used to extract the micron-sized micelles. Light microscopy analysis confirmed the presence of micelles averaging 1 micrometer in diameter.

Future experiments will consist of decreasing the polar solvent-to-surfactant ratio to form gadolinium-filled micelles in the nanoscale, as well as increasing purification and yields.

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Poster Board No. 17

Stratigraphy and Transmissivity of the Kaweah River Fan, Visalia, California

The Kaweah River fan is located in the Tulare Basin of the San Joaquin Valley of California. This fluvial fan supplies groundwater for several farms and cities including Visalia. The geology in this region is generalized yet is similar to all major river fans that flow into the San Joaquin Valley from the Sierra Nevada. The objective of this thesis was to: 1. Correlate stratigraphic units to hydrologic units from research, 2. identify the spatial extent and stratigraphy of the lithologic units, 3. use correlations to identify the aquifer, and 4. measure and estimate the aquifer's hydraulic conductivities and transmissivities. Field core samples were taken from soil surface to 132 feet below surface. In this process, a new method for sampling unlithified-core for laboratory testing was created to make this study possible. The results show that Pleistocene stratigraphy described by Marchand and Allwardt (1981) is found throughout the study area. Furthermore, the upper Turlock Lake Formation or Layer 3 aquifer is the major host for groundwater in the fan and is characterized by a high transmissivity of 2700 ft2/day (250 m2/day). In conclusion, this study demonstrates that the San Joaquin Valley has two different models for confining beds which are the lacustrine and swamplands for the terminal basin and paleosols for the fluvial fans. The notion of paleosols as confining beds for the fluvial fans was first proposed by Weissmann and Fogg (1999) whereas this report confirms it through laboratory experiments.

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Common Core: The New Labyrinth

According to the Common Core State Standards Initiative (2015), 43 states, the District of Columbia, four territories (Guam, American Somoan Islands, US Virgin islands, and Northern Mariana Islands), and the Department of Defense Education Activity (DoDEA) have implemented the Common Core State Standards (CCSS). The CCSS represents a model for all students, including English Language Learners (ELL), designed to advance their critical reading competency by developing proficient understanding of difficult text and analytical writing skills in response to complex text. The purpose of this article is to examine the methodology of scholars who suggest to school districts the actions needed to successfully prepare ELL students for college and career readiness. I analyzed the methods of high schools participating in the Understanding Language, Stanford Graduate School of Education "Schools to Learn From" research project (STLF), which is supported by the Carnegie Corporation of New York and involves schools that are preparing high percentages of ELL students for college and career readiness (Castellón et al., 2015). College and career readiness is defined as the level of development required for students to enroll and succeed without remediation in a postsecondary institution that offers a baccalaureate degree or to transfer to a baccalaureate program or high quality certification program in order to advance in their careers (Conley, 2007, 2010). The determinants that schools can control to assist ELLs are acceleration, critical thinking, equitable practices, and support (ACES), which can be associated with curriculum, instruction, and structure to bring students to college and career readiness (Burris & Garrity, 2012). I will be applying the ACES framework to High School A and High School B featured in the STLF project (Castellón et al., 2015).

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Impact of Acculturation on Immigrants' Dental Health

Tooth decay is the most common dental disease affecting children and adults in the U.S (Centers for Disease Control and Prevention [CDC], 2015). Furthermore, immigrants are more likely to experience dental diseases than their native counterparts in the U.S. due to differences in educational levels, cultural norms, and exposure to health services (Vared, Zini & Sgan-Cohen, 2009; U.S. Department of Health and Human Services, 2016). Depression, loneliness, financial stress, and low self-esteem are some of the outcomes of migrating to a new country, which can cause immigrants to neglect their health while they are trying to become financially stable (Vared, Zini & Sgan-Cohen, 2009). Research also shows that people's health-seeking behaviors can be linked to their ethnicity (Butani, Weintraub & Judith, 2008). This literature review explains how acculturation can affect immigrant adults' perceptions of utilizing dental services. It also answers how immigrants' age at immigration, duration of stay in the U.S., and residency in urban areas can influence their dental-health-seeking behaviors.

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Marijuana Attitudes, Perceptions, Use, and Academic Achievement

This research looks into perceptions and attitudes about the legalization of marijuana and the correlation between marijuana use and academic achievement as defined by grade point average (GPA). California remains the last of the west coast (Alaska, Washington, Oregon) to permit nominally marijuana use. This status may change with the proposed initiative on legalization slated for the 2016 election. Although there is an overall trend in the acceptance of quazi-legality, it is not a given (Ohio, 2015). Studies have been conducted into marijuana use and academic achievement, yet this research has been geographically bound to the eastern and southeastern portions of the United States. Variables investigated included; academic achievement (GPA), employment, relationship status and attitudes towards state recreational use legalization. The diversity in age and ethnicity of a large urban California university students offers a different population sample than previous research and the goal is to examine if the findings of this study are similar to the findings of previous studies within a different social and political climate. In addition, this research seeks to provide a measure of individual's attitudes towards marijuana legalization, and examines the perceptions of possible harmful implications stemming from legalization and recreational use. Data were collected on familial history of neurological and psychological disorders and general demographic information. The data upheld the predictive influence of marijuana use and low GPA, but the values did not reach significance. Overall, the data found significant support for California recreational marijuana legalization among both users and non-users.

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Rating RateMyProfessors.com: A Comparative Analysis of Official Student Evaluations and Unofficial Online Comments

RateMyProfessors.com is the largest and most popular website that allows college students to find out about professors' personalities, helpfulness, easiness, and clarity. Although many debate the credibility of the website, RateMyProfessors.com is only one of the limited resources students can count on to learn about faculty performance. This research is composed of two studies: In study 1, 400 students were questioned about their beliefs and perspectives with respect to RateMyProfessors.com. This part of the study found that nearly three-fourths of the participants have selected most of their professors based on the ratings found online. In study 2, the official teaching evaluation results from six faculty members were compared to the unofficial comments posted online. The formal and informal evaluations were found to be similar, making RateMyProfessors.com a great tool for students.

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Poster Board No. 1

Nanoparticle Delivery of Curcumin and Chemotherapeutics for the Treatment of Drug-Resistant Pancreatic Cancer

Pancreatic cancer, one of the deadliest diseases in the United States, is difficult to treat in a safe and effective manner. This disease is especially problematic when the tumor becomes resistant to treatment. This situation leaves doctors with two choices: 1.) increasing the dosage of the toxic chemotherapeutic thus increasing the chance of killing the patient, or 2.) choosing another toxic chemotherapeutic and hoping that the new drug will not kill the patient during treatment. Using nanometer-sized drug delivery devices, known as nanoparticles, to deliver chemotherapeutics specifically to the tumor site is a promising treatment option for drug-resistant cancers. Nanoparticle delivery increases the bioavailbility of the encapsulated drug, delivers it specifically to the tumor site, and lowers the effective dose necessary to kill the tumor cells, thus reducing the risk of toxic side-effects on the patient. Recently studies have demonstrated the effectiveness of curcumin, a natural compound found in turmeric spice, in re-sensitizing drug-resistant cancer cells to treatment when given in combination with standard-of-care chemotherapeutics such as gemcitabine and docetaxel. Here we have developed nanoparticles contain curcumin in combination with gemcitabine or docetaxel. We validated these formulations by characterizing its size and electrical charge by dynamic light scattering analysis and use high performance liquid chromatography (HPLC) to confirm their chemical composition and concentration of the entrapped drugs. We then treat pancreatic cancer cells (sensitive and drug-resistant) with the nanoparticle formulations and use viability assays to evaluate the efficacy of the novel drug in comparison to treatment with just the chemotherapeutics. The nanoparticle are more effective in killing the cancer cells at lower doses than treatment with high doses of gemcitabine or docetaxel. The long term benefits of this work are the development of a novel, safer and more efficient treatment for drug-resistant pancreatic cancer and a significant reduction in moralities associated with this disease.

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Simulation of Scene Perception and Navigation of Wood Ants in Naturalistic Environments

When an animal moves through their environment they must identify reliable sensory cues to guide their routes. Identifying reliable sensory cues is not a trivial process because often it is not possible to know in advance which cues may be useful. Animals that rely on vision to navigate through the world must extract and integrate behaviorally relevant visual cues, often from cluttered scenes, so that they can locate a desired goal. In ants, a number of studies have identified several visual cues that can guide an ant when navigating, however, as to how the cues are perceived or prioritized is unknown. Prior work on ant navigation identified the cues that ants can uses for guidance such as the edges of objects, the horizon and the center of mass, but it has not been shown how the visual cues are behaviorally weighted. It is currently unknown how ants value one cue versus another or how a specific cue or combination of cues comes to be learned and ultimately helps an ant reach its goal. In order to investigate how visual cues are extracted and prioritized, a model was created to simulate ant navigation in procedurally generated environments where the visual cues could be precisely characterized. In these computer-simulated environments, we examined how different cues were viewed and learned during a single random foraging walk and its corresponding return route. Following this single bout of foraging and learning we examined the success of the simulated ant in finding the goal location using the information stored. In addition to the simulated environment, we imaged a real world environment. We took a series of panoramic images along a simulated foraging route in the Allergy Free Garden at Fresno State. We converted these images into views that represented an ant's visual perspective and ran them through our simulation. The results of this data have provided insight into the mechanisms involved in prioritization and perception of visual information. Additionally, it has let us investigate how memory can be optimized in simple networks and nervous systems.

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Variation in Daily Growth Rates in Juvenile Chinook Salmon

The San Joaquin River Restoration Program (SJRRP) was established in 2006 to mitigate the effects of over fifty years of damming and water diversion on the San Joaquin River in Central California. An integral part of this program has been the reintroduction of Chinook salmon (Oncorhynchus tshawytscha) to the river. The Aquatic Ecology lab at California State University Fresno has collaborated with the SJRRP in studying the feeding and habitat requirements of juvenile Chinook Salmon on the San Joaquin. This study seeks to investigate the average daily growth rates of juvenile Chinook Salmon, and determine if that rate varies by week. Daily growth rates can be reasonably extrapolated through measurements taken from otoliths, or ear bones, of salmon. High powered microscopy allows us to measure ring distances on the order of micrometers. Salmon lay a new ring of calcified tissue on each otolith for each day of feeding, much like tree rings. The distance between each ring corresponds positively with the amount of daily growth of the fish. After analyzing the images of 19 separate otoliths, the data show a significantly consistent linear decline in weekly growth rates. Interestingly, the variation in growth rates among the fish also decreases significantly over weeks. Since the date of capture for each otolith is known, we can align growth-rate data with variations in temperature, water quality, or prey abundance, which may be used in subsequent studies to inform the progress of the river restoration.

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Identification of Mutants Involved in Chalcone Degradation in Caenorhabditis Elegans

Plant Parasitic Nematodes (PPNs) cause an estimated annual monetary loss of $157 billion worldwide in agriculture. To limit this cost, understanding how nematicides work is important to synthesize the most effective nematicidal agents. Previous work in Dr. Calderón-Urrea's lab identified two organic chalcones (chalcones 17 and 25) as effective nematicidals on model nematode Caenorhabditis elegans and the PPN Meloidogyne incognita (Saeed, et al. 2012 and Calderón-Urrea, personal communication), although their mechanism of action is unknown. I address this lack of knowledge by identifying the pathways that may enable C. elegans to overcome (live in the presence of) organic chalcones.

To identify the pathways involved, I have been screening populations of mutagenized (using Ethyl methanesulfonate-EMS- as mutagen) C. elegans to identify nematodes able to survive in the presence of chalcones (the control chalcones 1, and the chalcones 17 and 25); these surviving worms may have transmissible mutant alleles allowing them to survive the chalcones. The screen is conducted in the F2 eggs by plating them onto chalcone (toxic) plates. For three days after that, I monitor the eggs to determine if any of them can overcome the chalcone.

Initial results show that our mutagenesis protocol is working since we have identified several morphological mutations (such as dumpy and blister phenotypes). The second screen with chalcone 25 produced two nematodes that were able to overcome the chalcone and reproduce normally. However, the initial screens using chalcone 1 have shown that none of the mutagenized nematodes (approximately 10,000 genomes each) have been able to overcome the toxic effects of the chalcone. Future work will include screens of chalcone 17 and study survivors of chalcone 25 further. We expect to find mutant nematodes that overcome the toxic effects of chalcones 1 and 17 and identify the mechanism of action of chalcone 25.

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Characterization of a Novel cGMP-Sensing CRP from Rhodospirillum Centenum

The cyclic nucleotide ligand, cAMP, was long thought to be required for Escherichia coli cAMP receptor protein (CRP) and its related proteins in terms of DNA binding and transcriptional regulation functions. Recently, cyclic GMP was found to serve as a secondary messenger in the bacterial species Rhodospirillum centenum, especially for its cyst formation process. cGMP can bind to the CRP homolog of R. centenum (termed Rc_CRP) to initiate DNA binding. To comparatively study this Rc_CRP protein along with the E. coli CRP, we cloned the Rc_crp gene in pBAD18 and heterologously expressed it in E. coli. Since E. coli is unable to produce cGMP, we then cloned gcyA (encoding a guanylate cyclase) from R. centenum into a compatible plasmid vector (pACT3) to produce cGMP. GcyA was confirmed to produce cGMP because its presence activated the cGMP-responsive E. coli CRP mutant, R123N/T127C/S128T CRP, in our CRP reporter strain. However, when we tested Rc_CRP using this established in vivo assay system, we were unable to detect any cGMP-dependent activity from Rc_CRP. To identify what caused the lack of this expected cGMP-dependent activity, we are currently testing two working hypotheses. Firstly, the DNA-contacting F-helix residues of Rc_CRP are slightly different from those of the E. coli CRP, thus Rc_CRP could not detect the E. coli CRP DNA binding site of the reporter strain. Secondly, Rc_CRP needs to interact with E. coli RNA polymerase for transcriptional activation of the reporter gene (lacZ), but Rc_CRP is from R. centenum (not from E. coli) and may not be compatible with the E. coli RNA polymerase.

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Analysis of Residues Critical for the Constitutive Activity of Clp from the Pathogen Xanthomonas Axonopodis

The CRP/FNR superfamily of transcription factors includes Clp (CRP-like-protein). Although Clp serves an important virulence function in Xanthomonas species, a plant pathogen, its activation mechanisms are not well-studied. Clp is active without any ligand in terms of DNA binding, and this activity is inhibited by the binding of its ligand, c-di-GMP. This ligand effect is opposite of the model protein, Escherichia coli CRP. apoCRP is inactive and the protein is activated by the ligand cAMP. The focus of this study is to characterize critical residues involved in the c-di-GMP-free activity of Clp. We recently identified via a chimeric protein approach that the region between Arg163 and Pro175 is important for the c-di-GMP-free activity. Next, through site-directed mutagenesis, we substituted Clp residues with the ones found in the E. coli CRP, resulting in R166Q, H169L, E174Q, D170N and V165A mutants. Among them, three Clp mutants showed different phenotypes compared to wild type Clp; while H169L and E174Q Clp displayed reduced activity, D170N Clp completely lost its in vivo c-di-GMP-independent activity. This result suggests that His169 and Glu174 are important for c-di-GMP-free activity and Asp170 is critical. We are currently analyzing the Asp170 residue in more detail by randomizing its codon and screening for Clp mutants containing normal c-di-GMP-free activity. In a separate approach, we created an R144K/T148L/T149I Clp mutant mimicking R123K/T127L/S128I CRP which showed high cAMP-free activity, expecting that it will have high c-di-GMP-free activity. The R144K/T148T/T149I Clp failed to increase Clp activity; in fact, it lost the activity of wild type Clp. This result suggests that Clp differs from CRP in the function of its dimerization domain as well. Our data imply that Clp is surprisingly different from CRP throughout the protein in terms of ligand effects and protein conformation, despite its high sequence similarity to CRP.

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Identifying Genes of Interest Disrupted in Transposon Mutants in Mycobaterium Smegmatis

An increase in multidrug-resistant pathogens is a major public health problem. Only one-third of the diseases can be treated as a result of increased antibiotic resistance in pathogens. One of the pathogens widely studied, Mycobacterium tuberculosis, is the causative agent of the disease tuberculosis. A non-pathogenic Mycobaterium smegmatis is frequently used as a model organism. One method to study the functional genomics of this bacterium is transposon mutagenesis with Tn5 transposon. Transposon mutagenesis was used to create mutants in random genes. Genomic DNA was performed for eleven mutants followed by restriction enzyme digest with SalI and PstI. Digested DNA were self-ligated into circular fragments. DNA flanking the transposon was amplified by using primers Kan-2RP and Kan-FRP that are complementary to the ends of the transposon. Amplified products were sent for sequencing and the sequences were analyzed in order to identify disrupted genes. Out of 47 mutants the genes disrupted in mutants NG 28,29,30,33 and 34 were identified. NG 28 (MSMEG_0484), was discovered to be an eptc-inducible aldehyde dehydrogenase with unknown function. The M. tuberculosis gene homolog Rv0484c was a probable short-chain type oxidoreductase with unknown function, possibly involved in cellular metabolism. NG 29 and 30 (MSMEG_0646) were discovered to be a putative transporter with unknown function. The M. tuberculosis gene homolog Rv0646c or LipG a lipolytic enzyme involved in cellular metabolism. NG 33 (MSMEG_0900) was a putative transporter with unknown function. Finally, NG 34(MSMEG_1642)is an ABC transporter with unknown function. Work is needed to characterize unknown potential proteins of interest.

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A Fruit Fly Model of the Neurodegenerative Disease, ALS-PDC, Induced by Exposure to an Environmental Neurotoxin

Amyotrophic lateral sclerosis-Parkinsonism dementia complex (ALS-PDC) is a triad of neurodegenerative diseases characterized by a loss of motor function, tremors, and dementia. In the early 1950s, there was a high prevalence of ALS-PDC amongst the inhabitants of Guam. BMAA (Beta-methyl amino alanine), a non-natural amino acid, was implicated in causing the multiple symptoms of ALS-PDC due to its similarity in structure to glutamate. Exposure to BMAA may be biomagnified in the food chain from the cyanobacteria that produce the BMAA, to the symbiotic root nodules of the cycad plants. Drosophila melanogaster (fruit fly) are a good model for studying human neurodegenerative disease and the basic mechanism of neurotransmission.

Canton S flies were fed BMAA at varying concentrations (12.5, 25, and 50 mM) to model the ingestion route of exposure similar to that of humans. The flies show 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. By day three only 80, 60 and 40% of the fruit flies fed the lower dosage to higher dosage flies remain alive. Fruit flies tend to climb up the walls of a container once they are tapped down it. The flies are tapped down a vial and the number of flies that are above the 5.5 cm mark after 30 seconds is recorded. The BMAA-fed flies show just like their viability, a dose-dependent decrease in reactive climbing behavior.

In a parallel experiment, various concentrations of BOAA (Beta-N-oxalylamino-L-alanine) have been added to standard fly food and given to a group of age-matched female flies. Surprisingly, BOAA has no effect on the viability, nor the locomotor ability of the fruit fly. BOAA is found in the chickling pea, Lathyrus sativus, found in parts of India and Ethiopia. In contrast, when flies are co-fed L-serine with L-BMAA, there is a marked abrogation in the locomotor and viability of the co-fed flies as compared to BMAA-only fed flies. All of these data taken together point to 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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Identifying Gene Disrupted in Mycobacterium Smegmatis Transposon Mutants

Transposons are a small piece of DNA that move into different positions in the genome. Mycobacterium smegmatis was used because it is a non-pathogenic bacterium and has a rapid growth rate which makes it an ideal model organism. SalI, NarI, PstI and MluI restriction enzymes were used to cut genomic DNA isolated from eleven mutants. The restriction digest was self-ligated process using T4 ligase. Kan2F and Kan2R primers were used to PCR amplify the flanking genomic region from the ligated mixture. Any bands that amplified were sequenced. Using the website Smegmalist, we found that MSMEG_1517, MSMEG_6906, MSMEG_1050 and MSMEG_1642 were disrupted in from the 5' end mutants, respectively. In M. tuberculosis, the homolog for MSMEG_1050 is a SAM-dependent methyltransferase, the homolog for MSMEG_1642 is an ABC transporter/ATP-binding protein, and MSMEG_1517 is a protein with SPFH domain / Band 7 family protein and MSMEG_6906 has an Alpha/beta hydrolase fold. Future experiments will continue with the bands that did not amplify through PCR.

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Effects of Gender, Need for Leadership and Positive Affect Between Transformational and Transactional Leadership Styles

Overall, past leadership researchers have neglected to study followers, and thus have missed a crucial component to the leadership process (Uhl-Bien, Riggio, Lowe, & Carsten, 2013). Followership theories state that the qualities and perceptions of followers have a huge impact on a leader's behaviors and outputs (Kelley, 1988). This study took a follower-centric approach to examine the significance of several variables on follower perceptions and attitudes of their leader. Researchers hypothesized that a follower's indication of being able to identify with the leader and having positive feelings toward the leader (i.g. relatable and likability of the leader) would increase the favorability of the leader. Another hypothesis was that the participants would be fonder of the transformational leaders. Researchers also hypothesized male leaders would be rated higher than female leaders. In this study, researchers sampled college students (n=99) and randomly assigned each participant to one of four conditions, in which they were given a transformational or transactional leader. The leader's gender was also manipulated in each condition. Participants were then given an online survey after they were exposed to their condition. Results indicated that for male transformational leaders, need for leadership was positively associated with positive affect, perceived effectiveness, and higher recommendation ratings. In addition, transactional male leaders were associated with higher recommendations and positive affect when participants had higher need for leadership. Also, results indicated that a follower's perception of being able to identify with the leader was positively associated with higher levels of recommendation of that leader and higher levels of perceived effectiveness. Positive feelings were also positively associated with higher recommendation ratings. Participants that were assigned to the transformational leader conditions were found to be significantly more likely to have higher positive feelings toward their leaders than those in the transactional leader conditions. In conclusion, this study exemplifies the importance of the effects of psychosocial variables in creating follower perceptions of their leader. The results and conclusions from the analysis are discussed further in the paper.

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Social Anxiety and Values in Relation to Acceptance and Commitment Therapy

Acceptance and Commitment Therapy examine the level of suffering people with social anxiety disorder experience. Individuals who suffer from Social Anxiety Disorder (SAD) often isolate themselves from society. The current literature review defines different aspects of social disorder and how the disorder relates to one's values. Experiential avoidance is the attempt to avoid any social interaction that increases social anxious thoughts, feelings, and bodily sensations (Kashdan, 2007). When individuals engage in cognitive challenging situations it may lead to self-control reduction as defined by the individual's ability to regulate attention energy and acceptance of emotional distress. Acceptance and Commitment Therapy (ACT) is a third-wave behavior therapy that focuses explicitly on changing one's connection with one's thoughts, instead of changing the content of those thoughts. ACT asserts that strong change is possible and it can come quickly, because the real problem is the general milieu and the purpose of action, and not the well-conditioned life difficulties. The overall results from different studies in my literature review indicate that symptom improvement is possible to result from a person's willingness to join social gatherings and practice aversive emotions, which are recognized with one's values.

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Neurotoxic Effects of BMAA on Human Neuroglioma Cells to Investigate Amyloid Beta Formation

Alzheimer's disease (AD) is a progressive neurodegenerative disease characterized by neuron cell death. Amyloid-Beta Peptide (Aβ) plaques outside nerve cells and hyper phosphorylated tau neurofibrillary tangles are found within Alzheimer brain nerve cells. Aβ a ~4 kDa peptide fragment are thought to play an important role in Alzheimer's disease by forming insoluble fibrous proteins outside nerve cells and causing protein misfolding. Proteolytic cleavage of Amyloid-β Precursor Protein (APP) produces C-terminus fragments labeled C83 and C99 (sAPPa, sAPPβ respectively) these fragments are further cleaved by γ-secretase to produce two forms of Aβ (Aβ40 and Aβ42).

The measurement of the C-terminus fragments is an indirect way of measuring the Aβ produced. □-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. The late onset of neurodegenerative diseases such as AD and Amyotrophic Lateral Sclerosis–Parkinsonism/Dementia Complex (ALS-PDC) has been linked by previous studies to bound BMAA in the brain creating a neurotoxic reservoir. There remains a gap in the relationship between BMAA and APP processing.

The purpose of this study is to investigate the effects BMAA will have on H4 neuroglioma cells overexpressing APP751. This will provide insight on a possible correlation between the Aβ (Aβ40 and Aβ42) fragments produced and the C-terminus (C83 and C99) fragments produced through APP processing. From previous work we have confirmed that BMAA increases the C99 fragments which are produced in the amyloidogenic pathway of APP processing. To evaluate our hypothesis that Aβ42 will increase with increased C99 fragments this study used an ELISA method. H4APP cells were treated with varying concentrations (0, 30, 100, 300, 1000, 3000 μM) of BMAA with 24, 48, and 72 hours incubation and conditioned media was tested using an optimized ELISA technique to quantitatively measure Aβ42. These results will allow us to further investigate the neurotoxic effects BMAA has on H4 neuroglioma cells.

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Synthesis and Structure Activity Effects on the Cytotoxicity of Asymmetric Curcumin Analogues towards Prostate Cancer Cells

The organic compound Curcumin was isolated from turmeric a type of ginger found in east India. Curcumin has shown the ability to treat prostate cancer through in-vitro cell based experiments and in-vivo animal models. Unfortunately, curcumin's low bioavailability, potency, and cytotoxicity warranted further research. The research conducted by our group looked at curcumin's chemical structure to synthesize analogues of curcumin with improved properties.

The research being carried out involves the synthesis of asymmetric bulky heterocyclic 1,5-Diheteroaryl-1,4-pentadien-3-ones curcumin analogs. These analogues were synthesized through the Horner-Wadsworth-Emmons reaction of 1,3-bis(diethylphosphonato) and acetone with heteroaromatic aldehydes. The analogues synthesized featured a five carbon dienone linker with different terminal heteroaromatic rings. The structure of all the analogues were confirmed through their 1H and 13C NMR spectra. The five carbon dienone linker was identified as the best scaffold for the analogues from previous research conducted by our group. The synthesized compounds cytoxicity were tested using a WST-1 assay against the PC-3, DU145, and LNCaP prostate cancer cell lines. All the synthesized compounds exhibited stronger and better cytoxicity towards the PC-3, DU145, and LNCaP cancer cell lines than curcumin. The cytoxicity effects of asymmetric heteroaromatic rings on curcumin analogues will be presented.

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Small Molecule Binding Sites Explored in Camelid Variable Heavy Chain Antibodies

A technique for the detection of detrimental chemicals found in living spaces using camelid variable heavy chain antibodies (VHH) has been developed. VHH from camels are useful in comparison to traditional monoclonal antibodies in that they are easily expressed in bacteria, have a high thermostability, long binding loops, and are immensely small. The chemicals being detected for the purposes of this study are poly-brominated diphenyl ethers (PBDEs), which are thought to be carcinogenic, mimic the body's endocrine system, and cause neural damage to humans. Unfortunately, few crystal structures have been solved with VHH binding to small molecules, so it is unclear how these detection kits work. Our objective is to find the binding sites of these small molecule haptens using PBDEs as a model with crystallography techniques. We have obtained preliminary crystals with purified protein and are optimizing the conditions for crystallization. The next step is to introduce the small molecules and have both crystal structures analyzed using x-ray diffraction. We hypothesize that novel binding strategies between VHH and our small molecules will be realized in our model. With this knowledge, the solved structures may allow us to engineer VHH with improved affinity for their respective ligands and improve our detection methodologies.

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Keto-Enol Tautomerization Equilibrium of Acetylacetone in Mixed Solvents. Does Meyer's rule still apply?

The keto-enol tautomerization is a concept that looks at proton migration within a compound. Recent studies have examined the solvent effects on the tautomerization of β-diketones and have shown that the keto tautomer is favored as the solvent polarity increases. This trend is known as Meyer's rule and studies have validated this rule by studying the tautomerization equilibrium of a β-diketone in the presence of a single solvent. In order to evaluate the applicability of Meyer's rule, the tautomerization equilibrium of a β-diketone is studied in a mixture of solvents. By systematically varying the molar ratio of the solvent mixture, this study examines the tautomerization in a mixture of two solvents through 1H NMR spectroscopy. NMR based chemical shift changes are measured using a high-resolution spectrometer (300 MHz) and a desktop spectrometer (82 MHz) for the solvent mixtures Methanol/Chloroform, Methanol/Acetone, Methanol/DMSO, Acetonitrile/Chloroform, Acetonitrile/Acetone, and Acetonitrile/Methanol as a function of molar ratio for acetylacetone, a simple β-diketone. These experiments reveal the change in the equilibrium process as a function of the molar ratio of solvents is not always linear thus providing new insights that could lead to the expansion of Meyer's rule to include ternary mixtures.

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Private Embarrassment: An Empirically Informed Philosophical Analysis

The term embarrassment has descriptive ambiguity in philosophical literature, even if scholars generally assent to a degree of certainty regarding what a construal or evaluation of embarrassment essentially involves (e.g., an aversive exposure to an interpersonal interaction). This ambiguity pervades common usage, in and across disciplines, even if philosophers and psychologists alike have tried to clarify the term. Two philosophers in particular, Béla Szabados and Luke Purshouse, have given accounts of embarrassment in two categories—public and private. While public accounts tend to fit the standard interpretation of embarrassment, private embarrassment seem to be slightly problematic. But, in light of people's ability to recount privately embarrassing events that do not fit the standard interpretation of embarrassment, philosophical projects that wish to give an adequate theory may now also need to demonstrate how intrapersonal (or private) models of embarrassment are construed or evaluated. Whether these views are incommensurable with interpersonal models of embarrassment, or theories of embarrassment in general, is what I address in my project.

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Characterization of Potential Oomycete Pathogens Present at California State University, Fresno Farm Laboratory

Oomycota are a class of fungal-like organisms that include several devastating plant pathogens. Many genera attack agricultural crops, and mobile spores known as zoospores can be disseminated via irrigation water. The objectives of this study were to characterize the species of oomycetes present in agricultural fields and irrigation reservoirs at the California State University, Fresno Farm Laboratory and to determine probable source pathways from the irrigation reservoirs for pathogen dissemination. Two methods of baiting the pathogens were used. In the first, soil and water samples were collected in fields and returned to the lab. Pear or cucumber was then used as bait, since oomycetes are one of the few organisms that can penetrate their intact skin. The baits were left in the sample for two to five days. In the second method, pears and cucumbers were suspended in cheesecloth in irrigation reservoirs for five days. For both baiting methods, symptomatic plant tissue was excised and plated on an oomycete selective medium. Positive samples were identified using morphology and DNA sequencing. Of 56 total isolates, four plant pathogenic genera were identified in the field samples. Three of these were also found in the irrigation water, indicating that the irrigation system may act as a source of infectious disease.

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Oxidation of 3-OH in Silibinin and Derivatives

The 2,3-dehydrosilibinin is a naturally occurring flavonolignan, a minor component of silymarin, an extract from the seeds of milk thistle (Silybum marianium). However, it exhibits better antiproliferative activity toward prostate cancer cell lines, LNCaP, DU145 and PC-3 compared to other components in the silymarin extract. Through our primary data, 2,3-dehydrosilibin derivatives also prove to have lower IC50 values compare to their counterpart silibinin derivatives. Interestingly, silibinin can be converted to 2,3-dehdyrosilibinin through base-catalyzed oxidation in the presence of oxygen. Several methods using various strong bases have been investigated and have resulted in a percent yield range from 10- 51%. Present derivatives of 2,3-dehydrosilybinin synthesized in our lab have shown that as C5 becomes alkylated, the oxidation of C2-C3 decreases. We believe that this is due to the absence the hydroxyl group on C5, which previously underwent hydrogen bonding with the carbonyl oxygen at C4. With the benzylation and methylation of C5, the carbonyl oxygen began to form a hydrogen bond with the hydroxyl group on C3, thus inhibiting the oxidation of C2-C3. In this presentation, the methodology developments of 5,7,20-O-trimethyl-2,3-dehydosilibinin and 5,7,20-O-tribenzyl-2,3-dehydosilibinin will be explored.

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Sequencing of Farnesoic Acid O-methyltransferase in Triops longicaudatus

Methyl farnesoate (MF) is a juvenilizing compound found in over 30 different crustacean species. Farnesoic acid O-methyltransferase (FAMeT) is the final enzyme in the MF synthetic pathway and is responsible for converting farnesoic acid (FA) to MF. While many studies of methyl farnesoate's role in oocyte production have been performed, little work has been done to characterize FAMeT's regulatory role beyond the conversion of FA to MF. Using tadpole shrimp (Triops longicaudatus), this study attempted to isolate and sequence FAMeT. By creating forward and reverse primers based off of the swimming crab (Portunus trituberculatus), the FAMeT enzyme was isolated via RNA extraction and RT-PCR. Post-amplification, electrophoresis gel imaging demonstrated a DNA band of approximately 700bp. After extraction of DNA from the gel, the sample was sent to UC Davis for sequencing where the returned results confirmed that the band was approximately 700bp. Further confirmation was performed via a comparison of both DNA sequence and amino acid sequence between P. trituberculatus and T. longicaudatus. This study forms the basis for future research on the enzymatic function of FAMeT and its role in the regulatory pathway of FA to MF.