2013 Interdisciplinary Graduate & Professional Student Symposium

Thursday, April 4, 2013
Performances 3-5:30 p.m.
Talks 4-5:30 p.m.
Poster Sessions 6:00-8:30 p.m.

Friday, April 5, 2013
Art Exhibit (all day)
Talks 8:30 a.m.-3:45 p.m.
Panels 8:30 a.m.-3:45 p.m.
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 Animal Science Graduate Group; Genetics Graduate Group; Department of Geology; Immunology Graduate Group
SCHEDULE

Thursday, April 4, 2013

3-5:30 p.m. Performances...................................................Ballroom BC
4-5:30 p.m. Talk Session 0A..................................................Ballroom A

5:30 p.m. Welcome Reception and Wine/Beer Tasting.............1st Floor
6-8:30 p.m. Poster Sessions.......................................................1st Floor

Friday, April 5, 2013

8:30-10:00 a.m. Art Exhibit (all day)..................................................Lobby
8:30 a.m. GSA Coffee, Bagel, Donut Day......................................Lobby

8:30-10:00 a.m. Talk Session 1A..................................................Ballroom A
Talk Session 1B..................................................Ballroom B
Talk Session 1C..................................................Ballroom C
Talk Session 1D..................................................Conference Room A
Panel Session 1..................................................Conference Room B

10:15-11:50 a.m. Talk Session 2A..................................................Ballroom A
Talk Session 2B..................................................Ballroom B
Talk Session 2C..................................................Ballroom C
Talk Session 2D..................................................Conference Room A
Panel Session 2..................................................Conference Room B

12:00 p.m. Lunch will be provided

12:30-2:00 p.m. Talk Session 3A..................................................Ballroom A
Talk Session 3B..................................................Ballroom B
Talk Session 3C..................................................Ballroom C
Talk Session 3D..................................................Conference Room A
Panel Session 3..................................................Conference Room B

2:15-3:45 p.m. Talk Session 4A..................................................Ballroom A
Talk Session 4B..................................................Ballroom B
Talk Session 4C..................................................Ballroom C
Talk Session 4D..................................................Conference Room A
Panel Session 4..................................................Conference Room B

5:30-8:30 p.m. Keynote Speech and Awards Dinner...............Ballroom ABC
Acknowledgements

The Interdisciplinary Graduate and Professional Student Symposium gratefully acknowledges the numerous individuals, organizations and businesses who have contributed to making this symposium a success.

This year we are pleased to introduce the Written Paper Category. In the spirit of “Redefining Interdisciplinary Research,” this category seeks to highlight strong interdisciplinary papers that critically examine disciplinary assumptions and boundaries. Finalists in this category will be selected prior to the IGPS Symposium and recognized at the Awards ceremony.

The IGPS Planning Committee would especially like to thank our event volunteers whose help on the days of the symposium is so critical, but whose names were not available at the time of printing. This includes the many faculty, postdoctoral scholar, student, staff and alumni who volunteer to serve as judges, moderators and coordinators at the IGPS Symposium on April 4 and 5. Thank you for supporting UC Davis graduate students!

Special Thanks to our Keynote Speaker
Steve Hollingworth, President and CEO, Freedom from Hunger

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New IGPS Category: Written Paper

The written paper category was introduced by the Graduate Student Assistant to the Dean and Chancellor, Rosalyn Earl. The goal is to encourage more graduate and professional students to submit papers that incorporate interaction among two or more different disciplines.
The Interdisciplinary Graduate and Professional Student Symposium is very proud to welcome Steve Hollingworth as our keynote speaker.

Steve L. Hollingworth
President and CEO
Freedom from Hunger

Steve Hollingworth has served as President of Freedom from Hunger since September 2011.

An expert in international development, his fields of expertise include: microenterprise and microfinance, health, education, agriculture, environment, civil society strengthening, local capacity-building, governance and emergency relief and rehabilitation.

Prior to joining Freedom from Hunger, Hollingworth spent 26 years with CARE, most recently as Chief Operating Officer, based in Atlanta, GA. In this capacity, he was instrumental in developing and implementing organization-wide strategy and was responsible for direct line management of global operations and programs with a total of 13,000 employees and a budget of $650 million. He has also held senior field positions in Asia (India, Sri Lanka and Bangladesh), Africa (Lesotho) and Latin America (Bolivia), building collaboration between practitioners, technical assistance providers, donors and government agencies.

Mr. Hollingworth has an M.S. in Economics, Development Studies, from Victoria University of Manchester, UK and a B.A. in Economics from Augustana College in Rock Island, Illinois.
Factors Relating to the Experiences of Childhood Physical Abuse and Implications in the U.S. Legal System
Bahareh Abhari, Education
Co-author: Nima Rahimi
Paper Finalist
Child physical abuse is the second most common form of maltreatment in the United States and has been associated with many negative short and long term outcomes. Adults who were victims of child abuse also show increased mental health problems such as depression, anxiety, substance dependence, and conduct or antisocial personality disorder (Fergusson, Boden, & Horwood, 2008). The current study presents factors that may be associated with experiencing child physical abuse and how an individual’s negative abuse experiences in childhood has had implications in the U.S. legal system. Suggestions for future research and application of this information in mental health services and community parent education programs will be presented.

NK cells mediate preferential killing of glioblastoma cancer stem cells
Erik Ames, Immunology
Co-authors: Takeshi Hagino; Ruben C. Fragoso; William J. Murphy
Poster # 28
The cancer stem cell (CSC) hypothesis represents a paradigm shift in understanding tumor biology. Essentially, CSCs (or tumor initiating cells) are a small subpopulation of tumor cells that possess the ability to form a tumor in vivo and, importantly, are relatively quiescent. It is this quiescent state that largely renders CSCs resistant to cytoreductive therapies such as chemotherapy and radiation which rely on DNA damage during replication, although CSCs have also demonstrated increased DNA repair activity and additional drug efflux. Natural killer (NK) cells appear able to detect and reject allogeneic hematopoietic stem cells, but not solid tissue, as demonstrated by their inability to induce graft-versus-host disease (GVHD). Overnight co-incubations with NK cells resulted in the CSC population to become preferentially targeted. When human NK cells were administered intracranially to orthotopic glioblastoma-bearing mice, tumors reduced in size or remained stagnant. These data suggest that NK cells can be used clinically to treat solid tumors and may provide the greatest benefit when used in combination with surgery, radiotherapy, or chemotherapy by targeting the small population of CSCs that remain after these therapies.

Comedy in Spite of Henrik Ibsen: Hysterical Heroes and Pragmatic Heroines in Chinese Theater
Megan Ammirati, Comparative Literature
Talk Session 0A
Ever since the twentieth century, Chinese theater has been associated with an entire range of emotions and genres with the noted exception of comedy. Humor is conspicuously missing from the modern understanding of Chinese drama, primarily because early playwrights looked to Henrik Ibsen as a model. This tragedian was such a powerful force of inspiration for dramatists worldwide that he presented a rather inconvenient problem for comedic playwrights: how does one advocate for humor when a theatrical community is thoroughly devoted to social reform? Yang Jiang and Ding Xilin were two of the only canonized Chinese playwrights who attempted to explore comedy at the height of Ibsen’s influence. Their plays wittily reverse many of Ibsen’s standards: excerpts of action replace his suspenseful climaxes and new visions of male and female behavior stand in for his well-worn archetypes. The men in these comedies are overwrought hysterics who are calmly comforted by stoic heroines. My paper will discuss the extent to which Yang Jiang and Ding Xilin were able to playfully subvert the theatrical expectations of 20th century China and how their experimentation reflect understandings of gender in literature.

Reclaiming our waste: potential remediation of contaminated biosolids using biochar
Carolyn Anderson, Soils and Biogeochemistry
Co-authors: Daniel Bair; Kate Scow; Sanjai Parikh
Talk Session 3A
Our waste is treated at wastewater treatment plants and transformed into a nutrient-rich soil amendment called biosolids; the challenge is that biosolids also ubiquitously contain contaminants such as pharmaceuticals. We aim to assess the ability of biochar, the charcoal byproduct of some modes of energy production, to bind such pharmaceuticals and prevent them from being taken up by crops. Due to its chemical composition and hydrophobic nature, biochar has a high affinity for many pharmaceutical contaminants found in biosolids, including ciprofloxacin, triclosan (TCS), and triclocarban (TCC). Previous work has shown that biochar with a high surface area can preferentially bind such pharmaceuticals, which could mean the contaminants are less bioavailable, both in terms of plant uptake and effects on soil microorganisms. Through a controlled greenhouse study, we show how the combined effects of biochar and contaminant-spiked biosolids affect (1) plant growth, (2) the fate and transformation of pharmaceuticals in the soil and plant, and (3) soil microbial communities and related soil processes.
Influence of dose, size and chemical composition on persistence of Silver Nanoparticles in the Rat Lung
Donald S. Anderson, Pharmacology and Toxicology
Co-authors: Rona Silva; Danielle Lee; Patricia Edwards; Kent Pinkerton; Laura Van Winkle
Poster # 25
We investigated lung deposition, retention and clearance of 20nm and 110nm spherical AgNPs coated with citrate or PVP. Rats were instilled with either one of the AgNP solutions or a vehicle control and were assessed at 1, 7 and 21-days post treatment. Ag was quantified in tissue using ICP-MS. At one day postinstillation, lungs dosed with 1.0 mg/kg AgNPs had 0.25 to 0.51 mg Ag/g tissue. Total leukocytes and neutrophils in bronchoalveolar lavage fluid increased in a dose dependent manner 1-day after exposure to all AgNPs with significant increases in the 1.0mg/kg dose compared to all other doses for all 4 particle types. This increase persisted at the 7-day time point in all AgNP groups except for 20nm PVP. Distribution of Ag in the lung was determined using autoradiography and semiquantitative scoring to demonstrate Ag was preferentially localized to the bronchoalveolar duct junction at the 1-day time point. At 7-days post exposure, Ag was localized to the subepithelial extracellular matrix of the terminal bronchioles. Uptake of Ag by alveolar macrophages was also observed. These findings suggest Ag can persist in the lungs over time and alveolar macrophages have a role in the clearance. Supported by U01ES02027 and P42ES004699.

The New Era of Cell Based Therapies: Adult Stem Cells and Huntington’s Disease
Johnathon Anderson, Genetics
Co-author: Jan Nolta
Talk Session 0A
Huntington’s Disease (HD) is a devastating illness that destroys neurons in the brain, resulting in a loss of brain function and a shortened lifespan. The FDA is currently reviewing our application to take an adult-stem-cell based therapy through clinical trials for the treatment of HD. These cells can detect areas of diseased tissue and secrete signals that help repair the damaged areas. Recently we’ve engineered these same cells to also secrete a special signal that stimulates the growth of neurons in the brain. Since these adult stem cells can mature into different cell types, it is important to ensure that the engineered cells stay in their original, healing state. Using an exciting new technique we can test this by measuring how much each and every gene in the entire genome is “turned on”. Our results show that the only significant difference between the normal and engineered cells is an increased production of this neuron growth signal in the engineered cells, which indicates that there is no sign of differentiation a great sign. This opens the door for testing these newly engineered cells in animals with HD, and a potential, more specifically tailored treatment for people suffering from HD.

Microalgalae Oil for Biofuel Applications and Analysis by NMR Spectroscopy
Lisa A. Anderson, Chemistry
Co-authors: Annaliese K. Franz; Diana M. Wong
Poster # 46
Microalgalae oil in the form of triacylglycerols [TAGs] are promising next generation biofuel feedstocks. This research aims to improve current microalgal biofuel technology with new methods of modulating lipids with chemical triggers, catalyzing conversion into biodiesel, and determining biodiesel fuel properties. Our group has developed a microplate screening approach with microalgae to discover conditions that increase growth and lipid production. Conditions from the microplate assay have been evaluated in larger cultures to compare lipid levels and TAG composition. NMR spectroscopy is also applicable in studying the kinetics of biodiesel conversion to monitor efficient conversion of TAGs to fatty acid alkyl esters (FAAEs, biodiesel). This presentation will discuss a facile, rapid, and non-invasive method for comparing microalgalae lipid composition and accumulation and monitoring transesterification of acylglycerols for the application of biodiesel production.

Escherichia coli O157:H7 and Cryptosporidium parvum Co-infected in Young Domesticated Swine
Elizabeth M. Antaki, School of Veterinary Medicine, Population Health and Reproduction
Co-authors: Rob Atwill; Xunde Li; Patricia Pesavento; John Adaska; Barbara Byrne
Poster # 26
Escherichia coli O157:H7 and Cryptosporidium are important zoonotic pathogens that cause severe diarrhea in young animals, with possible transmission to humans. The objective of this study was to determine if a primary infection with Cryptosporidium will predispose young pigs to prolonged fecal shedding of the E. coli O157:H7 pathogen. Twenty-seven weaned domesticated piglets were inoculated with doses of an E. coli O157:H7 strain to define the infectious dose and duration of fecal shedding. Among these pigs, thirteen of them were initially infected with 105 oocysts of C. parvum four days prior to the E. coli O157:H7 inoculation to initiate a primary infection within the piglet intestinal tract. Fecal samples were collected daily and screened for each inoculated pathogen. On days 2, 3, and 6 post-inoculation, one pig co-infected with 107 CFU, was necropsied for the colonization and lesion formation in the intestines by histological examination. On days 7 and 14 post-inoculation, two pigs from each inoculum group were necropsied in the same way, while the remaining pigs were followed until they were negative. Overall, a primary infection with Cryptosporidium will alter the colonization of the E. coli O157 in the pig.

Developmental PCB 95 exposure affects spatial memory in weaning mice
Christopher Barnhart, Molecular Biosciences
Co-authors: Dongren Yang; Hao Chen; Lihong Qi; Pamela Lein
Poster # 15
Polychlorinated biphenyls [PCBs] are ubiquitous environmental contaminants linked to cognitive deficits in children and experimental animals. We have shown that developmental exposure to
Photographic Facticity: Bosnian Atrocity Formats through the lens of Holocaust Frames
Amila Becirbegovic, German
Talk Session 3A
The phenomena of photographic journalism that emerged after the Holocaust is represented via the similarities of those concentration camp photographs to other analogous atrocities, as notably illustrated by the Bosnian camp pictures. These mirrored conventions focus in on the uncanny equivalents, with respect to photo composition, framing, setting, subjects, and arrangements. This recognized Holocaust frame stands for the ultimate notion of that which constitutes an atrocity case, allowing the world to be reminded of the past horrors through current conflicts. However, while the resemblance of the Holocaust and Bosnian camp pictures serves to highlight this important connection for political purposes, it also utilizes and exploits these established precedents via photographic narratives.

Testing Vitis arizonica Candidate Genes for Pierce’s Disease Resistance in Nicotiana tabacum SR-1
Carolina Bistue, Viticulture and Enology
Poster # 9
The pathogenic bacteria Xylella fastidiosa is the causal agent of Pierce’s disease (PD) in grape and numerous other economically important crops. The Walker lab has made significant progress in the breeding of PD resistant plants by using the resistance from Native American Vitis species and elite Vitis vinifera wine and table grapes. Another approach is to genetically transform susceptible vinifera varieties with resistance genes cloned from resistant grape species. The breeding program has allowed the Walker lab to localize the PdR1b gene responsible for the resistance to PD in Vitis arizonica. Five candidate genes have been identified through map-based positional cloning and transformed into susceptible grapevine cultivars. Due to the difficulty presented in grapevine transformation, tobacco SR1 was chosen as a model organism. From the transformation process, ten independent lines of each of the five genes were obtained and have begun to be tested in the greenhouse by inoculating with the bacteria. Symptom development as well as ELISA will be used as a screening method. Preliminary greenhouse results for the tobacco plants will be presented.

Do social and nonsocial cues enhance statistical learning in distracting environments?
Ryan Barry, Human Development
Poster # 61
Infants’ environments contain statistical regularities that aid in learning. Given the importance of social information in infant learning, a key question is the extent to which infants can use both social and non-social cues to guide their learning of statistical regularities. Method: 9-month olds were shown two sequences in the bottom corners of a screen. Each sequence contained three-shape clusters: two co-occurring shapes and one constantly changing shape. Infants were assigned to either the social or non-social cue condition. During the test trials, infants were shown consistent and inconsistent splitting events. For the consistent events, the co-occurring shapes remained together during splitting. For inconsistent events, the co-occurring shapes split apart. Results: Pilot data has been analyzed. Infants showed a preference for consistent events in both the social condition, $t(5)= -3.07, p=.03$, and the non-social condition, $t(4)= -5.85, p=.004$. Conclusions: These results suggest that infants learn statistical regularities equally well from social and non-social cues.

Exposure to wildfire pollution during infancy influences adult innate immune responses
Carolyn Black, Immunology
Poster # 18
Data on the effects of air pollution on the immune system are scarce, with most studies focused on the acute effect of pollutants on the innate immune system of the lung. Outdoor-housed primates born in the spring of 2008 at the California National Primate Research Center were incidentally exposed to particulate matter and ozone levels well exceeding national and state air quality standards during a wildfire outbreak in June 2008. This provided an opportunity to study the long-term effects of particulate matter and ozone exposure on immune development using a model
that closely resembles actual pediatric population exposures during the same period. Animals born in 2008 (n=26) and control animals born in 2009 (n=25) were assessed for pulmonary function and markers of innate immune function in 2011 and 2012, respectively. We found lower levels of markers for innate immune response in wildfire-exposed animals, which in females correlated with reductions in lung function. These differences were apparent years after the 2008 wildfires, suggesting that early life exposure to pollution may alter the course of innate immune development.

**Healing Shawl**
Nicole Blalock, Native American Studies
Art Exhibit
Healing Shawl, 75” x 75”, dye sublimation printed poly stain, hand-tied chainette fringe. As a researcher and an artist, I am interested in issues of representation, identity, and sovereignty. I have recently expanded my techniques to include experimentation with alternative photographic processes and multidisciplinary pieces that combine image with performance, post-processing, and mixed media. Although distinct activities, my research and art run a parallel course; developing and enriching my understanding of critical issues in society. Both are a result of archiving experience and thought and draw from my rich academic, professional, and personal history. Inspired by the testimonials of indigenous women who have been victims of everything from microaggressions to rape, The Healing Shawl is both a textile and a performance. As a textile, any dancer wishing to dance for victims of violence can wear this piece and viewers have the opportunity to read the words of women describing their experiences. As a performance, this piece raises awareness and creates a space to honor women as survivors and in memorial to those who have left us. The Healing Shawl allows dancer, singers, and viewers to contemplate the effects of violence against women in their own lives and pay tribute to our women who carry on.

**Solving the Structure of Cf4-Avr4, a Classic Plant-Microbe Interaction**
Stephen Bolus, Plant Pathology
Co-authors: Ioannis Stergiopoulos; Andrew Fisher; Jim Lincoln
Talk Session 4D
Cf4 is a receptor-like protein from Solanum habrochaites (wild tomato) that is capable of recognizing Avr4, a fungal effector protein from the tomato pathogen Cladosporium fulvum. Avr4 plays an important role in pathogen virulence by protecting fungal chitin from degradation by plant chitinases during host infection. After Cf4 recognizes Avr4, a defense response is activated in the plant cell to limit pathogen spread. However, new pathogenic races of C. fulvum have mutated Avr4 proteins that are not recognized by Cf4. Site-directed mutagenesis and domain-swap experiments have so far failed to explain how Cf4 and Avr4 interact with each other at the molecular level. Therefore, analyzing the Cf4-Avr4 protein interaction at the atomic level is necessary to better understand this model plant-microbe interaction. We propose to solve the crystal structures for the receptor-like protein Cf4, the fungal effector Avr4, and the assumed receptor-effector complex. We expect to correctly identify the amino acids that are essential for Cf4’s recognition of Avr4. Better knowledge of the Cf4 receptor and its Avr4 ligand will facilitate the development of novel breeding tools for improved pathogen resistance in plants.

**Understanding the Sorption Mechanisms of Biochar compared to Activated Carbon**
Adina Boyce, Biological and Agricultural Engineering
Co-authors: Bryan Jenkins; Mark Grismer
Poster # 2
Adsorption of inorganic molecules from dilute aqueous solutions on biochar and activated carbon is a complex interplay between non-electrostatic and electrostatic interactions. Non-electrostatic interaction are essentially due to dispersion and hydrophobic interactions, whereas the electrostatic or coulombic interactions appear with electrolytes when they are ionized at the experimental conditions used. Both interactions depend on the characteristics of the adsorbent and the adsorptive and the solution chemistry. The carbon surface chemistry has a great influence on both electrostatic and non-electrostatic interactions, and can be considered one of the main factors in the adsorption mechanism from dilute aqueous solutions. This poster presents the current knowledge about the fundamental factors that control the adsorption process of biochar and activated carbon from aqueous phase.

**Moving forward by looking back: Using staff and participant perceptions of a physical activity promotion program for program improvement purposes**
Heather Breen, Education
Co-author: Heather Breen
Poster # 33
Health promotion programs that provide personalized support for obesity prevention are becoming a national priority, particularly for urban minority youth who are at a greater risk of developing such health problems. This study explores the experiences of under-resourced female youth enrolled in the “Physical Activity for Youth” (PAY) program, an all-female physical activity promotion program run by a youth development organization in a racially and economically diverse region of Northern California. Using a grounded theory approach to data collection, initial findings arising from qualitative observations and semi-structured interviews reveal the extent to which program staff and participants hold similar perceptions about the program’s effectiveness and its overall goals. Different perceptions between participants and program staff suggest aspects of the PAY program that should be altered to better serve the needs of its participants. Implications in terms of program improvement will be discussed.

**Weed Management in Rainfed Rice in Kolda Region, Senegal: An Agronomic and Economic Assessment**
Whitney Brim-DeForest, International Agricultural Development
Co-author: Albert Fischer
Poster # 76
Though not a primary crop, rice (Oryza glaberrima) is native to Africa, and in West Africa, is a staple in the diet. In southern Senegal, where women are the primary farmers, the system is rainfed and weed management is done solely by hand. This study was conducted in the Kolda Region of Senegal in 2010, with the objectives of determining whether modified weed management systems can a) decrease labor, b) increase yields, c)
reduce weed competition during the critical period, and d) reduce seed production that contributes to the weed seedbank. The evaluated systems were: 1) glyphosate stale seedbed (SS); 2) green manure stale seedbed (GM); 3) combination green manure and glyphosate stale seedbed (GM X SS); and 4) traditional control (TRAD). Yields were not significantly different (α = .05). At 45 days after spraying (DAS), combined grass and sedge biomass was significantly less (p = 0.0068) in the glyphosate-treated systems. Counts of broadleaf plants at 45 DAS were significantly greater in the same systems (p = 0.0064), as was rice biomass (p = 0.0078). Labor requirements varied between systems and a cost-benefit analysis determined that the SS and GM systems had the highest output to input ratio.

“Veiled” Women, Ardent Voices: Representation of Voice in North African writers
Jamiella Brooks, French
Talk Session 4D
When we say “text,” many of us think of a book. Yet when we say “speech” or “voice,” we think of its oral implications. This causes us to ask: how, then, can a text speak, or represent voice? I aim to analyze this question at its crossroads, the line between text and voice, particularly as it surfaces in North African novels and the female voice. The Western area, the Maghreb (contained by Morocco, Algeria, and Tunisia) has experienced turbulent changes in the last century: independence from colonial forces, political and social upheaval, and reinscribed identities and ideologies. These changes have unveiled the need for new forms of expression, particularly in the realm of literature. In fact, many authors I will explore have only just entered a literature “tradition” hardly two decades old. While male Maghrebian authors have experienced a lengthier history of attention in their works, women authors remain largely unknown, especially outside of their own countries. This research will strive to explore voice as it surfaces on lesser-explored horizons, to “listen” to the written voice, and to give these voices more attentive eyes and ears.

“Improvising While Black: Chronicing a Black Aesthetic”
Mary Ann Brooks, Theatre and Dance Performance
“Improvising While Black” is a journey into cultural self-identification. This project is an extension of an independent study compilation of student interviews on improvisation as survival in the Black community here at UC Davis. The concept of a Black aesthetic, my own thoughts and dances chronicling the embodiment of racial identity in all its complexity and unpredictability is what will frame the dance material. The aforementioned interviews will be used in an edited video montage throughout the performance. As a dance and performance maker, I often address issues of representation and identity. Through performing Blackness and investigating the idea of a Black aesthetic, I am delving into a rapidly evolving concept. As an African American who also self identifies as Black, I am aware of the ways that Black folk have struggled to name themselves. Labels such as negro, Afro-American and colored have all been terms used to identify Black people. My research is an inquiry into how naming happens, how identity forms itself, and how people who have been historically oppressed accept, reject or coopt certain labels assigned to them by the dominant culture. I am also interested in how this process of naming and the formation of identity expresses itself in an artistic sense. What cultural signifiers show up when a collective group of people adopt their own language, dances, visual representations? What happens when this process is constantly interrupted by domination, subjugation and repression? This project is an inquiry into how Black folks use improvisation as a tool for survival. What do I mean by improvisation? What is a Black aesthetic—Black vernacular, dance, music, food, literature, clothing, hair, lifestyle, family, etc. How does a Black aesthetic intersect with other identities—feminine, masculine, gender variant, queer, artist, differently-abled, scholar, etc? Is Blackness an improvisational concept?

A New Toolbox for Studying Brain Activity
Gerard Joey Broussard, Neuroscience
Co-author: Lin Tian
Poster # 31
A detailed understanding of how brain circuits and, by extension, the mind as a whole-function is difficult to achieve. Most techniques which are used to study the brain give either a lot of information about a limited number of neurons or very blurry images of the function of many neurons. Genetically encoded indicators (GEIs) get past this difficulty by granting the ability to image in a detailed way the activity of many neurons at once. Because they are encoded by DNA, cells can be differentially selected for labeling with these indicators using tissue-specific promoters. Despite these advantages, most GEIs which are currently available give little information about subcellular and long range interactions. As such, we want to develop novel specialized GEIs targeting to areas where communication within the brain occurs. One project involves targeting GEIs to the axons of neurons. The second project involves developing a molecule targeted to synapses-sites at which most neuronal communication occurs-which will fluoresce in response to the presence of a neurotransmitter called glutamate. Both tools should greatly enhance our ability to analyze ways in which the brain represents and transfers specific kinds of information.

Suches in Space: Trope Bundles in Plato’s Timaeus
Christopher Buckels, Philosophy
Poster # 16
I argue that Plato presents a trope bundle theory of particulars in the Timaeus. There he gives us Form images, which, I argue, are property-instances, or tropes. These are Plato’s particulars. Ordinary material objects turn out to be bundles of Form images, which are bundles when they are co-located in absolute space. In the middle of the Timaeus, Plato introduces an entity he calls the Receptacle; I argue that this functions as absolute space. Thus, Plato’s basic ontology is threefold. First, I examine a disputed passage in the Timaeus, and I argue that in it Timaeus presents a trope theory. Then I argue that material objects are bundles of tropes. Finally, I argue that the Receptacle is not a substratum that bears these tropes as attributes but absolute space.
Receptions of Spectacle: Virgil’s Aeneid, Domestic Display, and Provincial Identity in Roman Mosaics
Nicole Budrovich, Art History
Talk Session 1B
Ancient Roman culture fostered inventive and contradictory interpretations of domestic art. This paper examines an atypical set of Roman mosaics depicting a specific athletic scene from Virgil’s Aeneid. Representations from Virgil are rare in Roman Art, which more often portrays scenes from Greek myth and the pastoral imagination. However, five examples of this scene have been identified in second-century floor mosaics from Southern Gaul. Using these mosaics as a case-study, this paper argues that a multidisciplinary approach is essential to interpretation. This paper addresses three modes of interpretation: receptions of Virgil’s text, the mosaics’ function in the Roman home, and the local regional context. I would argue that the mosaics both drew on Virgil’s universal appeal and responded to the local popularity of athletic spectacle. While this paper’s focus is art historical in nature, its conclusions are based on literary analysis, history, cultural studies, and archaeology—collectively underscoring the value of a multi-disciplinary approach to interpretation.

Black carbon emissions from in-use ships encountered during CalNex
Gina Buffaloe, Civil and Environmental Engineering
Co-authors: Christopher Cappa; Daniel Lack, Brian Lerner, Eric Williams; Tim Bates, Derek Coffman, Patricia Quinn; Paolo Massoli, Timothy Onasch; Shao-Meng Li, Ibraheem Nuaaman
Poster # 32
Light absorption measurements and black carbon mass measurements made aboard the NOAA-sponsored R/V Atlantis, during the CalNex campaign, were used to derive black carbon emission factors (BCEFs) from ships in operation along the California coast. Light absorption measurements were made using a photoacoustic spectrometer (PAS) at 532 nm and 405 nm, and a three wavelength particle soot absorption photometer (PSAP) at 467, 530 and 660 nm. Black carbon mass was measured using a single particle soot photometer (SP2) and a soot photometer-aerosol mass spectrometer (SP-AMS). Absorption measurements were converted to mass-based BCEFs using wavelength-specific absorption coefficients, and all the measurements were converted to EFs using a CO₂ balance method. Emission factors were binned according to ship type classifications and engine type classifications, and were also considered as a function of estimated engine load. These emission factors were also compared to BCEFs derived from the TexAQS campaign to investigate how low sulfur fuel use affects BCEFs.

A network-guided approach for improving rice tolerance to biotic stress
Daniel Caddell, Plant Biology
Co-authors: Pamela Ronald; Insuk Lee; Edward Marcotte
Talk Session 4C
Rice is one of the most important staple crops worldwide, but its yield is compromised by biotic stresses. Increasing our understanding of the protein encoding genes that regulate rice disease resistance and significantly improving the amount of potential genetic diversity that can be utilized for crop improvement will provide opportunities for further enhancing rice yields. Towards this goal, we used an established rice gene network, RiceNet, to predict 800 genes that may regulate biotic stress in rice. Fifty rice lines representing the genetic diversity of rice have been selected and will be phenotypically screened for resistance to pathogens. SNP analysis will be used to identify key parental lines. Rice lines with enhanced resistance to pathogens will be selected for detailed population analysis on RIL progeny. Validated genes will be introduced into agronomically important varieties by marker assisted breeding.

Hearing Aids for European Voters: Evidence that European Voters Can Accurately Perceive Parties’ Policy Positions
Christine Cahill, Political Science
Co-authors: Nathan Rexford; Jim Adams
Poster # 14
This has significant implications for government accountability since it appears that European voters are unable or unwilling to hold parties accountable for representing the interests of the electorate. This question is important because it gets to the root of democratic theory—if European voters are not accurately perceiving where parties are spatially located, then voters cannot hold parties accountable for the positions parties take on different policies. Perhaps most importantly, the parties may not be representing the interests of the electorate when making political decisions. However, I find that this relationship is not that straightforward, and instead certain segments of the European electorate are “listening” namely voters who are more ideologically extreme in their preferences than more centrist voters. This then has interesting implications for parties’ campaign strategies, as it seems in order to win the majority of votes, parties should appeal to more ideologically extreme voters. This finding may explain why parties are becoming more polarized in Europe.
Controlling Tomato Spotted Wilt Virus through use of a phenology model predicting the thrips lifecycle
A.J. Campbell, Plant Pathology
Cor-authors: Robert Gilbertson; Ozgur Batuman; Len Coop; Tom Turini; Neil McRoberts
Poster # 1
This work demonstrates the practical application of epidemiological and plant disease related knowledge. By focusing on the insect vector, instead of the disease itself, it is hoped that preventative measures are taken, stopping the disease before it starts. Additionally, use of this phenology model presents farmers with a more cost effective and environmentally sound strategy for controlling thrips and TSWV. In using the model, which predicts the stages of thrips lifecycle, farmers can apply insecticides at times when the insect population constitutes the greatest threat to the tomato crop. This diminishes chemical spraying at times when thrips are not active, thereby reducing both the grower’s costs and the amount of chemical in the environment. The model is available online, and growers near any of the five weather stations we use can view the model itself, along with an interpretation of its implications. This gives growers and farm advisors direct access to the information, enabling them to examine the raw data and form their own opinions. Significantly, this thrips phenology model can be adapted to other insect vectors that become important in California, using the vector’s lifecycle to alter the current model accordingly.

Bioeconomic Modeling of Verticillium Wilt in California Lettuce
Christine Carroll, Agricultural and Resource Economics
Cor-authors: Colin Carter; Krishna Subbarao; Rachael Goodhue; Cynthia Lin
Talk Session 0A
In 1995, the disease Verticillium wilt, caused by the fungus Verticillium dahlia, unexpectedly appeared in a lettuce crop in Watsonville, California. Since then, the disease has spread rapidly through the Parajo Valley, the prime lettuce production region in California and the United States. The disease is introduced via infected spinach seeds, which are often imported. It persists in the soil for many years. Due to crop rotation, the disease affects lettuce and other crops, although spinach is not affected. My dissertation focuses on evaluating the policy options to control Verticillium wilt. I use a bioeconomic model to incorporate economic incentives and growers’ optimal decision-making as well as biology to accurately model natural systems. I simulate the growers’ profit maximizing decisions regarding which crops to plant, the timing of the plantings, and efforts to control the disease. One goal is to evaluate the benefits and costs of different control options, as well as the economic impact of the disease on growers and other stakeholders.

Change in Adolescent Gender Attitudes, 1976-2011
Angela Carter, Sociology
Talk Session 2C
The determinants of attitudes toward gender equality have been widely studied in existing literature, with fairly consistent findings of greater egalitarianism since the mid-1970s and a plateau effect since the 1990s. However, less attention has been paid to adolescence as a life stage with strong impact on the formation of views regarding gender roles. Structural theories of attitudinal change indicate potentially significant differences between adults and adolescents based on level of workforce engagement; more traditional gender attitudes among young women may result in differential occupational and educational aspirations. This project will use Monitoring the Future, which is nationally representative survey data, and multilevel logistic regression models to examine changes in high school seniors’ attitudes regarding women’s roles and equal opportunities. I hypothesize that although liberalizing trends will also be evident for adolescents, they will not be as pronounced as in the adult population and will be correlated with demographic and family background characteristics. Individuals from some racial and socioeconomic groups, as well as more recent cohorts, may be more likely to hold progressive views than others.

The impact of individual cognitive differences on reading in a second language: A comparison study of deaf and hearing second-language-learners of English
Deborah Cates, Linguistics
Cor-authors: David Corina; Megan Zirnstein; Stephen Hamilton; Matthew Traxler
Poster # 22
Research Questions: 1. How do second-language-learners of English without an assembled phonology in their first language learn to read English? 2. What are the weightings of individual difference characteristics that correlate with skilled reading in hearing second-language-learners of English without a first language assembled phonology? 3. How are the individual difference characteristics of deaf second-language-learners of English similar to or different from those hearing second-language-learners of English? This is a preliminary results analysis of an ongoing project. It is poorly understood how deaf readers learn to process written English, a sound-based “assembled phonology,” in the absence of hearing. This process is complicated by the fact that many deaf people in the U.S. have ASL, not English, as their first language. Chinese-English bilinguals educated in China provide an ideal comparison group for deaf bilinguals because, as fluent readers of a logographic script (an “addressed phonology” which does not emphasize sound), they face similar challenges in learning to read English. This study evaluates the impact of cognitive variables on English-as-a-second-language reading fluency.

Discovery of trypanosomatid parasites as common associates of Drosophila: Potential implications for disrupting the transmission of insect-vectored human diseases
James Angus Chandler, Evolution and Ecology
Talk Session 2C
The fruit fly Drosophila is a leading model organism for studying insect biology and, in particular, insect defenses against microbial infections. Since cellular responses to infections are shared between insects, advances in Drosophila have led to a greater understanding of how all insects fight infections. Despite the laboratory usefulness of this system, little is known about the microbes that are associated with wild fruit flies. To fill this gap, I identified the yeasts and bacteria that naturally infect flies. While analyzing this data, I made an unexpected discovery: that fruit flies are associated with non-bacterial, non-yeast microbes called
trypanosomatids. Relatives of the fly infecting trypanosomatids include the parasites that cause African sleeping sickness and Chagas disease, which are spread by tsetse flies and kissing bugs, respectively. Because of the ease with which Drosophila can be studied, research into trypanosomatid infections in insects can be more easily done in Drosophila than in tsetse flies or kissing bugs. Therefore, I am currently exploring ways to inhibit trypanosomatid infection in Drosophila, with the hope that this knowledge can be used to prevent infections in insects that spread human diseases.

**Targeting Metastatic Cancer**

Astra Chang, Comparative Pathology  
Co-authors: Aaron Schwertschkow; Jan Nolta  
Poster # 7  

The revelation of cancer stem cells as the culprits of the recurrence and spread of cancer, called metastases, has given patients with aggressive cancers new hope. Current cancer therapies involve harsh radiation and chemotherapies that increase morbidity and are ineffective against these cells. This is supported in that over 90% of mortalities are due to recurrence of cancer caused by metastases even after extensive surgery and chemotherapy. In 2010, cancer was responsible for one in every eight deaths worldwide and with close to 600,000 of these in the United States there were almost 3 times as many new cases with costs of over $263 billion in medical care. Rather than concentrate on one cancer type, this project targets common properties in a number of metastatic carcinomas carrying some of the highest estimated international mortalities—colon, breast, pancreatic, and prostate carcinomas. This project provides a better understanding of the biology of cancer and therapeutic use of adult stem cells, and a platform therapeutic with ability for specific targets to be quickly adapted and/or expanded. Such therapeutics will save lives, reduce the burden on health care, and provide a viable treatment option for many decades to come.

**Becoming the Legitimate Government of China: Grassroot Lobbying**

Jia Lin Grace Chieh, History  
Talk Session 2C  

This study looks at the social, cultural, and political impacts of American foreign policies on different ethno-racial groups living in Southern California from 1950 to 1980. After World War II, Chinese Americans and Anglo Americans joined together to form multi-ethnic grassroots China lobby organizations to rally for greater local and nation-wide support for the recognition of the Republic of China as the legitimate Chinese government. This study specifically concentrates on how Cold War foreign politics affected the racial status of Chinese Americans and Chinese immigrants and looks at their reasons for participating in these grassroots China lobby organizations.

**Dairy cattle interactions with sprinklers used to reduce heat load in summer**

Jennifer M. Chen, Animal Behavior  
Co-authors: Karin E. Schütz; Cassandra B. Tucker  
Talk Session 3B  

Cows can accumulate heat load in summer, leading to negative effects on welfare and production. Sprinklers effectively cool cattle, but elicit variable behavioral responses: in some studies, cows readily use spray, but avoid or show no preference in others. Some behavioral variation may be explained by spray attributes that differ across studies. Our objective was to examine the effects of water volume and droplet size on dairy cattle preferences for sprinklers. Once daily for 8 consecutive days, individual cows (n = 18) chose between pairs of treatments in a shaded, Y-shaped maze. The possible choices were a no-spray Control, a Low sprinkler treatment, and/or a High sprinkler treatment. In all 3 comparisons, when cows chose the treatment delivering more water, respiration rate was lowered during the 12-min test. Although sprinklers reduced respiration rate, cows tended to choose Low over Control only 69% of the time, and showed no overall preferences in the other comparisons. However, when choosing between Control and sprinklers, the odds of choosing either sprinkler treatment increased at higher body temperatures. In summary, cows did not show clear preferences based on spray attributes, but body temperature influenced choice.

**The Effect of Lysozyme Transgenic Goat Milk on Kid Goats**

Merritt Clark, Animal Biology  
Co-authors: James D. Murray; Elizabeth A. Maga  
Poster # 50  

Recently, there has been an international debate over the approval of transgenic animal products for human consumption and more research is needed to determine any risk. UC-Davis has a herd of transgenic goats producing the antimicrobial protein human lysozyme (hLZ) in their milk with the goal of using the milk to treat childhood diarrhea. This study was designed to detect any unintended effects of the hLZ transgene on non-target organisms consuming the milk by comparing weights, E. coli and coliform counts and intestinal histology of kid goats raised on control or hLZ milk from birth until 60 days of age. There were no significant differences in the weights of control and hLZ fed goats, or in the numbers of E. coli and other coliforms in intestinal contents. Histological analysis of intestinal segments revealed significant changes in...
villi that are indicative of a healthier intestine. The results indicate that consumption of hLF milk results in positive or insignificant intestinal morphology and bacterial changes. Further research will investigate the effect of the hLF transgene on kid goats using metabolomics and bacterial profiling. These types of analyses will be useful in fully assessing the safety of transgenic animals.

A study of Starr and Ferguson: Evidence for Beat Gesture Priming
Michelle Cohn, Linguistics
Paper Finalist
In a qualitative analysis of a televised interview of Ringo Starr on the Late Late Show with Craig Ferguson, I provide evidence for beat gesture priming in six “episodes”. Unlike iconic and emblematic gestures, beat gestures do not encode any particular meaning; and, unlike sign languages, beat gestures cannot stand alone. Rather, they occur with spoken language and often coincide with the stressed syllables of words. These gestures — as I show with my data — can prime the gestures of another individual, given an emotional alignment with their interlocutor. Such congruence is significant considering the literature on the many other forms of subconscious alignment (e.g. body position, eye gaze, postural sway, etc.) and provides a further window into the intricacies of human communication from an interdisciplinary perspective.

Metabolic analysis of Saccharomyces cerevisiae to evaluate the relationship between nitrogen utilization efficiency and ethanol tolerance during batch fermentation
Michelle Lozada Contreras, Chemical Engineering
Co-author: David E. Block
Talk Session 3A
During alcoholic fermentation, sugar utilization of Saccharomyces cerevisiae decreases in the presence of alcohol, followed by a loss in cell viability. Given an identical initial nitrogen concentration and composition, yeast will form different concentrations of biomass. Theoretically, strains that use nitrogen more efficiently to create more biomass will tolerate higher levels of ethanol produced. Our goal is to understand the relationship between nutrient environment, metabolism, and specific growth rate in yeast, in order to develop a rational approach to strain modification for increasing ethanol tolerance. We evaluated the nitrogen utilization efficiency and fermentation kinetic parameters of thirty-two yeast strains with a wide range of growth and ethanol tolerances. Maximum OD for the yeast ranged from 2.68-6.17. Through metabolic analysis, we investigated differences in carbon and nitrogen metabolism by using GC-MS to measure extracellular and intracellular concentrations from supernatant and cell samples saved from fermentations during the exponential and stationary phases.

The Role of Gastrointestinal Dysfunction in ASD and its Role on Behavior
Destanie Cummings, Immunology
Coauthors: Milo Carega; Tamanna M. Noyon; Paul Ashwood
Poster # 24
Autism spectrum disorders (ASD) are neurodevelopmental disorders characterized by impairments in social interactions, communication and stereotyped repetitive behaviors. Recent studies suggest an increasing prevalence of gastrointestinal (GI) symptoms in children with ASD. We seek to further examine the role the immune system plays in the mucosal immunity of ASD children with GI symptoms. We hypothesize that there exist a subset of children with ASD who experience GI symptoms and those GI symptoms are in part caused by immune dysregulation which in turn will affect repetitive behaviors. Blood samples collected from ASD children with and without GI symptoms and from typically developing children with and without GI symptoms will be analyzed by stimulating and analyzing PBMCs. We expect that children with ASD and GI symptoms’ immune response will be more skewed towards a pro-inflammatory pathway. Animal models will also be utilized by inducing colitis to C57B6 mice. Colitis induced animals as well as controls will undergo behavioral testing. We anticipate animals with induced GI issues will have a similar immune skewing as the ASD w/GI and that this will positively correlate with repetitive behaviors seen in the animals.

Climate Change and Public Policy: A Multidisciplinary Perspective
Organizer: Colin Cunliff, Physics
Panelists: Colin Murphy, Transportation Technology and Policy; Meredith Niles, Ecology; Colin Cunliff, Physics; Liam Damewood, Physics
Panel Session 1
“Emissions of greenhouse gases from human activities are changing the atmosphere in ways that affect the Earth’s climate. The evidence is incontrovertible: Global warming is occurring.” - public statement adopted by the American Physical Society, Nov. 2007
Climate science and policy are complex topics that require multiple perspectives and a diverse set of tools. New research on risk assessment tells us that people exaggerate the risk of events beyond our control (e.g. crazy gunmen, or nuclear radiation), and underestimate the risk of events within our control (e.g. climate change). The physical theories used to model phase transitions and turbulence are now being employed to model extreme weather events. Geologists are exploring potential methods of underground carbon dioxide sequestration. Clearly, the terms “climate science” and “climate policy” must be thought of as umbrella terms that encompass physics, psychology, geology, ecology, meteorology, sociology, and many other disciplines. This panel brings together members of multiple departments to address the science of climate change and its implications for public policy.

Microglia Regulate the Number of Neural Precursor Cells in the Developing Cerebral Cortex
Christopher L. Cunningham, Neuroscience
Co-authors: Verónica Martínez-Cerdeno; Stephen C. Noctor
Talk Session 2D
Neuron production must be properly regulated to ensure that output does not exceed requirements of the growing brain, yet our understanding of mechanisms that restrain production is incomplete. We investigated function of microglial cells in the developing cerebral cortex of mammals and show that microglia limit the production of cortical neurons by engulfing neural stem/precursor cells (NSPCs). We show that during normal development microglia selectively colonize the zones inhabited...
by NSPCs and engulf NSPCs. We found that deactivating microglia with tetracyclines or eliminating microglia with liposomal clodronate significantly increased the number of NSPCs, while activating microglia in utero through activation of the maternal immune system significantly decreased the number of NSPCs. These data demonstrate the microglia play a fundamental role in brain development by regulating the size of the NSPC pool in the developing cerebral cortex. Thus microglia may play an important role in determining the number of neurons that are produced and thus the size and/or shape of the brain. Furthermore, our data suggest that any factor that alters the number or activation state of microglia can profoundly affect neural development.

**Increased elf4E phosphorylation prevents response of prostate cancer cells to mTOR inhibitors**

Leandro Salati D’Abronzzo, Comparative Pathology
Co-authors: Leandro D’Abronzzo; Ryan Beggs; Swagata Bose; Paramita M. Ghosh
Poster # 45

Inhibitors of mammalian target of rapamycin (mTOR) had been used in various clinical trials, but with limited efficacy. We previously showed that the mTOR pathway is activated in castration resistant prostate cancer, while its inhibition upregulates androgen receptor (AR) signaling, resulting in resistance to mTOR inhibitors. The goal of the proposed study is to elucidate the molecular mechanisms by which mTOR inhibitors affect prostate cancer cells. To try and elucidate these mechanisms I used a cohort of cell lines and tested their viability when challenged with the mTORC1 specific RAD001, the mTORC1/2 inhibitor Torin1 and the PI3K/mTORC1 inhibitor BEZ235, individually or in combination with bicalutamide, the standard of care for patients that didn’t respond to androgen withdrawal therapy. Comparison of the effects of these drugs demonstrated that resistance to mTOR inhibitors correlated with increase in elf4E phosphorylation at Ser 209. My hypothesis is that increased phosphorylation of elf4E during mTOR inhibition is responsible for this resistance. My aims are to figure out how mTOR inhibition leads to increased elf4E phosphorylation, and then test if this increase is actually the mechanism responsible for resistance.

**Multi species Benthic Foraminiferal Weight Record of Oxygen Minimum Zone Expansion over the Past 16,000 years**

Catherine V Davis, Geology
Co-authors: Davis V. Catherine; Tessa M. Hill
Poster # 10

Oxygen Minimum Zones (OMZs) are the site of high CO2, low pH waters, the understanding of which becomes increasingly critical as atmospheric CO2 increases and oceans become more acidic worldwide. We utilize a high-resolution core, MV0811-15JC (34°36.930'N, 119°12.920'W; 418m water depth) from the Santa Barbara Basin (SBB) to examine a multispecies record of benthic foraminiferal weight. Ongoing work in SBB has characterized drastic changes over the past 15,000 in response to climate and the climate-dependent migration of the OMZ and related CO2 maximum. There exists increasing interest in resolving the effect of environmental parameters on foraminiferal shell weight, which is shown in culture studies to respond to more acidic ocean conditions. We apply lessons from planktic and benthic culture studies and investigations of the planktic foraminifera fossil record to construct a record of benthic foraminiferal test weight against oxygenation records for this site. Records of shell weight from four species, across two genera correspond with the migration of the OMZ. This work tests the viability of multispecies benthic weight record as an additional tracker of low oxygen and high carbon environments.

**Patterned Spontaneous Activity Guides Visual Development Before Eye Opening**

Zachary Davis, Neuroscience
Co-author: Barbara Chapman
Talk Session 1C

The development of neural circuits has long been understood as an activity dependent process. However the mechanism by which activity plays a role, and the extent to which activity is instructive to the process, remains a topic of debate. Spontaneous activity is thought to instruct early anatomical refinement of neural circuits while stimulus driven activity drives functional refinement. Using the visual system as a model for circuit development we can examine the consequences of perturbations in the patterns of spontaneous activity before a time when the retina is photo active. It is unknown to what degree the functional properties of visual neurons are driven by spontaneous activity or light evoked activity. Here we show evidence that the development of the functional responses of visual neurons in the thalamus are dependent on the patterned spontaneous activity that occurs before the retina is photo active.

**Assisting ESL Students in UWP 1 Through Supplemental Online Grammar Instruction**

Garrett DeHond, Education
Co-authors: Dana Ferris; Grant Eckstein
Talk Session 2D

Initiated by Dr. Dana Ferris, this project piloted and evaluated a supplemental online grammar instruction program for UWP 1 (Expository Writing) students. Twelve sections (nearly 300 students) of UWP 1 during the fall quarter of 2012 were involved in the pilot project. The sections are evenly split between classes implementing the grammar program and sections utilizing a vocabulary and style journal. Data have been collected from the program and journals, pre-test and post-test writing samples, surveys, and interviews with focal students, and have also been conducted. The data will be analyzed quantitatively and qualitatively to evaluate the effect of the program and journals on student achievement in UWP 1.

**Shear Stress Modulates VCAM-1 Expression in Response to Dietary Lipids via IRF-1**

Justin Sherrod DeVerse, Biomedical Engineering
Co-authors: Angad Sandhu; Natalie Mendoza; Christina Edwards; Scott Simon; Anthony Passerini
Poster # 41

Despite an appreciation for the importance of dyslipidemia to cardiovascular disease, the specific mechanisms that determine the localization of atherosclerotic plaques in arteries are not well-defined. We examined the ability of fluid shear stress (SS)
to modulate diet-induced inflammation via the transcription factor interferon regulatory factor 1 (IRF-1). We demonstrate that triglyceride-rich lipoproteins (TGRL) isolated from human serum after a high-fat meal bias a cytokine (TNFa)-induced inflammatory response in cultured endothelium via a transcriptional mechanism involving the editing of VCAM-1 by IRF-1. To demonstrate a direct role for fluid SS in the regulation of IRF-1-induced inflammation, we examined IRF-1 and VCAM-1 expression in human aortic endothelial cells acutely stimulated with TNFa and TGRL while being exposed to a spatially varying flow field. We demonstrate that SS characteristics of atherosusceptible regions in arteries potentiated VCAM-1 expression in an IRF-1 dependent manner. These findings support a mechanism for the convergence of signaling via physiological SS and dyslipidemia to influence focal susceptibility to atherosclerosis in arteries.

Minimizing the Risk of Disaster Failures in Telecom Networks
Fehrat Dikbiyik, Electrical and Computer Engineering
Corauthors: Marc De Leenheer; Abu Reaz; Massimo Tornatore;
Biswanath Mukherjee
Paper Finalist
Disasters can cause severe service disruptions due to large-scale correlated cascading failures in telecom networks. Major network disruptions due to disasters (e.g., 2005 Katrina Hurricane and 2011 Japan Tsunami) deprive the affected population of essential network services for weeks and severely hamper rescue operations. Leading scientists and analysts are warning of the threats posed by disasters due to climate change and terrorist activities. So, survivability against and adaptability to disasters is very important. Hence, network operators should proactively design their networks to anticipate disasters and develop new reactive procedures to recover networks after the disasters. In this study, we introduce risk for disasters, considering the probability of disasters and their effects on networks and we propose a prevention method which minimizes loss to a network operator in case of a disaster. Recovery methods should consider an immediate relief after the initial failure caused by disasters because, after the initial failure, more connections might be disconnected by correlated cascading failures. Thus, we investigate a reprovisioning scheme to recover disrupted connections under the risk of correlated cascading failures.

Socioeconomic Impacts of Condo use on the Caribbean Spiny Lobster
Angela Doer, Ecology
Talk Session 1C
Commercial fishing is the third largest source of income in The Bahamas and the largest source of income on the majority of the less populated Family Islands. Although many fish species are harvested for local consumption, the Bahamian spiny lobster (Panulirus argus) is the primary commercial fishery. However, there is a great deal of uncertainty about the current state of the lobster population, much of which is due to the increasing use of condos as a method of P. argus collection. Through informal interviews and semi-structured surveys, I examined the use of condos by Bahamian lobster fishermen, including the number of condos fishermen set, how often they check on them, and how the "open access" nature of the habitats influences these decisions. My preliminary results show a very strong correlation between condo use and beliefs about property rights, as well as strong links between beliefs about property rights and the home island of individual fishermen. My research also uncovered a substantial amount of condo-related conflict between fishermen, which has important management implications. This talk will consider the links between condo use, community, conflict, and cooperation in the Bahamian lobster fishery.

Integrated Regional Water Management (IRWM) Tribal Collaboration Effectiveness Study
Danielle V. Dolan, Community Development
Corauthors: Elisabeth Middleton; Sherri Norris; Stephanie Lucero
Talk Session 1C
The Integrated Regional Water Management (IRWM) Tribal Collaboration Effectiveness Study aims to evaluate the effectiveness of opportunities for tribal participation in California’s current IRWM program. Following an indigenous collaborative research methodology, we are identifying best practices for tribally-led water management project development and implementation, as well as greater integration of traditional ecological knowledge in IRWM project plans. This research will contribute to increasing public/private acknowledgement of the importance of including indigenous people and traditional stewardship methods in ecosystem management, thereby supporting indigenous communities worldwide to increase their role(s) in regional natural resource regulation and policymaking.

“Then We Will Benefit”: Eutopic Expectations and the Enactment of Sovereignty in Ramciel, South Sudan
Christian Doll, Anthropology
Poster # 13
Journalistic and popular discussion of South Sudan has emphasized conflict and violence and depicted it as a “failed” or “pre-failed” state. My work, however, presents local perspectives on the new nation, which provide a far more nuanced and optimistic understanding. By focusing on the new capital, Ramciel, I am able to present a concrete manifestation of the contestations and imaginations of the South Sudanese. I particularly emphasize the dialogue between the hegemonic ideals presented by the government and the understandings of local pastoralists subjected to this hegemonic vision, thus providing a particular case of the enactment of sovereignty and hegemony. In my discussions with citizens and leaders, people drew upon expectations for new oil capital, memories of colonization, politicized ethnic identities, reformulations of inherited tradition, experiences of humanitarian intervention, and neoliberal discourse to discuss Ramciel and South Sudan. Analyzing this discourse thus leads me to theorize South Sudan’s unfolding independence within the “longue duree” of African postcoloniality and draw theoretical conclusions about statehood and national identity not only within Africa but in the contemporary globalized world order.
Object Oriented Temporality and Petroleum Space/Time Continuum
Duskin Drum, Performance Studies
Paper Finalist
In this paper I will speculate that contemporary temporality is an aesthetic effect of an object called the Petroleum Complex. The paper will examine some parts of the performing body of the petroleum industry, starting with my experiences examining a major Midwestern pipeline junction. I will also look at performances of the collectives like Platform and the Midwest Radical Cultural Corridor, and other climate justice activists.

Graduate Writing Groups: Providing Specialized Writing Support Outside of the Writing Center
Grant Eckstein, Linguistics
Co-authors: Katherine Evans; Daniel Moglen; Whitney Whitener
Paper Finalist
Graduate students often delay writing tasks and binge write because of the complex nature of their projects. This can lead to poor work, frustration, and feelings of writing anxiety and isolation. We therefore suggest that writing centers facilitate an interdisciplinary, peer-exchange writing model called graduate writing groups. Such groups consist of four graduate students who commit to write daily and provide weekly feedback on one another’s writing. By using a writing group, we increased our writing consistency, minutes of writing per week, and pages per quarter. We also increased our amount and quality of feedback to one another. We explain how graduate writing groups function, report on our writing gains, and show that writing groups can help graduate students and the writing center.

Write Your Dissertation and Get Published: An Effective System for Increasing Writing Productivity
Grant Eckstein, Linguistics
Panelists: Katherine Evans, Linguistics; Daniel Moglen, Linguistics; Whitney Whitener, Linguistics
Panel Session 2
This session will be a panel discussion and demonstration that proposes an effective way to help graduate student writers become productive scholars. Our first presenter starts by discussing common graduate writing roadblocks (isolation, lack of motivation, insufficient discipline, and so on) and then reviews programmatic solutions that various graduate schools, writing centers, and interdisciplinary organizations have employed to some success, concluding with benefits and drawbacks of such systems. The second presenter discusses a newer model for graduate writing that is based on peer review and productivity theories. The new system reduces the same graduate writing roadblocks posited earlier but has additional benefits, such as leading students to longer-lasting and more productive scholarly behavior. As a group, we demonstrate this system in a roll-play fashion so that attendees can immediately implement the system. A final presenter then provides results of a study where UC Davis students engaged in the new system, overcame the roadblocks of graduate writing, and submitted articles for publication as single and co-authors before graduation. We end by speculating on ways the university can make this a no-cost, sustainable, interdisciplinary option for graduate students at UC Davis.

Adaptive Femtocell Access of Licensed and Unlicensed Bands
Ahmed Elsherif, Electrical and Computer Engineering
Co-authors: Wei Peng; Akira Ito; Zhi Ding
Talk Session 0A
Current cellular technologies and deployment tend to exhibit poor indoor coverage, especially for high speed data services whose broadband requirement suffers severe channel distortions and packet losses in complex indoor environment. One recent proposal for improving indoor wireless coverage is the concept of heterogeneous networking and more specifically the deployment of femtocells. A femtocell is an indoor cellular basestation that connects subscribers at a high speed and low power by reusing the same cellular spectrum. These femtocell basestations are linked to the core service network by utilizing common broadband connections such as Digital Subscriber Line (DSL), cable modem, or an RF as a backhaul channel. On another front, WiFi interfaces have been recently incorporated in most cellular user equipments. Our proposed method allows femtocells to jointly control transmission using both cellular technology and WiFi technology to maximize the sum of femtocell user throughputs using both technologies while constraining the interference effect to maintain the Quality of Service requirements for macrocell user equipments.

Lyme Disease does not Induce Immunological Memory
Rebecca Elsner, School of Veterinary Medicine, Microbiology
Co-authors: Stephen Barthold; Nicole Baumgarth
Talk Session 2B
Lyme Disease is a debilitating disease that occurs when ticks infected with a certain type of bacteria, Borellia burgdorferi (Bb), transfer these bacteria with their bite to humans, dogs and horses, among others. The disease is common in certain parts of the US and in Europe. Surprisingly, people living in these areas can get repeatedly infected and do not develop effective immunity. We are using mouse models of infection to study what parts of the immune system may not work properly during Bb infection. Our results indicate that the immune system is incapable of generating structures called “germinal centers”, that normally generate immunological “memory” – i.e. the ability to remember previous infections and prevent diseases from forming after a second exposure.

Exploring Implications of First Language Use during Second Language Writing
Katherine Evans, Linguistics
Talk Session 3B
Second language writing research indicates that language learners use their first language (L1) when writing in a second language (L2). The aim of this study is to develop a clearer picture of L1 use during L2 writing from the learners’ perspectives by exploring the reported triggers that cause them to use their L1s, and their perceptions of how the use of a particular language affects their writing. Data is comprised of interviews and surveys of freshmen international students enrolled in an ESL writing class. Results indicate that L2 writers use their L1s throughout the writing process, but are particularly triggered to do so for idea generation and lexical searching purposes, and may also be triggered.
to use their L1s based on certain task features such as prompt design, topic choice, and learner experience with the topic. Interview participants believe that L1 use when formulating sentences negatively affects the linguistic accuracy of their written work. Therefore, some employ strategies to get themselves into an “L2 state of mind,” which they believe helps them produce better writing. The presentation will explore these triggers for L1 use, student perceptions its effects and their strategies for using more L2.

Spontaneous Electrical Activity in the Retina is Critical for Establishing the Organization of the Lateral Geniculate Nucleus in the Absence of Eye-Specific Segregation

Samuel Failor, Neuroscience
Cor-authors: Hwaijong Cheng; Barbara Chapman
Talk Session 3B

During brain development information from the two eyes is initially mixed due to intermingled connections between the eyes and the brain. Maturation segregates these connections into eye-specific layers. The segregation of eye-specific inputs relies on correct patterns of electrical activity occurring in the retina during growth, and prior experiments have shown that the process of making proper connections is competitive: if neuronal electrical activity is increased in one eye, that eye will gain connections in the brain, whereas if activity is decreased in one eye that eye will lose connections. My research has shown for the first time that activity in the retina plays a non-competitive role during development. If one eye is removed at birth, the inputs from the remaining eye’s retina spread across the growing brain. If the pattern of electrical activity in the remaining eye is altered, the expansion of its inputs is inhibited and its lamination is abnormal, even though inter-eye competition is absent. We hypothesize that electrical activity is critical for activating a retinal cell’s ability to detect molecular signals important for forming connections with other neurons, and thus establishing correct eye-specific layers.

Influence of Synoptic Weather Events on the Isotopic Composition of Atmospheric Moisture in San Diego, California, U.S.A.

James Farlin, Ecology
Cor-authors: Chun-Ta Lai; Kei Yoshimura
Talk Session 3C

Synoptic weather events are known to strongly influence the isotopic composition of precipitation in continental locations. In this study we present hourly values of water vapor isotopologues measured over a 30-day period in locally extreme weather conditions in San Diego, California, U.S.A. We investigate how atmospheric and hydrological processes influence water vapor isotopologues using an isotope enabled GCM model (IsoGSM). Combining measurements and IsoGSM simulation, we demonstrate that convective mixing of marine and continental air masses are responsible for the isotopic variation of near-surface water vapor in this coastal location, which is most pronounced during Santa Ana winds. We demonstrate that a two-source mixing approach (Keeling plot) can reliably be used to estimate the isotopic composition of the source moisture, and from that, infer the moisture’s origin that contributes to the atmospheric moisture content in southern California.

A Bio-economic Model of Spotted Wing Drosophila for California Raspberries

Derek Farnsworth, Agricultural and Resource Economics
Poster # 23

Spotted wing drosophila (SWD) is an invasive fruit fly. It was first detected in California in 2008, and since has spread across the country causing hundreds of millions in damages to the U.S. berry and stone fruit supply chain. I construct a bio-economic model of SWD in Watsonville raspberries and test the scientific and economic viability of different management options. The primary dataset for this paper is a SWD study with trappings, fruit infestations, and the pesticides applied for a sample of organic and conventional raspberry fields in Watsonville, California. The bio-economic model of SWD estimates the effect of different environmental factors and management options. This information has economic value to growers and policy-makers and no equivalent model exists.

Fine Particle Capture by Analog Floodplain Vegetation

Kristen Fauria, Civil and Environmental Engineering
Cor-author: Geoff Schladow
Poster # 43

Vegetated floodplains and wetlands are known to improve water quality by trapping particulates; however the degree of fine particle capture by highly varying natural systems is unknown. In this study we conduct laboratory flume experiments to determine the rate of fine particle (2-10µm) capture as a function of flow velocity, stem density, particle diameter, and suspended particle concentration. Mats of 20cm tall bladed plastic grass serve as the analog vegetation and road dust is used as the particle flux as a 200 gallon flume recirculates water and particle concentration is measured. We observe an increase in particle capture when plastic grass mats are in the flume. Furthermore, we calculate particle capture rates and determine that the capture rates depend on particle size and closely match existing theory developed for order of magnitude larger particles. We conclude that direct interception by vegetation stems is an important capture mechanism for fine particles that are not usually removed by settling. Additionally, we use the experimentally derived particle capture rates to determine trapping rates that can be directly applied to restoration projects.

Developing a Care Coordination Screening Tool for Transitioning Patients with Chronic Diseases Back to Usual Care

Sarina Fazio, Betty Irene Moore School of Nursing
Cor-authors: Kelley Ceccon; Bridget R. Levich
Talk Session 4C

The Institute of Medicine and the Affordable Care Act have highlighted transitional care for patients as a national priority for improving health outcomes and decreasing costs. In response to these reports and financial incentives, numerous health care institutions have implemented care coordination programs across the country. However, many of these programs are still developing their policy and procedures, and limited published literature exists on standardizing care coordination discharge procedures. At present, this transition process is left to the discretion of the individual care coordinator. The medical stability of the
patient, patient reported self-confidence, and the fulfillment of
the plan of care are among the many factors considered to de-
termine suitability for usual care. Therefore, our standardized
screening tool has the potential to assist care coordinators in
effectively managing their caseload, serve as a measure for
quality improvement, and promote safe and successful patient
transitions. If this screening tool can be evaluated and vali-
dated as an effective tool, it may also assist other care coordi-
nation programs and contribute to the literature on this topic.

Conjunctive Water Management in an Aquifer-Floodplain
Recharge Operation
Carlos Flores-Arenas, Hydrologic Sciences
Co-author: Graham Fogg
Talk Session 4B
Conjunctive water use is of high interest in Yolo County. The
use of groundwater storage during dry periods of time, when
the lack of surface water constrains the diverse water uses, is
an alternative to increase the water availability to meet water
demand. Full benefits of conjunctive use can be achieved when
excess surface water during wet years can be recharged into the
groundwater. This is done normally in upgradient areas, but in
Yolo County the water for recharge is only available in down-
gradient areas such as the Yolo Bypass. This study investigates
the feasibility and utility of recharging groundwater near the dis-
charge end of the groundwater system along with reversing the
ambient groundwater flow direction by varying the distribution of
pumping. The Integrated Water Flow Model (IWFM) is used to
analyze hydrologic responses and their reliabilities to conjunctive
use alternatives. Model results suggest that a promising conjunc-
tive management framework to increase water availability could
be developed in the Yolo Bypass (a floodplain area) under sev-
eral flooding regimes by groundwater recharge, storing excess
water coming from the Sacramento River during flooding seasons
to then extract the aquifer storage capacity during dry periods.

Decoding the Stimulus: Weatherization and the Hidden
Welfare State
Laura Flynn, Community Development
Talk Session 2A
In 2009, the American Recovery and Reinvestment Act was en-
acted into law and became the single largest federal expenditure.
The legislation was designed to ameliorate some of the effects of
the recession by stimulating job growth and investing in a myriad
of programs. One of these programs was the Weatherization As-
sistance Program (WAP), a little known energy efficiency program
that provides free energy upgrades to low-income households. It
infused $5 billion over two years into the program, which more
than doubled its average budget. The program was designed to
be a quick infusion of funds into an ailing economy but the pro-
gram faced delays in implementation that led to sharp criticism from
some. My research aims to understand the political environ-
ment, structural limitations and framing of the Weatherization As-
sistance Program in the American Recovery Act period. I use con-
tent analysis to explore the complexity of the institutional realities
and social relationships shaped by the media’s coverage. The
results show the dangers for poverty programs that move from the
shadows in the public purview and the structural realities of gov-
ernment that make it challenging to shape narratives of success.

TULP4 Assembles into an ECS (Elongin-Cullin-SOCS box)-
type E3 Ubiquitin Ligase Complex and may Regulate NFκB
Signaling
Amanda Fox, Immunology
Co-author: Lorena Navarro
Poster # 3
It is our ability to respond to pathogens, and sometimes more im-
portantly, revert back to homeostasis which allows us to survive.
Tubby-like protein 4 (TULP4) is a novel putative immunoregula-
tory protein, which may be pertinent for this reversal process.
While conserved throughout the animal and plant kingdoms,
the molecular basis of TULP function in the cell is unknown, but
TULP4, has been linked to innate immunity. Preliminary luciferase
results reveal that overexpression of TULP4 inhibits LPS stimulat-
ed NFκB activation. In addition to its potential immunoregual-
tory function, TULP4 may also be associated with ubiquitin mediated
protein degradation. TULP4 contains its familial tubby domain
as well as a WD40 and a suppressor of cytokine signaling (SOCS)
domain, which link it to ECS-type E3 ubiquitin ligase
activity. Here we show that TULP4, specifically through a BC
box region in its SOCS domain, can assemble with pertinent
components of the ECS-type E3 core, Elongins B and C, Cul-
in 5 and likely Rbx2. In vivo studies show that TULP4 interacts
with ubiquitin tagged proteins. Further development of this re-
search will determine whether TULP4’s proposed immunoregula-
tory properties are linked to its probable ubiquitinase activity.

An Inline Dielectric Biomass Sensor for Real Time Growth
Monitoring of Yeast in Early Wine Fermentation.
Cevin L. Freed, Electrical and Computer Engineering
Co-authors: Andre Knoesen; Rajeevan Amirtharajah; Roger
Boulton; Charles "Chik" Brenneman
Poster # 11
In wine fermentation, yeast converts grape sugar into ethanol
and CO2. Winemakers use the conversion of sugar as an in-
dication of fermentation progress. However, sugar levels are
insensitive during the first few days of fermentation - a period
known as the lag phase. In this phase, yeast exponentially mul-
tiply and prepare their metabolic process for sugar to ethanol
conversion. The growth rates in this phase are significant mea-
sures of the health of yeast as well as nutrient condition of juice.
Thus, winemakers desire a low cost sensor capable of real time
sensing of yeast biomass. Existing methods that measure bio-
mass rely on optical scattering, weight, or hemocytometry and
are costly, time intensive, and sensitive to grape particulates.
To address these problems, an inline dielectric biomass sen-
sor has been developed to track growth in wine fermentation.
The sensor periodically measures the complex dielectric permit-
tivity of a flow cell at both low and high frequency. Because
the technique is electrical, no sample modification is neces-
sary. Fermentation studies during the fall 2012 harvest using
UV-Vis and Hemocytometer biomass references have shown
a high degree of growth correlation with the dielectric sensor.
Preparation of Colorimetric Sensors for Fumigants
Sanaz Ghanbari, Agricultural and Environmental Chemistry
Co-author: Gang Sun, Professor
Poster # 64
Fumigants are insecticides in the form of gas that are slightly heavier than air and have the ability to spread to all areas and surfaces. Measured in pounds, fumigants represent approximately 20 percent of all agricultural pesticides used in California. Some of the most widely used fumigants include methyl bromide, methyl iodide, methyl isothiocyanate, and chloropicrin. Before planting, fumigants are applied in the fields to control disease, weeds, and pests in the soil. Since fumigants are both toxic and gaseous, their offsite movement can pose hazardous impacts to people in nearby areas. Thus, rapid, onsite, and accurate detection and indication of exposure and concentrations of fumigants are necessary for human safety and protection of workers. In this presentation, preparation of paper based colorimetric sensors for methyl iodide and methyl bromide will be discussed. These sensors have the ability to rapidly show visible color changes that can quantitatively indicate the exposure level of the fumigants in the air and can be possibly used as attached strips on clothing or testing strips by farm workers.

The role of squalene in the membranes of Halobacterium salinarum
Sean F. Gilmore, Applied Science
Coauthors: Marc T. Facciotti; Andrew I. Yao; Atul N. Parikh
Poster # 65
In the work reported here, we examine the physical-chemical properties of squalene within lipid mixtures. Pressure-area isotherms, derived from Langmuir monolayer experiments, of the total and polar lipid extracts (with and without squalene, respectively) of the extremely halophilic archaeon Halobacterium salinarum, reveal packing to be strongly modulated by the presence of squalene in the total lipid extract. Consequently, squalene allows for tighter packing of archaean lipid mixtures due the interactions between squalene and the isoprene chains of the H. salinarum lipids. Additional evidence is seen in Langmuir isotherms of mixtures of squalene and DPhPC, a purified lipid with a chain structure that is nearly identical to the polar lipids of H. salinarum. In this simplified system, tighter lipid packing is observed to occur in mixtures containing 10-20% squalene, which is the range of squalene content of the membranes of H. salinarum. These and other results presented here support the notion that squalene plays a role in modulating chain order, lipid packing, and domain partitioning in the membranes of archaean analogous to that of cholesterol in eukaryotic membranes.

Autonomous Taxi System
Jay Gokhale, Mechanical and Aerospace Engineering
Coauthors: Kevin Gucwa; Michael Schirle
Poster # 35
Recent technological achievements in the field of autonomous vehicles have hinted at a future in which all cars drive independently. It is very possible that in the near future there will be a paradigm shift in transportation. Instead of every individual having a vehicle of their own, we may simply have a large number of autonomous vehicles that transport everyone. This autonomous taxi system coupled with a scheduler will be extremely efficient and far safer than the status quo. The new system will incur an enormous communication overhead when planning for millions of cars in real-time and handling changes in the system caused by traffic, accidents, and numerous other variables that exist in the real world. This large overhead brings about a trade-off between optimality and speed. I attempt to solve this issue using a decentralized planning system capable of computing in real time while planning close to optimally.

Syntactic scrambling in German and Japanese: an account using Dynamic Syntax
Christopher Graham, Linguistics
Talk Session 4B
Traditional accounts of syntactic scrambling have labeled it either A-movement or A’-movement with variance as to which type(s) of movement a language will allow, not only vis-à-vis other languages but also among clause types. For Japanese, Saito (1992) argued that clause-internal scrambling can be described as A- or A’-scrambling depending upon the relationship of the adjunct to VP or IP, while scrambling out of finite clauses is always A’-scrambling. For German, Grewendorf & Sabel (1999) argued that clause-internal scrambling is A’-scrambling and showed that scrambling out of finite clauses is ungrammatical. I suggest an alternative analysis based on the linear ordering of syntactic elements. Using the Dynamic Syntax framework developed by Kempson et al. (2001), I show that the unique requirements of anaphors and antecedents coupled with this linear parse model provide a more unified explanation of scrambling phenomena in German and Japanese. Two conditions regarding these requirements are posited: (1) that the antecedent precede the anaphor and (2) that the antecedent’s node sit at a level above the anaphor’s in the parse tree. I show that examples of German scrambling which satisfy both the node level condition and the linear order condition are considered grammatical, but dissatisfaction of one or the other yields ungrammaticality. Japanese examples which satisfy both conditions are grammatical and those which satisfy just the linear order condition are only marginally grammatical. Finally, I end with a discussion of Weak Crossover phenomena and argue that the same two acceptability conditions apply.

Reproductive and Parental Investment Strategies in Prehistoric California: Stable Isotope Estimates of Weaning and Childhood
Alexandra M. Greenwald, Anthropology
Co-author: Jelmer Eerkens
Talk Session 3C
Ecological theory predicts that individuals will alter reproductive strategies in response to environmental and social conditions. We predict a greater number of offspring, but reduced investment in each, during periods of environmental stress and social instability. Conversely, we predict greater investment in fewer offspring during periods of stability. We test this hypothesis by estimating two measures of parental investment, weaning age and childhood dietary quality using stable isotope ratios in dentinal collagen, for 18 individuals at the archaeological site CA-AJA-554, which spans the hypothesized high-stress
Middle-Late Transition period. Our data are consistent with the hypothesis that parental investment was lower during the MLT.

Exploring the application of 14C dating using archaeological oyster shells from the James River, VA
Brittany L. Grimm, Geology
Co-authors: Howard J. Spero; Juliana M. Harding; Tom P. Guilderson
Talk Session 1C
Radiocarbon dating is a technique commonly used by geoscientists and archaeologists to date a variety of materials. The Chesapeake Bay is especially significant for archaeological studies because Native Americans inhabited the area for centuries prior to the first successful European colonization of North America in 1607 at Jamestown, Virginia. Shells from Native American middens and early European colonies are often dated to trace the groups’ histories. Preliminary results indicate that bulk analysis of shells for 14C dating may lead to erroneous conclusions. Depending on the proportion of summer or winter material used for dating, the age can vary by a couple centuries in one shell. Thus, it is critical to determine seasonality in shells prior to dating. Because the hydrodynamics of estuaries change seasonally, the results from this study will be applicable to future geological and archaeological dating studies in both the Chesapeake Bay and other estuaries. Furthermore, future work dating younger shells from other archaeological sites along the James River will reveal if the local reservoir age has changed due to an increase in anthropogenic influences (e.g. farming) in the once-pristine watershed.

Key to the New World and Image of the Old: Urban Development and Deviation in Sixteenth-Century Havana
Alicia Guerra, Art History
Talk Session 1A
Little scholarship has engaged the departure that Havana’s urban form signifies in differing from the norms of townplanning employed in “New Spain” in the sixteenth and seventeenth centuries. In fact, sixteenth-century Havana’s town plan more closely reflects a medieval approach to urbanization than the Renaissance ideals of gridiron regularity decreed by The Laws of the Indies which governed the forms of most of Spain’s colonial cities. In order to demonstrate the significance of these deviations, this presentation will compare the early urban development of Havana with that of Mexico City, whose town plan presents a more common model for the urbanization of the rest of “New Spain.” This comparison will demonstrate that Havana experienced a gradual and organic realization of its urban space as a result of particularities concerning site, plan, and indigenous contact during the period of its origin. My findings are intended to provide a better understanding of the unique medievalness of Havana’s urban landscape as a physical manifestation of its particular role in Spain’s conquest and as a formal defiance of the Renaissance mechanisms of control which commanded the urban forms of the majority of Spain’s colonial cities.

Conditional Obedience: The Power to Protect, the Duties of Sovereignty and the Right of Rebellion in Hobbes
Christopher Hallenbrook, Political Science
Paper Finalist
Traditional interpretations of Hobbes’s thought present his conception of political obedience as contingent only on the preservation of life, which makes obedience practically unconditional. Focusing on Hobbes’s conception of natural right I present a reinterpretation of obligation, arguing that Hobbes considers political obligation to be conditional on the preservation of commodious living. Drawing on both Leviathan and Hobbes’s earlier works, I show that this conception is not confined to any one formulation of Hobbes’s thought and cannot be dismissed as unrepresentative of his thought as a whole. I reveal Hobbes’s thought to be less unequivocal in its support for absolutism than has been previously recognized and show that Hobbes placed substantive limits on the absolutism of monarchs.

Progressive increase in large intestine permeability correlates with plasma endotoxemia in diet-induced obese rats
M. Kristina Hamilton, Molecular, Cellular and Integrative Physiology
Co-authors: Gaëlle Boudry; Helen E Raybould
Poster # 47
High fat diet-induced obesity is characterized by increased intestinal permeability, increased plasma lipopolysaccharide (LPS), low-grade inflammation and metabolic alterations. The contribution of altered intestinal permeability in different regions of the intestine to the obese phenotype has not been determined. The aim of this study was to determine the temporal relationship between impaired small and large intestinal permeability and endotoxemia in rodent diet-induced obesity. Obesity was induced by feeding a high fat diet or normal chow for 1, 3 or 6 weeks. Permeability was determined using flux of fluorescent markers across intestinal tissue ex vivo. Plasma LPS-binding protein (LBP) was measured by ELISA. Paracellular permeability increased in the small intestine of HF fed rats at week 1, but normalized by week 3. Transcellular permeability was increased in the large intestine of HF fed rats. Elevated plasma LBP in HF fed rats significantly correlated with increased transcellular permeability and with adiposity. Impaired transcellular, but not paracellular permeability, in the large intestine leads to endotoxemia and the phenotype of diet-induced obesity in rats.

A new approach for predicting which bird species will occur at sites across North America
David J. Harris, Population Biology
Talk Session 2D
In order to protect the habitat of charismatic and endangered species like California Condors, or to prevent the spread of economically costly invasive species like Zebra Mussels and Cane Toads, ecologists and decision-makers need good information about where these species can be found and where they can live. Especially when field observations are limited, it is important to use mathematical models to synthesize our data into something that can be used to make predictions for places we haven’t observed directly. This can save money and maximize effectiveness when deciding which areas to protect or investigate further. My
research, which incorporates statistical techniques that were developed to solve difficult problems in other fields like speech recognition, shows that we can get better results by building models that can predict whole assemblages of species simultaneously.

**What makes you like yourself? Age differences in self-esteem**

Michelle A. Harris, Human Development
Co-author: Kali H. Trzesniewski
Talk Session 1A

Over 30 years ago, the leading researcher on children’s self-esteem concluded that children younger than 8 cannot verbalize global feelings of self-worth (Harter, 1983). Consequently, little research has been done to understand where self-esteem comes from and what predicts healthy levels of self-esteem from an early age. This research is important because self-esteem predicts many factors critical to individuals’ healthy development such as lower criminal behavior, higher physical health, lower levels of depression, higher economic wealth, and greater achievement. Gaining a better understanding of self-esteem and how it is formed can enhance parenting and teaching practices to facilitate healthy levels early on. As a first step toward addressing this gap, the current study developed a new measure of self-esteem and administered it, along with a standardized interview prompting explanations for self-views, to 5-10-year-olds. Results provide new insights into the question of whether children younger than 5 have global self-evaluations. Qualitative analyses revealed that younger children provided more concrete explanations for their self-esteem than older children, who provided more psychological explanations.

**Adolescents and the Specter of Discrimination: Reported Fears and Experiences among Minorities in Chicago**

Daniel Herda, Sociology
Talk Session 1D

How much does racial discrimination fear affect the lives of minority individuals? I answer this question using a sample of African American and Latino adolescents from Chicago. I document the extent of these fears and compare my young respondents’ reports to discrimination fears reported by their parents. I also develop and test hypotheses linking greater fear to personal experiences as a victim of discrimination, the victimization experiences of family and friends, and neighborhood racial composition. Findings are multiple, but indicate that: 1) discrimination fear is common among minority adolescents; 2) adolescents are affected by fear more than their parents; and 3) fears are more likely if one has been or knows someone who has been a discrimination victim.

**Mental Health Among Immigrant Families: Examining the Role of Family, School, and Cultural Context**

Organizer: Maciel M. Hernández, Human Development
Panelists: Emerald Nguyen, Sociology; Maciel M. Hernández, Human Development; Kelly Beaumont Bacher, Human Development; Cassie Hartzog, Sociology
Panel Session 3

This symposium highlights how family, school, and cultural contexts impact mental health in youth and adults of immigrant backgrounds. More recent immigrants to the United States are healthier than their native-born counterparts, despite socio-economic (SES) profiles typically associated with poor health (Garcia Coll & Marks, 2011). This “healthy immigrant effect” is often attributed to cultural differences that may promote health and reduce risk. We review different facets of mental health among youth and adults of immigrant backgrounds and highlight four studies on the topic. Each presenter will be given 7 minutes to discuss each study, followed by Q & A. Study 1 examines the influence of family context and language proficiency on the self-esteem of second-generation immigrant youth in the US. This study identifies direct and indirect pathways between parents’ SES and language ability and the complex nature by which adolescent self-esteem is formed. Study 2 examines the association between youth’s sense of school belonging and externalizing and internalizing behaviors across 5 years among Mexican American youth. The paper also examines the role of SES and generational status in explaining these processes. Study 3 examines the role of ethnic discrimination, an acculturative stressor unique to minority children, on using alcohol/drugs and engaging in risky sexual behavior among Mexican American youth. This study examines relationships over time (5th-9th grades) among ethnic discrimination, interpersonal relationships, and adolescent health behaviors. Study 4 examines how drinking patterns differ between the U.S. & Mexico across four generations of adults. This study examines if acculturation is associated with worsening or converging health behaviors. This panel will provide a platform for exchanging research on mental health among immigrant families, including the contextual factors that play a role in the development of these processes.

**Interface Characterization of Fe3O4 nanoparticle/GaAs**

Sahar Hihath, Physics
Co-authors: Dr. Van Benthem; Richard Kiehl; Warren Picket
Poster # 62

Semiconductor spintronic, which is a combination of half-metallic ferromagnets and semiconductor substrates, have gained a tremendous attention recently because it offers a path toward the development of hybrid devices. Spin injection from a ferromagnetic metal in to a non-magnetic semiconductor could combine magnetic storage of information with electronic properties in a single semiconductor device. Also, modification of electron spin in GaAs indirectly through adjacent ferromagnetic regions could offer new devices mechanisms. Therefore, characterization of Fe3O4/GaAs hybrid nanostructure could pave the way for future high memory storage spintronics material, which could potentially affect many aspects of our lives such as media, healthcare, information systems, computers and etc. Eventually, hybrid transistor devices can be fabricated from this material, which is non-volatile, fast, capable of simultaneous data storage, and information processing.

**The Jesse Stories**

Joseph Hill, English, Creative Writing
Performance

I use my writing to finely detail a sense of place and the people that live and are firmly entrenched in East Texas.

In my writing, I revisit the notion that not all of the civilized world is California or New York, and there are still people who think
and act like people thought and acted 40 years ago. I want to show the difficulties of a different type of life. And like my place and people of which I write, I want to show it and to write about it like they would. I write about East Texas with a minimum of internalization, creating character through an atmospheric sense of place, supported by dialogue. Internalizations, when they do happen, are not thought driven, but rather memory driven. In the work I will be reading from, I am utilizing both fiction and poetry to showcase the sparseness of this place by using each form to tell a different parallel narrative. I am seeking to focus on the restrictions of each form and how a writer has to utilize sparseness to accurately tell a story and how the poetical and fictive form work with and against that. My writing is important in that my characters are informed by this specific place and by my childhood in this place. East Texas was once thought to be timber rich, but now is just miles and miles of impenetrable forest, with railroads slicing through the trees, stopping at each small and desolate town. I write of the people that live in these towns, and their small but universal troubles. I want to show that although this may be one small segment of the population, an offshoot of the larger white population, it is still part of the larger conversation and should not be forgotten in light of more cosmopolitan literature.

From Whale Falls
Benjamin Hinshaw, English, Creative Writing Performance

In 2006, Iceland re-legalized whaling. The decision, though not a surprise, provoked international consternation. It also distracted attention from the country’s bizarre and unsustainable financial dealings, which over the course of the preceding decade had turned ordinary Icelanders into debt-laden spenders and speculators. When it became the first nation to be bankrupted by the credit crunch, Iceland’s tale became a cautionary one, its people left with no choice but to reconnect with the traditions and values it had abandoned in the pursuit of illusory wealth. For several years I have been working on a novel set primarily in the Iceland of 2006. Pivoting on the stranding of a container ship off the island’s west coast, its cast includes an anti-whaling activist recently returned from Antarctica, an exiled French craftsman whose mother has recently been murdered, and a professor of the Iceland of 2006. Pivoting on the stranding of a container ship off the island’s west coast, its cast includes an anti-whaling activist recently returned from Antarctica, an exiled French craftsman whose mother has recently been murdered, and a professor of its own food and agriculture systems has grown significantly of late (Gottlieb & Joshi 2010), and continues to be formalized by a wide variety of groups, culminating in a visible movement towards food justice (FJ). We have drawn from these efforts in constructing a framework for analyzing Food Justice Organizations (FJOs). A Delphi survey was used to gather data from 18 employees of FJOs and FJ advocates. Data indicates that FJOs vary in their missions and means; yet there are common values and struggles serving as unifying themes. Results illustrate demand for community-driven research serving as a basis for shaping critical frameworks for, by and from FJOs.

Surveying Food Justice Organizations to Uncover Vital Questions Using a Modified Delphi Method
Rasheed Hislop, International Agricultural Development Poster # 57

Work to eliminate disproportionate access to affordable, healthy food and inequalities in community’s abilities to define their own food and agriculture systems has grown significantly of late (Gottlieb & Joshi 2010), and continues to be formalized by a wide variety of groups, culminating in a visible move-
Identification of a gene(s) responsible for improved drought resistance in wheat
Tyson Howell, Genetics
Co-authors: Iago Hale; Ljupcho Jankuloski; Adam Lukaszewski; Jorge Dubcovsky
Poster # 23
A non-transgenic translocation of the short arm of rye chromosome 1 (1RS) into wheat plants has been used in wheat breeding programs for many years because of improved pest and disease tolerance, as well as increased yield. Unfortunately, this rye translocation adversely affects bread making quality traits, making it unusable in many high quality wheat breeding programs, particularly in the United States. To address this concern, a recombinant version of the 1RS chromosome arm was engineered by replacing two segments of the 1RS arm with interstitial segments of wheat DNA, hereafter referred to as the 1RS-MA chromosome arm. Wheat lines with nearly identical genetic compositions (near isogenic lines) with the exception of having either the 1RS or 1RS-MA translocation were generated and grown in the field under well watered and water limited conditions. It was shown that there is a large yield penalty associated with the 1RS-MA translocation, particularly under water limited conditions. These results indicate that there is a gene(s) localized to one or both of the regions replaced with wheat chromatin in the 1RS-MA translocation. This research ultimately aims to identify the gene(s) responsible for the observed yield differences.

Neural representation of position information in temporal sequences
Liang-Tien Hsieh, Psychology
Co-authors: Matthias J. Gruber; Lucas J. Jenkins; Charan Ranganath
Talk Session 3C
One of the biggest achievements in the evolution of the human brain is that it is equipped with intricate neural mechanisms that allow us to “mental time travel” to the past. This ability implies that the human brain is capable of keeping track of the occurrence and the temporal order of events and organizing them in a manner that can be easily retrieved at a later time. However, after decades of research on the neural basis of human memory, little is known about how memory for temporal information is represented in the brain. The current study addresses the gaps in our understanding of human memory and the abilities that underlie mental time travel. Moreover, our studies may also shed light onto the understanding of disproportionate temporal memory decrement, as compared to item memory, experienced by amnesic patients and older adults.

Fluorous-tag assisted Chemoenzymatic Synthesis of Oligosaccharides
Joel Hwang, Chemistry
Co-authors: Hai Yu; Xi Chen
Poster # 39
Carbohydrates, aside from being biological energy sources, have been known to play an essential role in signal transduction, cell recognition, and immunological response triggering. However, the synthesis of carbohydrates has been both skill intensive and time consuming due to the limitations of synthetic tools available. In this study, a variety of fluorous-tagged lactosides were synthesized, evaluated by different glycosyltransferases, and purified using a single fluorous solid-phase extraction (FSPE) cartridge. As a result, the enzymatic reactions were achieved with high yields using an efficient one-pot multi-enzyme (OPME) approach and were rapidly purified via the FSPE technique. It was found that the length of the fluorous tags on the lactosides and the distance between the tag and sugar play a critical role in the efficiency of the OPME reactions. This work suggests a practical way to synthesize structurally-defined oligosaccharides in large quantities within a reasonable time frame, which in turn will facilitate the elucidation of the functions of carbohydrates in biological systems and accelerate the development of carbohydrate-based therapeutics.

Decreased DGCR8 expression in subjects with 22q11.2 Deletion Syndrome: Implications for miRNA dysregulation in congenital heart disease
Vicki Hwang, Genetics
Co-authors: Ravi Dandekar; Blythe Durbin-Johnson; Chantal Sellier; Tony Simon; Flora Tassone
Talk Session 1D
22q11.2 Deletion Syndrome (22q11DS), the 2nd most common genetic disorder, causes a wide range of clinical manifestations including autism spectrum disorders and congenital heart defects (CHDs). Present in 75% of individuals, CHDs are the main cause of morbidity and mortality for this syndrome. About 60 genes map within the deleted region on chromosome 22. One of them, the DiGeorge Critical Region Gene 8 (DGCR8)
gene, is deleted in the majority of individuals with 22q11DS and is a crucial component of microRNA (miRNA) biogenesis and global gene regulation. We demonstrate decreased DGCGR8 expression and dysregulation of cardiac related miRNAs in subjects with 22q11DS when compared to typically developing (TD) controls. Importantly, we observed differential expression of miRNA (miR)-190, miR-208, miR-1, and miR-133 between CHD+ and CHD- subjects with 22q11DS and when compared to TD. We provide evidence that miRNAs that are dysregulated in nonsyndromic CHDs are similar to those seen here and that dysregulation of cardiac miRNAs can be detected in blood. Most of the 22q11DS molecular studies have been performed in rodent models, and to our knowledge, this study is the first to examine miRNA dysregulation in human patients with 22q11DS.

A Generalization of Wavelet Packets to Data on Point Clouds
Jeffrey Irion, Applied Mathematics
Poster # 36
We present a generalization of wavelet packets to data on point clouds. As the foundation for our wavelet packet transform, we use the partitioning and average-interpolation schemes of Rustamov. We then use the lifting scheme of Jensen, Nason, and Silverman to generate wavelet coefficients. Using geographical networks and graphs of dendrites, we compare the compression results achieved by this lifting transform to those obtained by Rustamov's wavelet transform. We then develop a wavelet packet transform for such point cloud data. First, we investigate the compression achieved by this transform. We then utilize our wavelet packet transform as a feature extractor for classification and regression algorithms in an effort to improve their results.

Determination of Carcinogenic 4(5)-Methylimidazole in Caramel Model System Consisting D-glucose, ammonia, and sulfate
Hae Won Jang, Environmental Toxicology
Cor-authors: Takayuki Shibamoto; Matt Hengel
Talk Session 2C
It is ideal to find the way to mitigate the formation of carcinogenic 4(5)-Methylimidazole [4(5)-MI] in caramel using Maillard reaction systems. In the present study, formation mechanisms of 4(5)-MI were investigated using Maillard reaction systems. Aqueous solutions consisting of D-glucose [0.1, 0.5, 1 M], and ammonium hydroxide [0.1, 0.5, 1 M], and/or sodium sulfate [0.1, 0.2, 0.5, 0.7, 1.0 M] were heated at 150 °C for 2 h in an oven. 4(5)-MI analysis was conducted by gas chromatography-nitrogen phosphorus detector (GC-NPD). The amount formed ranged from 28.56 ± 0.65 to 1260.71 ± 214.7 µg/mL under various conditions. It was shown that the formation of 4(5)-MI was a dose response to D-glucose and ammonium hydroxide. Interestingly, sodium sulfate significantly decreased the formation of 4(5)-MI. Addition of sodium sulfate reduced 4(5)-MI formation by 45.9 % in 0.1 M D-glucose/0.1 M ammonium hydroxide system, 63.9 % in 0.5 M D-glucose/0.5 M ammonium hydroxide system, and 41.8 % in 1 M D-glucose/1 M ammonium hydroxide system. The results suggest that sulfate plays an important role in reducing 4(5)-MI formation in Maillard reaction systems.

The Effect of ErbB Inhibitors on Bladder Cancer
Maitreyee Jathal, School of Medicine, Urology and Comparative Pathology
Co-authors: Duanna Challenger; Benjamin A. Mooso; Paramita M. Ghosh
Poster # 48
Recurrent bladder cancer cells express higher levels of the epidermal growth factor receptor (EGFR) and related receptors ErbB2, ErbB3 and ErbB4; hence ErbB inhibitors have been tried in bladder cancer trials with minor results. Studies in other tumor types show that resistance to ErbB inhibitors arose due to increased ErbB3 levels. We investigated whether MM-121, a monoclonal antibody against ErbB3, sensitized bladder cancer cells to chemotherapy. T24, TCCSUP, J82 and HTB-2FT4 cell lines were treated with the dual EGFR/ErbB inhibitors dacomitinib (PF00299804) and Tykerb (Lapatinib) or MM-121. All but the HTB-2FT4 cell line expressed high ErbB levels. The IC50 value for MM-121 in J82 cells was 0.86 µM, while that for TCCSUP and HTB-2FT4 cells was ~10 µM. T24 cells were resistant. Comparison of the T24 cell line to the low ErbB expresser showed that, in HTB-2FT4 cells, MM-121 sensitized the cells to Cisplatin but not PF00299804 while in cells with high ErbB levels, the combination of MM-121 + PF00299804 inhibited cell survival. Cellular response to cisplatin and efficacy of MM-121 + PF00299804 strongly correlated with ErbB expression. Thus bladder cancer response to ErbB inhibitors is dependent on ErbB expression.

In-Field transfer and survival of indicator E. coli from wildlife feces to Romaine lettuce
Saharuetai Jeamsripong, Epidemiology
Co-authors: Michele Jay-Russell; Jennifer A. Carabez; Edward R. Atwill; Anne-Laure Moyne; Linda J. Harris
Poster # 63
Foodborne outbreaks have been linked to enterohemorrhagic E. coli contamination of produce. Generic E. coli strains may be used to monitor for fecal material in the produce. This study was to determine the amount of generic E. coli that transfers onto lettuce following simulated contamination by wild animal defecation. Chicken, rabbit, and pig feces were inoculated with rifampicin-resistant generic E. coli to estimate the transfer and survival of bacteria on lettuce. Negative binomial and linear regressions were used to assess contributing factors for prediction of contamination and to measure bacterial survival, respectively. Inoculated E. coli was recovered from a total of 182/196 (93%) lettuce heads. A decreasing concentration (7.8 log reduction) was observed in 47 samples from the fecal pat to the 5foot no-harvest zone. Age of scat, distance from scat, and distance from sprinkler heads were statistically significant with the magnitude of bacterial transference in linear model (p < 0.05). The inoculum of bacteria on 288 heads of lettuce can survive up to 10 days. Decimal reduction times of bacteria in chicken and rabbit feces were 2.2 and 2.5 days, respectively, while in pig feces was unpredictable due to bacterial growth.
Genomics of Thyroid Hormone Resistance
Robyn Jimenez, Genetics
Talk Session 4B
Resistance to Thyroid Hormone (RTH) Syndrome is an inherited human endocrine disorder most frequently caused by mutations in thyroid hormone receptors (TRs). TRs are hormone-regulated transcription factors that function by binding to specific DNA response elements and regulating target genes. RTH has been widely viewed as a disease of repression, in that disease-receptors are simply impaired in their ability to regulate gene expression when compared to ability of the wildtype (wt). Consistent with this idea, we have shown that several genes strongly activated by the wt-TRs in response to the thyroid hormone were poorly activated by an RTH-P453S TRß1 mutant under the same conditions. However, other genes repressed by wt-TRs were not repressed by P453S-TRB1, and most surprisingly, several genes not regulated by wt-TR were regulated by P453S-TRB1. These observations indicate that RTH can manifest as changes in expression of genes that are not targets for wt-TR. This work may help explain the diversity of the RTH clinical phenotype, why RTH does not simply mimic hypothyroidism, and further detail how human endocrine disorders arise from abnormal TR signaling yet differ from oncogenic disorders associated with other TR mutations.

Spectral Representation Analysis of Dielectric Screening in Solids and Molecules
Amandeep Kaur, Physics
Co-authors: Erik Ylvisaker; Deyu Lu; Tuan Anh Pham; Giulia Galli; Warren E. Pickett
Talk Session 1B
We propose a new approach to identify and rationalize the contribution of core electron polarization to dielectric screening, based on ab initio calculations of the dielectric matrix in its eigenpotential basis. We present calculations of inverse participation ratio, density of states for epsilon, phonon frequencies, dielectric constants, quasiparticle (QP) energies of several systems, and we discuss the quantitative effect of including core polarization. We find that new eigenmodes appear for epsilon by considering semi-core states into the valence (em ~ 0.4-0.5). These new eigenmodes are highly localized in real space. Along with the new eigenmodes we find some mixing of the semi-core eigenmodes with the valence only modes. These new and mixed eigenmodes affect phonon frequencies, static dielectric constants by up to 10% with the effect more substantial for heavier alkali hydrides. If a precision of ~ 200 meV in the QP energies is desired then the semi-core screening is relevant to be considered.

Electrovocal Performance as/in Research
Gretchen Jude, Performance Studies
Performance
This performance explores the implications for embodiment of the use of digital audio technology in situations of electrovocal performance. During the course of the presentation, what starts as a lecture will morph into an artistic performance illustrating the same topic, so as to pose the question: How much does performance of abstract subject matter change when its discourse context slowly shifts from the academic to the artistic? As a vocalist and computer musician, I find that, insofar as my music entails programming, my body is lost while I am at the keyboard; in contrast, when vocalizing (which is rooted in the breath and the physical body) I literally rediscover my voice, subsequently grounding my artistic practice. Similarly, as a performance studies scholar, I find that my work as a performer moors my intellectual practice in the physical realm. This presentation will use audio technology to problematize the increasingly sidelined position of the body in the realms of technology, as well as providing a real-time experiment in performance-as-(artistic) practice. The academic lecture will be similarly denaturalized and reframed as work of sound art, highlighting the transformations of the voice between as it travels between microphone and amplifier.

The Exploration of Dramatic Design
Travis Kerr, Theater and Dance
Art Exhibit
I remember when I was very young freezing on a cold winter day, watching a marching band show. At the end of the first movement, everyone came together in a series of diamonds, played a final note, and stopped dead. The note resonated through the air and I felt the hair on the back of my neck standing up. Electricity ran through my body. How did it happen? I was completely entranced by this perfect moment when the earth stood still. Later I started finding that same feeling in movies, theater, and nature. Now, I attempt to create those moments. I found that the tricky and truly amazing thing about each of these moments is that they only exist in the form of a symphony. In nature, it’s the texture of the bark with the sun shining through mist on a small bright flower. In theater, it is the right lighting with the right space while someone moves to music just so and says two words that suddenly resonate with something in your life and open up a new understanding, perception, or awareness. That is to say I found I couldn’t make these moments alone. This inspired my deep appreciation for collaboration, which is simply sharing ideas until an alignment shifts in both of you. Then you give the combined discovery away. Visual collaboration is some-
times more challenging that verbal, which is why I utilize communication media including sketching, rendering, and model building. But they are all a means to an end; the real art is the moment in life. Thus my art is a collaborative exploration of the world, of dreams, of stories, of memories, of mistakes, and of moments through sculpting environments for dramatic storytelling.

Obesity and risk of coronary heart disease: A case control study among men and women in urban Bangladesh
Rumana J Khan, Epidemiology
Corauthors: Christine P Stewart; Bruce N. Leistikow; Danielle Harvey
Poster # 60
Background: The aim of the study was to examine the associations of obesity (body mass index or BMI, waist circumference or WC, Waist to hip ratio or WHR and Waist height ratio or WHtR) with coronary heart disease (CHD) in a Bangladeshi population.
Methods: The study included 189 hospitalized CHD cases (133 men and 52 women) and 201 controls (137 men and 68 women). Logistic regression was done to assess the associations between obesity and CHD. Results: The mean age was 53.1 ± 8.3 for men and 51.9 ± 8.4 for women. After adjustment for confounders the OR of CHD for men was 1.69 (95% CI, 1.24-2.32) per 1 standard deviation (SD) increase in BMI, 1.94 (95% CI 1.40-2.70) per 1 SD increase in WC, and 1.57 (95% CI, 1.14-2.16) per 1 SD increase in WHtR. The OR for women was 2.64 (CI, 1.61-4.34) per 1 SD increase in BMI, 1.82 (95% CI 1.12-2.95) per 1 SD increase in WC, 2.32 (95% CI, 1.36-3.96) per 1 SD increase in WHtR and 1.94 (95% CI, 1.23-3.07) per 1 SD increase in WHR. Conclusion: BMI, WC and WHR were associated with CHD for both men and women. Since the measurement of WC and BMI can be done easily we recommend that both BMI and WC should be included in clinical and in community setting for CHD risk assessment.

Nitrogen Cycling and Rice Crop Management: Implications for Subsidence of Delta Peat Soils
Emilie R. Kirk, Soils and Biogeochemistry
Corauthors: Bruce Linquist; Chris van Kessel
Talk Session 3D
Since being drained for agriculture in the mid-1800s, the peat soils of the Sacramento-San Joaquin Delta have been farmed continuously. Due primarily to oxidation of the exposed peat, the Delta has been subsiding so that levees now protect islands up to 6 meters below sea level. This subsidence increases the threat of catastrophic levee collapse as the gradient between the rivers and the soil surface increases. Rice production has been proposed as an alternative to aerobic cropping systems in the Delta to protect the soil from further oxidation and loss. A nitrogen (N) fertilizer field trial on Twitchell Island in 2011 revealed no significant rice grain yield response to N (p<0.05), high yields in all plots, and N uptake in unfertilized plots averaging 202 kg N/ha (SE 6.5). It was hypothesized that soil organic matter oxidation resulted in sufficient N mineralization to sustain crop production during the growing season. Experiments were conducted using a 15N tracer method during the 2012 season to test this hypothesis and develop a total N budget for the system. Preliminary results from 2012 show a similar pattern to 2011, and depending on the source of this N suggest a large amount of peat is mineralizing during rice cultivation despite apparent reductions in subsidence rates. These results raise questions about the degree to which rice systems can be used to halt subsidence on Sacramento-San Joaquin Delta peat soils.

Safety of Enterococcus faecium in Food Production Facilities
Lauren M. Kapit, Food Science and Technology
Corauthors: Eun Bae Kim; Linda J. Harris; Maria L. Marco
Poster # 44
Enterococcus faecium strain NRRL B-2354, formerly known as Pediococcus sp. NRRL B-2354, was originally isolated from milk and is a valuable surrogate organism in the validation of the thermal processing of dry foods. The recent reclassification of this strain to E. faecium raised many concerns regarding this strain’s safety because many clinical strains of E. faecium are known to be opportunistic pathogens and to possess antibiotic resistance genes that could be transferred to other bacteria in hospital settings. Knowledge on the possibility to cause human disease is of great importance to the food industry. If this strain was considered a pathogen, the strain would not be useable in food production settings, which would result in a number of additional costs and product losses. Our results thus far are significant because we have seen distinct genetic differences between clinical and non-clinical isolates, and we have seen a change in the biosafety of the strain from potentially dangerous to safe. Continuation of this project can further clarify the difference between community-associated isolates and hospital-associated isolates of E. faecium and allow the non-pathogenic strains to be used as probiotics and starter cultures.

Risk of intestinal nematode infection associated from exposure to ambient waters using quantitative microbial risk assessment models
Arti Kundu, Civil and Environmental Engineering
Talk Session 2A
The study area was focused on Arias-Arenales river which is in the north-western region of Salta province in Argentina. The monthly monitoring was done for 13 months (from Feb 2009 to Feb 2010). There were total 11 monitoring points- 5 points were directly located on the river while 6 points were selected on the channels that discharges directly into the river. We had selected 5 direct monitoring points on the river for different risk assessment scenarios so that we could estimate the human health risk from direct or indirect ingestion of A. lumbricoides in the surface water. These points were P1, P2, P6, P10 and P11 where P1 and P2 were selected as low pollution controls on the Arias and Arenales river. P6 was a recreational area called Parque los Sauces with picnic tables, grills and a place for children play area, and P10 and P11 were used at upstream and downstream of the wastewater treatment plant (WWTP) and municipal landfill. Monte Carlo simulations were used in quantitative microbial risk assessment (QMRA) to estimate the human health risks associated with Ascaris lumbricoides in the surface water. The average density of A. lumbricoides in the surface water was 4.93 helminth egg (HE)/liter. The average density of HE in surface water is higher compared to acceptable level of helminth of ≤ 1HE/liter and tolerable risk is above the level as recommended by the World
Health Organization. We ran models for different scenarios of direct or indirect exposure of Ascaris lumbricoides in surface water to estimate the risk of infection in different users. We found that risk of infection is highest in children from accidental ingestion of surface water. We also concluded that consumption of lettuce irrigated with contaminated water has the highest annual mean infection risk as compared to other considered vegetables in this study. We observed that annual mean infection risk for accidental ingestion of irrigated water by farmers is above the tolerable level recommended by World Health Organization (WHO, 2006).

Effects of zinc oxide on broiler health during a coccidiosis challenge.
Rachel Kurzbard, Animal Science
Coauthor: Kirk Klasing
Talk Session 3D
Coccidiosis is one of the most detrimental infections in the poultry industry. This disease is minimized through use of coccidostats or sub-therapeutic antibiotics. Growing concern for antibiotic resistance necessitates research for alternative disease treatments. Much of the inflammation and decline in growth due to coccidiosis is caused by secondary onslaught of bacteria. Zinc has been shown to have bactericidal properties, and may inhibit bacterial overgrowth in the gut. This experiment investigated the effects of supplemental zinc on broiler health. One-day-old broilers were randomized to 7 treatment groups of 8 pens per group, with four birds per pen (n=8). Control birds were fed the basal diet only. Treatment groups received increasing concentrations of zinc oxide between 1000 and 2000 ppm. All birds except negative controls were infected at 8 days of age. Birds supplemented with zinc had significantly higher weight gain (P < .0001), feed intake (P < .0001) and pre-infection feed efficiency (P = .0013) than control birds. This suggests that plethoric levels of zinc may improve the health of broilers.

Risk-taking in Mexican-origin adolescents: Contributions from substance use risk and anxiety.
Clinton Lee, Human Development
Co-authors: Clinton Lee; Rick Robins; Amanda Guyer
Talk Session 3B
Mexican-origin adolescents face high risk for substance use problems and associated risk-taking behaviors. They also experience high levels of anxiety compared to other ethnic groups. Substance use has been linked to increased risk-taking, but less attention has been paid to the role of anxiety among these relationships. The present study investigated risk-taking behavior in Mexican-origin adolescents as a function of anxiety symptoms and substance use risk. Forty-six adolescents (MAge=16.31, SD = .47) were recruited from Mexican-origin families enrolled in a longitudinal study of risk for and resilience to substance use. Participants were classified as high or low risk for substance use based on age-14 substance use frequency. They completed a measure assessing anxiety symptoms and a measure of risk-taking behavior. Results indicated that the interactive (b=2.76, p<.01) and main effects of high risk for substance use (b=.89, p<.01) and anxious arousal (b=2.17, p<.05) were associated with higher levels of risk-taking. Results suggest that Mexican-origin adolescents who have used substances and reported more symptoms of anxious arousal may be more likely to engage in risk-taking behaviors.

Impacts of Participatory Engagement in Public Art, A Case Study
Tiva Lasiter, Community Development
Talk Session 4D
This presentation discusses the process and outcomes of a participatory public art project. The case study of Hutchison Farm Mural, a collaboratively designed and community-executed large scale mural on a preschool playground on the UC Davis campus, is presented and evaluated. The community of preschool teachers, parents, older siblings, and the preschool children themselves were involved in the process from design, planning, to execution and evaluation. Impacts of the participation process, as well as the impacts of the final product of a completed mural and a new, distinctive place are considered. The process of participatory public art, the relationship between artists, community members, users, and stakeholders is discussed. Important considerations and potential obstacles that influence the successful administration of high quality participatory public art are highlighted. Youth development, knowledge sharing, and skill development are other important aspects of this case study.

Testing assumptions of the climatic envelope for rare and common plant species using empirical methods
Iara Lacher, Ecology
Poster # 34
A smaller geographic range does not equate to a narrower climatic tolerance. This frequently used assumption applied in species distribution models may underestimate future suitable habitat and thus overestimate extinction risk. To test this assertion, I compared the fitness responses of narrowly distributed and broadly distributed Mimulus and Clarkia species under multiple climatic scenarios. I applied three temperature treatments and seven precipitation treatments based on climate stations, models, and scenarios for 2080. Fitness was measured as above-ground biomass and total seed head count. All species showed a positive response to water treatments and varied responses to temperature treatments. Both Mimulus species responded positively to increases in water and negatively to increases in temperature while both Clarkia species exhibited slight negative responses to increases in water and had very strong positive responses to increases in temperature. However, narrowly distributed M. nudatus showed less sensitivity to water and more sensitivity to temperature than broadly distributed M. guttatus, while both Clarkia species responded similarly to both water and temperature. Results suggest climatic responses to temperature and water are dependent on species and not distribution size. Furthermore, this research refutes commonly accepted expectations that occurrence data accurately represent climatic tolerances of species. Caution is recommended in using occurrence data in predicting responses to climate change, especially for the management and triage of rare species.
The Molecular Machines that Bacteria Use to Cause Disease. Can They be Stopped?
Karen LeGrand, Microbiology
Coauthors: Karen LeGrand; Yan Zheng; Shane Petersen; Kang Liu; Glenn M. Young
Talk Session 2B
Infectious bacteria use many tools to help them cause disease. A tool commonly used is a type 3 secretion system (T3SS), which is a molecular machine bacteria use in two ways. As a molecular motor, a T3SS can power a tail-like structure, called flagella, that allows bacteria to swim. Also, T3SS can be used as a molecular syringe to inject bacterial toxins into human cells, like a doctor injects a shot into the arm. When infectious bacteria come into contact with humans, they use T3SS to swim towards sites they will infect and inject toxins that take over our immune response. Evading the immune system allows bacteria to grow inside humans, making T3SS essential for bacteria like Yersinia enterocolitica to cause disease. Y. enterocolitica uses three different T3SS that operate independently, which makes it difficult to develop prevention or treatment measures to combat infection. My research group screened thousands of bacteria and identified one with a mutation in the molecule CsrA. Initial experiments indicate CsrA is required for Y. enterocolitica to assemble the T3SS machinery, swim or to secrete toxins. These results suggest that CsrA regulates multiple T3SS and may serve as a good target for treatment or prevention measures.

Hydrodynamic Contributions to Amoeboid Cell Motility
Owen Lewis, Applied Mathematics
Coauthor: Robert Guy
Poster # 56
Understanding the methods by which cells move is a fundamental problem in modern biology. Cell locomotion is integral to physiological processes such as wound healing, cancer metastasis, embryonic development, and the immune response. Much existing research on cell motility has been conducted within the framework of migration across a flat substrate. However, within the last decade, advances in microscopy led to an increasing number of experiments on cell migration though 3D fibrous environments and in confined spaces. These experiments raised new questions about the basic mechanisms of cell locomotion and challenged the assumptions behind the existing paradigm of cell motility. In particular, they show that cells have the ability to crawl without specific adhesion to the substrate, and they emphasize the important roles of cytoplasmic streaming and intracellular pressure in generating protrusions. For these fluid-drive types of motility, we do not have a good mechanistic understanding of how cells coordinate localized behavior across the cell body to achieve directed motion. A relatively simple model that reproduces existing experiments provides insight, and can inform future avenues of investigation into cell motility.

How Social Context Cues in Support Seeker Profile Influence Support Provider’s Self-Disclosure in Online Support Forums
Siyue Li, Communication
Coauthors: Na Li; Xuan Tan; Bo Feng
Talk Session 3A
The current study examined how social context cues affected a support provider’s self-disclosure in an online support forum. An experiment tested “social context cues – perceived social presence – trust – self-disclosure in support provision” model. Although the original model was not supported, a “social context cues – perceived social presence – opinion self-disclosure” was validated. More social context cues led to higher perceived social presence of a support seeker, which in turn, facilitated more opinion self-disclosure in support provision. Further, the study found gender difference in different types of self-disclosure in support provision.

Torts of Appeal: Do Elected Judges Rule Differently than Appointed Judges?
Matt Lesenyie, Political Science
Talk Session 1B
What happens when individual citizens have an appeal in state supreme court? Can their case’s outcome be partially explained by their states’ judicial selection method? The project attempts to answer this question in three parts. First, I explain the rationale for selecting lawsuits as the case observations. Second, this project details why we should expect a bias towards the respondent at the state supreme court level and subsequently how that bias affects the dependent variable estimation. Third, I show how judicial behavior is conditioned by electoral proximity – the time to the justice’s next election. I estimate the likelihood of justice votes using a multinomial regression model. I find that in the civil tort case domain, state Supreme Court justices are responsive to elections.

Development of a Sustainable Infrared Heating Method for Tomato Peeling Process
Xuan Li, Biological and Agricultural Engineering
Co-author: Zhongli Pan
Poster # 77
A new and sustainable infrared (IR) peeling method was successfully developed to achieve effective tomato peel removal without using lye and steam. The objectives of this study focused on three aspects, including the efficacy of IR peeling, modeling of the IR peeling process, and elucidation of the complex mechanism of IR induced peel separation. Our peeling results demonstrated that IR peeling produced peeled tomatoes with superior product quality, reduced peeling loss, and similar processing time (30-75s) compared to lye peeling. Development and validation of mathematical models related to heat transfer, pressure generation and stress distribution during IR peeling revealed that providing rapid and uniform IR heating on tomatoes with various size and shape is the key to achieve effective peel loosening and cracking. The peel separation phenomena during IR heating were strongly related to the reduction of peel strength and adhesiveness, shifts of transition temperature as biopolymers in skin, thermal expansion of cell walls, and collapse of cellular layers in peels. The findings gained from this research have led to a successful design and build of a prototype tomato IR dry-peeling system used for industrial demonstration.
Recent GX E studies have demonstrated that certain individuals may be more sensitive to the environment as indicated by their genotype. Using the NICHD database, we examined maternal sensitivity, measured by observation at 6, 15, 24, 36, 54 months, in predicting developmental outcomes while also exploring OXTR and ESR1 moderation. A factor analysis revealed two factors: prosocial behavior from kindergarten to grade 6, and self-report cooperation, empathy, and attachment at 15 years of age. Individuals homozygous for OXTR rs22554298 GG allele had significantly higher empathy, cooperation and attachment at 15 years of age when maternal sensitivity was high but scored significantly lower when maternal sensitivity was low. In a female subsample, girls with the recessive ESR1 rs9304799 GG allele had earlier age of menarche when exposed to less maternal sensitivity but later age of menarche when exposed to greater maternal sensitivity. Our results support the differential-susceptibility hypothesis that some individuals carry internal characteristics which make them more susceptible to environmental influence than others in a for-better-and-for-worse manner.

Mitochondrial Proteomic Changes in Ischemic Heart Failure
Tingting Liu, Molecular, Cellular and Integrative Physiology
Co-authors: Le Chen; Eun Jung Kim; Diana Tran; Brett S. Phinney; Anne A. Knowlton
Poster # 72
Mitochondrial dysfunction is an important part of the decline in cardiac function in heart failure. We hypothesized that there would be specific abnormalities in mitochondrial function and proteome with the progression of ischemic heart failure (HF). We used a high LAD ligation in 3-4 month old male rats to generate HF. Rats were studied 9 weeks post ligation. Echo confirmed a significant reduction in fractional shortening post ligation. Electron microscopy of left ventricle samples showed significant mitochondrial changes including decreased size, increased number, abnormal distribution, and cristae loss. Mitochondrial functional studies demonstrated that total ATP was decreased and mitochondrial respiration impaired in HF. Complex functional assays revealed that only complex I had reduced activity in ischemic HF. Analysis of LV mitochondrial protein by mass spectrometry identified 33 significantly differentially expressed proteins. Of these proteins, 15 were up-regulated and 18 down-regulated in the failing heart. A set of NADH dehydrogenase proteins were significantly decreased, consistent with the impairment of complex I activity. There were similarities but more differences with other types of HF.

Metabolic Flexibility is the Key to Salmonella’s Success in the Gut
Christopher Lopez, Microbiology
Co-authors: S. E. Winter; F. Rivera-Chavez; A. J. Baumler
Poster # 17
Salmonella infects thousands of people worldwide annually and is a leading cause of bacterial contamination of food products. This study identified how phage-mediated spread of a secreted effector protein, SopE, enabled S. Typhimurium to increase generation of a potent electron acceptor, nitrate, that subsequently provided a significant boost in Salmonella growth in the intestines. Previous studies have shown that higher levels of Salmonella Typhimurium in the intestines of infected animals lead to increased transmission to new hosts. Thus, identifying the factors that allow Salmonella to reach high bacterial counts during intestinal inflammation is of key importance to lay the foundation for future therapy development. By identifying specific factors that lead to increased virulence and transmission, including the addition of secreted effector proteins like SopE, researchers can be better prepared to reduce contamination and outbreaks of Salmonella. In addition, nitrate respiration is a conserved feature in many members of Enterobacteriaceae, thus this research may be relevant to other intestinal pathogens.

Media Consumption, Haipai and the Modern Girl
Unity Love, Art Studio
Poster # 75
Lithographs Moon Over Huangpu River and A Prosperous City that Never Sleeps by Chinese artist Yuan Xutang, portray young women dressed in the iconic fashions which visually defined China’s "Modern Girl." Modern girls sought to achieve the look and lifestyle associated with modern China as presented to them in advertisements, film and other media. Despite the expected connotations of modernization as synonymous with westernization, some of these young women maintained a core of traditional Chinese virtues even as they broke a number of Chinese traditions. This paper explores the “Modern Girl” identity as a liminal connection between old traditions and modernity in the visual culture of early 20th century China.

Intermediate Good Sourcing, Wages and Inequality: From Theory to Evidence
Philip Luck, Economics
Talk Session 0A
This paper develops a model which investigates the employment and wage consequences of offshoring and outsourcing. I model the outsourcing and offshoring decisions as being driven by labor market frictions. This model fits observed trends in three key ways: (1) larger firms and multinationals pay higher wages, (2) labor market friction help direct FDI flows, and (3) of offshoring firms, more productive firms have an incentive to be vertically integrated. Additionally this model allows me to consider how ownership of intermediate goods suppliers affects domestic wages and wage dispersion. I find evidence of a role for ownership as the model predicts. I also find evidence that these effects are also governed by industry specific characteristics including the skill intensity of production.

Beating Around the Bush: Feminist Peripheries and the Violent Woman in Literature
Stephanie MacAller, English
Talk Session 3C
From Cleopatra to Thelma and Louise, the mystique of the violent woman has pervaded and seduced its audiences-feminists and misogynists, alike. While feminist scholars alternately praise and
censure the construction of violent women, the assumption that violence, since gendered masculine, renders all women victims constitutes a dangerous assumption which, until very recently, has remained unchallenged. A few recent psychological and sociological inquiries into female perpetrators has revealed that violent crimes by women are on the rise and yet remain virtually unacknowledged by feminist scholars. As a critical intervention in literary studies, this essay draws inspiration from other academic fields in order to defy the comfortable tendency to “beat around the bush” when it comes to female violence.

How Mexican Rural Mexican Patients Narrate their Stories: Genre Analysis of the Psychiatric Interview
Dalia Magana, Spanish
Poster # 19
The role of language and cultural competency in healthcare is key for effective interactions with minority patients. While Latino patients are particularly vulnerable to numerous health issues, few studies have inspected the medical discourse of these patients. Given this gap, my study uses linguistics (discourse analysis) and epidemiological research on language in healthcare to examine the narratives of rural Mexican patients in the central valley. My data consists of 23 psychiatric interviews that were conducted in Spanish and video-recorded. To analyze the discourse I use Genre Theory. This theory stems from Systemic Functional Linguistics (SFL), a social theory on language that views language in a situated context. In SFL, genre refers to the forms that the language takes to obtain the culturally appropriate objectives, that is, the general purpose of the interaction. Using Genre Theory I inspect how patients narrate their experiences and how this discourse is co-constructed and negotiated between doctor and patients. This interdisciplinary study aims to draw attention to the role of language and culture in the healthcare of Spanish-speaking Latinos in the U.S.

Implementation of a Community Based, Multi-Year, Multifaceted Program in Mexican-origin, Rural Communities in California’s Central Valley
Rosa D. Manzo, Education
Panelists: Rosa Gomez-Camacho, Education; Meagan Hanbury, Agricultural and Resource Economics; Lisa Martinez, School of Nursing; Albert Aguilera, Nutritional Biology
Panel Session 4
Obesity and overweight are health problems resulting from the interaction of predisposing genes with environmental, economic and social stimuli, in conjunction with excess caloric intake throughout growth from childhood to adulthood (Haworth, Ploomin, Carnell, & Wardle, 2008; Sinha and Kling 2009). Evidence suggests that a major barrier in controlling overweight/obesity is the complex interrelation of these factors, making single-approach interventions less likely to succeed than integrated, multifaceted approaches (Dobbins, De Corby, Robeson, Husson, Tirilis, 2009). Niños Sanos, Familia Sana is an interdisciplinary research project that aims to deliver a multifaceted behavioral intervention developed by a university-community/school-based collaborative. This research panel is composed of graduate students in education, agricultural economics, nutrition, and nursing. Graduate students will present on the Community-Based Participatory Research (CBPR) practices implemented to develop the nutrition, economic, and physical activity components for the intervention site and the recruitment and retention strategies in the control group. Preliminary findings on food insecurity and use of the U.S. safety net within this population will be discussed. In addition, acculturation factors and their effects on migration will be discussed. This project is unique as it is an interdisciplinary research project and it is nested in CBPR methodology. Results of baseline data collection may be useful in understanding underlying conditions of childhood obesity. Lastly, community input and assessment is a valuable tool in increasing participant yield within low income, rural, Mexican-origin communities.

Mistaken Identity: Preschool Children Pass Tasks Assessing Identity Statements Earlier Than False Belief Tasks
Katerina Marcoulides, Psychology
Poster # 42
A false belief task is where person 1 hides something in location 1, leaves, and person 2 moves the item to location 2. Switching the object’s location makes person 1’s belief become false. Children either pass or fail the task such that they are either able to correctly identify the false belief that person 1 should have under the circumstances, or they will misrepresent what the person’s false belief is. There are two main theories about why children fail the task: 1. It measures a child’s possession of a theory of mind. 2. It measures a child’s ability to successfully utilize their theory of mind. Assuming the second theory is correct, failing the task is due to the child’s inability to suppress the easier response (the current location versus where person 1 thinks the object is).

Co-infection patterns of infectious salmon anemia and sea lice in farmed Atlantic salmon in southern Chile (2007-2009)
Fernando Mardones, School of Veterinary Medicine, Epidemiology
Coauthors: Pablo Valdes-Donoso; M. Jarpa; M. Ulloa; T. E. Carpenter; A. M. Perez
Poster # 30
Infectious salmon anemia virus (ISAV) caused a large epidemic in farmed Atlantic salmon in Chile in 2007-2009. Here we assessed co-infection patterns of ISAV and sea lice (SL) based on surveillance data collected by the fish health authority. ISAV status and SL counts in all Atlantic salmon farms located in the 10th region of Chile were registered monthly from July 2007 through December 2009. Each farm was categorized monthly according to its ISAV and SL status. A multinomial time-space scan test using a circular window was applied to identify disease clusters and a multivariate regression model was fitted to quantify the association between disease-clustering and farm-management factors. Most of the identified clusters (9/13) were associated with high SL burdens. There were significant associations (p<0.05) between management factors and ISAV/SL status. Areas in which good management practices were associated with a reduced disease risk were identified. The findings of the present study suggest that certain management practices can effectively reduce the risk for SL and ISAV in the face of an epidemic and will be helpful toward creating an effective disease control program in Chile.
Cumulative Genetic Plasticity, Parenting, and Romantic Relationships: Evidence for Differential Susceptibility
April S. Masarik, Human Development
Co-authors: April S. Masarik; Rand D. Conger; Keith F. Widaman
Talk Session 4C
The capacity to successfully initiate and maintain romantic relationships is central to well-being, influenced by earlier parent-child experiences and possibly moderated by individual differences in genetic make-up. We test the differential susceptibility hypothesis (Belsky & Pluess, 2009) that individuals carrying more plasticity alleles on a set of five commonly studied genetic polymorphisms will be more warm or hostile toward a romantic partner in adulthood as a function of warm and hostile parenting behaviors experienced in adolescence. Participants (N = 343) were videotaped with their biological parents in adolescence and with a romantic partner in early adulthood during semi-structured interaction tasks to yield observer-reported measures of warmth and hostility. Findings resembled patterns of “strong” differential susceptibility: individuals with the least genetic plasticity were not affected at all in their romantic relationships as a function of their parents’ earlier behaviors towards them. Yet, as genetic plasticity increased, so did the magnitude of associations from hostile and warm parenting to hostile and warm romantic relationships, respectively.

Waking the giant: Reactivating latent virus to cure Feline AIDS
Samantha McDonnel, School of Veterinary Medicine
Co-authors: Brian Murphy; Ellen Sparger; Paul Luciw; Lisa Tell
Talk Session 4B
Feline immunodeficiency virus (FIV), the lentivirus of domestic cats responsible for feline AIDS, establishes a latent infection after experimental inoculation. In this study, the latent proviral promoter was associated with deacetylated histones, which is consistent with a condensed chromatin structure. A variety of histone deacetylase inhibitors (HDACi) increased acetylation at the FIV promoter and were effective in activating FIV transcription in a dose-dependent manner. The FDA-approved drug suberoylanilide hydroxamic acid (SAHA) is a particularly promising candidate for reactivating latent virus. In this modified strain showed heterotrophic growth in the dark and a 2-fold growth rate increase in the presence of light. With recent, increased focus on cyanobacteria-based industrial applications, this advancement in trophic systems is desirable for more efficient, economical, and controllable production systems. Additionally, manipulating this metabolic system provides greater insight into the mode of obligate photoautotrophy in cyanobacteria.

Rewiring Photoautotrophic Cyanobacterial Metabolism for Dark Growth
Jordan McEwen, Chemistry
Co-authors: Iara M. P. Machado; Michael R. Connor; Shota Atsumi
Talk Session 1A
All bacterial metabolic systems start with the input of energy and carbon. The photoautotrophic organism Synechococcus elongatus strain PCC7942 strictly depends on the input of light and carbon dioxide for biomass increase. In this work, we use synthetic biology approaches to probe and rewire photoautotrophic cyanobacterial metabolism for the ability to grow without light energy. We determine that sugar transporter systems are the necessary genetic factors for continuous growth under diurnal (light/dark) conditions. Installing heterologous sugar transporters allowed the engineered strain to use saccharides such as glucose, xylose, and sucrose as both energy and carbon inputs. This modified strain showed heterotrophic growth in the dark and a 2-fold growth rate increase in the presence of light. With recent, increased focus on cyanobacteria-based industrial applications, this advancement in trophic systems is desirable for more efficient, economical, and controllable production systems. Additionally, manipulating this metabolic system provides greater insight into the mode of obligate photoautotrophy in cyanobacteria.

Attitudes About Welfare and Participation in Food Assistance Programs
Kelsey Meagher, Sociology
Talk Session 2A
This paper examines the influence of elites’ attitudes about welfare and poverty on the food assistance choices of low-income Americans. I evaluate whether the state-level ideological context of low-income Americans influences their preferences for public aid (e.g., food stamps) or private aid (e.g., food pantries), controlling for their level of need. This study builds on existing models of food assistance behavior by adding an ideological dimension to the literature on demographic and socioeconomic predictors of food aid receipt. Using data from the 2009 Current Population Survey and 2008 Congressional voting records as a proxy for elite ideologies about poverty, I estimated a multilevel multinomial regression in order to investigate whether variations in state-level ideological context predict preferences for food stamps or food pantries among low-income Americans. My analysis suggests that the state-level ideological context of political elites has a significant impact on the food assistance behaviors of low-income Americans. People who lived in states where political elites demonstrated greater support for anti-poverty programs were more likely to use food stamps than people who lived in less supportive ideological contexts, controlling for demographic and economic factors. The effect of state-level ideology on food aid choices did not vary by food security status.

What Medical Ethnography Can Teach Philosophy About Population Biology Models
Shawn Miller, Philosophy
Talk Session 3D
Philosophers of science often characterize scientific models, e.g., Galileo’s idealized frictionless plane, as convenient fictions. This conception, however, sheds little light on complex models with numerous, heterogeneous parts such as ones used in, for instance, population biology. My paper looks to the work of medical ethnographer Annemarie Mol as providing a strategy for viewing such models as deliberately constructed objects that have knowable histories that can be fruitfully traced. I will provide a case study where such tracings provide greater understanding of the model in question, which helps further illuminate the outputs of the model.
Individual- and Country-Level Predictors of Attitudes toward Men as Caregivers
Whitney Mollenhauer, Sociology
Talk Session 3B
This paper analyzes cross-national variation in gender role attitudes in 46 European countries, using European Values Survey data. Composite measures of two dimensions of gender role attitudes were constructed using confirmatory factor analysis; one dimension relates to support for women's dual roles as workers and mothers, while the other dimension relates to support for men as caregivers within their families. A series of multi-level models test individual- and country-level characteristics that predict individuals' gender role attitudes. Individual-level predictors of support for men as caregivers were similar to those for women's dual roles, including religiosity, education, employment status, and birth cohort. Country-level characteristics tested include measures of women's empowerment, welfare regime, and family policy. Length of maternity leave had no statistically significant effect on individuals' support for men as caregivers; however, a policy of non-transferable parental leave for fathers was associated with more egalitarian attitudes on the "men as caregivers" measure. Countries with a high proportion of employed women or women in their parliamentary bodies also had a positive (more egalitarian) effect on attitudes.

Harmful Algal Blooms and Their Impact on Public and Environmental Health
Caroline Moore, Pharmacology and Toxicology
Co-author: Birgit Puschner
Talk Session 3C
Research on harmful algal blooms has a profound impact on several areas: public health, policy surrounding water use and pollution, and environmental and wildlife health. With the potential to be carcinogenic and neurotoxic, constant low and high levels found in surface waters from the Klamath River to San Diego to China may cause neurodevelopmental problems or cancer and possibly contribute to other diseases in humans, wildlife, fish, and marine mammals. In California there is satisfactory supply of fresh and safe drinking water, but through recreational exposure, bioaccumulation in crops, exposure to livestock and possibly even inhalation, harmful algal bloom toxins can affect everyone. Rising temperatures from climate change and increased urban pollution in watersheds increase the risk for harmful algal blooms. Not surprisingly, algal blooms may only gain public attention when they pose economic losses to regions by impacting tourism, recreation, or fisheries. It is critical to develop strategic monitoring plans to reduce exposures. Bringing an interdisciplinary team of scientists from the UC Davis graduate groups together will increase knowledge about toxicity, long-term health risks, and mitigation strategies.

Finding One's Place
CJ Morello, English, Creative Writing
Co-author: Natalie Kessel, Cinematographer
Performance
My thesis project in poetry is a film and text multimedia performance which is meant to complicate the notion of ‘finding one’s place’, or the very idea that a singular state is a place where persons can find themselves or be found. This work says that the place of the present is an unstable void that the self uses as a site of recovery, but that what is recovered is possibility, and not stability or persistence. The project took shape as a book of poems which investigates the scientific constitution of reality, and how this runs up against and combines with personhood and subjectivity. The film component, which is meant to be shown in concert with the readings, is intended to displace and complicate the narrative of the voice performance. The themes of this work are the ideas of migration, settlement, and their relationship to the persistence of self or groups of selves.

Sunshine in the Gas Tank: Comparing Different Renewable Transportation Fuels
Colin Murphy, Transportation, Technology and Policy
Talk Session 0A
California has been a leader in promoting GHG emissions reduction policy and UC Davis researchers have played a significant role in developing these policies. We are currently at an important transition point in sustainable energy, as many advanced technologies are now entering the commercial market. It is important that consumers and policy makers understand the different technologies which will define our future, in order to make informed decisions. Renewable fuels are a particularly interesting case study. Several technologies have been on the market for the last decade, but there is substantial uncertainty surrounding the relative environmental merits of each. It can be difficult to weigh the competing claims of “green” vehicles or fuels, especially when they are often embedded within traditional marketing. Many renewable technologies require substantial investments in fuel production and distribution infrastructure, so it is important that society carefully evaluates all options before committing to a particular fuel. This talk will help people begin to understand the options before them and make a more informed decision.

Replacing Platinum with Aluminum: Cheaper Catalysts for a New Energy Economy
Thomas Myers, Chemistry
Co-author: Louise A. Berben
Poster # 70
The conversion of both high and low energy carbon feedstocks into usable liquid fuels remains an important challenge facing the scientific community today. These transformations are most often accomplished using catalysts based on expensive metals such as platinum. Switching to a cheap abundant metal such as aluminum will allow a broader application for such chemical transformations. Herein we report an aluminum based catalyst which utilizes bio-inspired organic molecules to facilitate the electron transfer necessary to achieve effective catalysis. This catalyst is capable of converting carbon dioxide to more energy rich molecules such as formic acid, which can be utilized in fuel cells or further converted to liquid fuels. In addition the same aluminum catalyst is capable of activating and dehydrogenating organic molecules. This process plays a key role in the refining of petroleum allowing for a more efficient abstraction of usable fuel. Future work will focus on converting carbon dioxide directly to more valuable fuels along with expanding the breadth of reactions catalyzed by this complex.

Interdisciplinary Graduate and Professional Student Symposium 33
**Effect of dietary nitrate supplementation on dairy cattle enteric methane and nitrous oxide emissions**
Clayton Neumeier, Animal Biology
Co-authors: Qian Wang; Girma Getachew; Daniel Putnam; Alejandro Castillo; Frank Mitloehner
Poster # 18
Nitrate acts as an alternative hydrogen sink in the fore-stomach (rumen) of cattle to reduce methanogenesis and therefore methane emissions, a greenhouse gas. However, nitrate in the rumen may be reduced to nitrous oxide, an even more potent greenhouse gas, which could offset the benefits of supplementing nitrate to reduce methane emissions. The present study investigated the effects of varying concentrations of nitrate supplementation (1, 2, and 3% nitrate) on enteric methane and nitrous oxide emissions with an in vitro gas production system. The in vitro systems were incubated for a period of 12h at 39°C. Gas samples were collected every 2h and analyzed for carbon dioxide, methane, and nitrous oxide concentrations. Nitrate vs. urea treatment at 2% and 3% decreased (P<0.001) methane production during the early and overall incubation period. Nitrous oxide production was observed only in the nitrate treatments. This study indicates that nitrate supplementation is an effective strategy to mitigate methane emissions from cattle, but the treatment induces nitrous oxide emissions. Further research is necessary to confirm these results in vivo and elucidate methane and nitrous oxide emission dynamics from rumen eructation.

**A critical role for antibodies in autoimmune disease prevention.**
Trang Nguyen, School of Veterinary Medicine, Immunology
Co-author: Nicole Baumgarth
Poster # 73
Humans, mice and many other species harbor a specific type of white blood cell, “B cells” that generate antibodies, that target bacteria and viruses. Each B cell generates antibodies (immunoglobulin, Ig) against a unique target. Because specific antibodies are generated at random, sometimes these will bind to targets within one’s own body. The immune system has developed a process to delete B cells that bind to self. How this works is not well understood. Our studies revealed a very surprising finding, namely that a particular type of antibody (IgM) is required to remove self-reactive B cells, while they are developing in the bone marrow. These results may explain why some people develop autoimmune diseases such as lupus.

**Breast Cancer Uncensored, a Multidisciplinary Perspective in the 21st Century**
Anita Nosratieh, Biomedical Engineering
Panelists: Sarah E. McKenney, Biomedical Engineering; Nicolas Prionas, School of Medicine; Anita Nosratieh, Biomedical Engineering
Panel Session 1
Over the years as a PhD student in breast imaging, I have noticed that the heightened awareness of breast cancer screening is falling short in public understanding. As of September 2012, California law requires health care facilities to notify women categorized as having dense breast tissue about their condition; the need for education is now of even greater importance. The goal of this session will be to shine light on the real risks, the screening process and outcomes. Topics that will be covered include: genetic disposition and diet, screening and diagnosis, treatment and support groups for breast cancer. The format for the session will be a power point presentation where each presenter will have eight minutes to cover their topic(s). At the end of the session, the remaining time (10 minutes) will be spent as a panel discussion opening the floor to the audience. My hope is that the audience will walk away with greater perspective and knowledge, demystifying this disease.

**Farming our energy and chemicals: End of the hunter-gatherer epoch**
John William Kidder Oliver, Chemistry
Co-authors: Iara M. P. Machado; Hisanari Yoneda; Shota Atsumi
Poster # 40
Photosynthetic energy and carbon capture (PECC) is a renewable alternative to fossil fuel gathering. PECC chemically redistributes inactive carbon from waste CO₂ into reactive molecules such as fuels, using sunlight energy captured by cyanobacteria. These microbes have high growth rates compared to plants, thrive in nonpotable or saline water, and can be grown in closed systems on non-arable land removing competition with food crops. Currently 99% of our chemical feedstocks, used to make plastics, medicines, solvents, and fertilizers are gathered from non-renewable sources. Metabolic engineering – adding or removing defined genetic elements to change metabolism in an organism – can be used to build pathways from CO₂ to valuable chemicals not naturally produced in cyanobacteria. My work focuses on the design of chemical production in a model cyanobacterium, Synechococcus elongatus PCC7942. In this talk I will explain a recently published PECC pathway for the fuel and plastic precursor 2,3-butanediol, and discuss how captured-carbon products (CCP) can become the farming
In mammalian cells, glycans containing sialic acid play a significant role in many biologically relevant processes such as influenza virus infection. In order to adapt to environmental changes, sialic acid adopts variations at the hydroxyl groups, the most common form being the O-acetyl groups. Isolation of partially O-acetylated sialic acid is challenging due to harsh conditions used in extraction methods; thus, syntheses of these analogues are important. Four partially acetylated N-acetyl neuraminic acid (Neu5Ac) analogues have been made in an efficient 4 step manner. Previous methods required 13 steps to synthesize the naturally occurring mono-O-acetylated Neu4,5Ac2 and 15 steps to make di-O-acetylated Neu4,5,9Ac3. Using Diversity Oriented Synthesis, four important Neu5Ac analogues were made in one step, two of which led to natural products after deprotection.

**Single-unit responses to amplitude modulated tones and noise in the auditory cortex of aged macaque monkey**
Jacqueline A. Overton, Neuroscience

A major complaint by individuals with age-related hearing loss is a difficulty understanding speech. This occurs even when audiometric thresholds are normal suggesting that there is likely a deficit in the central auditory pathway. Amplitude modulations of the envelope carry much of the relevant information in a speech signal, therefore, understanding how auditory cortical neurons process amplitude modulated (AM) stimuli and how that processing changes with normal aging is essential to understand the aging-related central auditory temporal processing deficits. To investigate this problem we recorded from single neurons in auditory cortex in two aged macaque monkeys (mean 25 years old) while presenting them with sinusoidally AM broad-band noise stimuli varying in modulation frequency from 2 to 128 Hz. Neural responses were compared to results from a similar study in younger monkeys (Yin, P., et al., 2011). We found no difference in the percentage of AM-sensitive cells or the bandwidth of sensitivity in the neural responses from older monkeys compared to younger monkeys. In older monkeys, however, we observed a difference in the distribution of best modulation frequencies. These results suggest that natural aging results in a change in how auditory cortical neurons encode the rate of amplitude modulated signals at low and high modulation rates.

**From Liquid Discrimination to Spectroscopic Analogues: Novel Applications of Nuclear Magnetic Resonance Spectroscopy**
Michael Pinter, Chemistry
Co-author: Matt Augustine
Poster # 51

The application of nuclear magnetic resonance (NMR) spectroscopy to identify liquid explosives and analyze spoilage in perishable liquids is described. The most challenging part of this work is the recovery of NMR signals from non-ferrous metal containers. In comparison to traditional high resolution NMR spectroscopy, this container limitation required the application of lower magnetic fields, lower associated radio frequencies.
w, and higher radio frequency amplitude \( w_1 \). These particular NMR parameter choices are the ideal recipe for non-linear effects such as the Bloch-Siegert shift that scales with the ratio \( w_1/w_{1n} \), where \( n = 1 \). This scaling factor increases in comparison to traditional NMR by three orders of magnitude by operation at a moderate magnetic field strength and elevated rf power and makes the design and use of NMR analogues of non-linear laser spectroscopy, where \( n > 1 \) feasible for the first time.

Experiences of Electric Bike Users in the Davis-Sacramento Region: Are E-Bikes More than Just the “Lazy Person’s Bicycle”?  
Natalie Popovich, Transportation Technology and Policy  
Co-authors: Elizabeth Gordon; Zhenying Shao; Yan Xing; Yunshi Wang; Susan Handy  
Poster # 52

This research presents the key aspects of the experiences of 27 electric bike users in the Davis area. Studies have shown that replacing car trips with bike trips has many benefits including: reducing emissions, improving air quality and public health, and decreasing congestion. Despite the widespread use of e-bikes in countries such as China and the Netherlands, there is very little research on e-bikes in the US. This research aims to provide a better understanding of the benefits and shortcomings of e-bikes and to explore which factors encourage and discourage their widespread adoption as a means of transportation. We found the largest barriers to e-bike adoption to be: the perception of biking as recreational, the stigma of e-bikes as “cheating”, the high cost, and the lack of clear policy governing e-bike use. The largest benefits of e-bikes are: physically-enabling, environmentally-friendly, and functional. Because e-bikes enable people that would otherwise not be able to ride a bike due to physical limitations, they can help combat the stereotypes surrounding which “type” of people bike and positively reinforce the image of bikes as transportation.

“We Give Birth in Full Makeup”: Sofía Vergara’s Performance of Costeña and Latina Excess  
Isabel C Porras, Cultural Studies  
Paper Finalist

As feminist scholars of race argue, women’s bodies mediate transnational ideas about race and sexuality. The US Latina embodies excess—sexual, ethnic, and aesthetic. She is too curvy, too loud, too bright, too tight—too much, at least according to middle-class mores. Similarly, costerios, or people from the Atlantic coast, embody excess in the Colombian imaginary. This paper employs a hemispheric approach to racial frameworks and investigates how US latinidad and Colombian costenismo both project excess onto racialized female bodies. Through close readings of performances, marketing materials, and social media about and by Sofía Vergara, star of ABC’s Modern Family, I investigate how costenísmo and Latinidad both operate as loud/colorful/passionate/sensual in their respective countries.

**Story in Science: Narrative Structure as a Tool for Technical Communication**  
Stephanie Pulford, Mechanical and Aeronautical Engineering  
Paper Finalist

Stories are an integral component of how we understand the world around us, how we learn and retain information, and how we engage and interact with others. Yet few resources exist for scientists and engineers who want to identify and improve the story quality of their communication. Here I provide a foundation for recognizing and strengthening the story structure within scientific and technical communication. To do this, I adapt principles of story from literary theory, technical editing, creative writing, and literacy research, and demonstrate how these story mechanics improve the audience’s experience and understanding of data. After revealing the mechanics of story in technical writing, I provide methods that researchers may use to strengthen storytelling in their own work.

**Graph of Fears**  
Stephanie Pulford, Mechanical and Aeronautical Engineering  
Performance

In 2007 I made a graph of my 35 worst fears. Today I revisit and analyze that graph in a wry and emotional spoken word performance that illustrates an impulse to conquer the unknown by quantifying it. In Graph of Fears I present a story of an attempt to articulate the everyday dread that hovers just out of conscious thought; to assign labels and dimensions to those fears, and shove them thus defanged into the light for scrutiny. As a natural complement to the infographic that inspired this piece, Graph of Fears subverts the genre of scientific presentations as its medium. As the formality of the presentation gradually breaks down, it echoes an inevitable failure to fully intellectualize and impose order onto the messy and unresolved experience of a life in progress. Armed tenously with this imperfect shield of scientific detachment, Graph of Fears travels through a funny and raw landscape of emotions. Along the way, it touches on themes of depression, isolation, hope, glitter and tacos. By shining a light on my own attempt to deconstruct my anxieties, I invite the audience to see an image of their own fears to laugh or revile or intellectualize or dismiss as they see fit, but not before first dredging them from the half-light and looking them in the eye.

**Scientists as Storytellers: Using Narrative in Technical Communication**  
Stephanie Pulford, Mechanical and Aerospace Engineering  
Poster # 68

There are many reasons to recognize and enhance the role of story in science: stories help us to experience, retain, and recall data, and they form the basis of interaction that scientists require to share their results and add to the body of human knowledge. Stories also make knowledge-sharing an easier and more pleasurable experience for an audience. Accordingly, mastery of story is an increasingly sought-after item in a researcher’s professional toolbox. Yet storytelling is treated as an unteachable: scientists must learn storytelling by induction or not at all. In this talk, I challenge the presumed unteachability of story by revealing scientific storytelling in terms that are accessible to science students and professionals. I show story mechanics at work...
in formal technical writing, on both a global, document-wide scale and on a local, sentence-to-sentence scale. Since this sentence-to-sentence scale is a particularly ripe facet of storytelling for improvement within scientific communications, I focus my talk on providing methods for strengthening storytelling at this local level.

**Origins and Population Genetics of Feral Dogs on Isabela Island, Galápagos**

Sini Reponen, Forensic Science  
Co-authors: Sarah K. Brown; Bruce Barnett; Benjamin N. Sacks  
Poster # 66

As part of an effort to control introduced species in the Galápagos, feral dogs were eradicated in the 1980s from Isabela Island, where they had occurred independently of humans for at least 100 years. Although their initial introduction was likely by European settlers, translocation by South American indigenous people was also a possibility. At the time of eradication, three morphologically distinct and ecologically specialized populations occupied distinct portions of the island. Whether these populations had become genetically isolated or remained differentiated in the face of gene flow is unknown. We extracted DNA from 92 of the eradicated dogs and used mitochondrial, Y chromosome, and STR markers to determine their origins and to investigate gene flow among the three populations. Both the mitochondrial and Y chromosome haplotypes were consistent with European ancestry. STR analysis showed that the two most remote of the three populations were genetically indistinguishable, suggesting high gene flow or insufficient time to genetically differentiate. The population closest to permanent human settlements shared many alleles, but had a higher genetic diversity, probably due to recent domestic introductions to feral populations.

**Modernity and the Niger Delta in Helon Habila’s Oil on Water**

Amy Riddle, Comparative Literature  
Poster # 4

The recent novel, Oil on Water, written by Nigerian author Helon Habila, follows a journalist attempting to locate a British woman who has been kidnapped by militants claiming to fight for the restoration of the Niger Delta. Previous readings of this novel have been restricted to an examination of the human dialogue and political message, which have been interpreted as being predictable and ambiguous. I will argue in this paper that Habila’s novel intentionally dilutes human personality and perspective in the story in order to centralize “nature” as the main character by giving it agency. This agency points to a modernity where humanity is an element of an ecosystem, but is ultimately subservient to its will.

**An opportunistic herpesvirus infection: the chicken as a model for pathogenesis**

Charmaine M. Robinson, Animal Science  
Co-authors: Mary E. Delany; Hans H. Cheng  
Talk Session 1C

Marek’s disease (MD) is a highly contagious neoplastic disease resulting from an oncogenic herpes virus (MDV) that induces lymphoid tumors in chickens. MDV is found in an integrated form in the telomeres of the chicken chromosomes in late-stage lymphomas. The objective of this research was to study integration of the virus into the chicken host genome and understand the kinetics post infection. Our goals were to 1) establish viral genome status relative to the host genome in cells over a time continuum and 2) determine if tissues (bursa, thymus, and spleen) vary in integration profile. MD-susceptible chicks were infected with MDV and chromosome preparations were examined by fluorescence in situ hybridization (FISH). MDV was found in an integrated state in the host chromosomes very early in infection and well before transformation and tumorigenesis. Integration was observed in cells from all immune organs, suggesting that both T and B cells can support viral integration into the chicken host chromosomes. Overall, understanding the significance of viral integration and its potential role in cellular transformation are important to furthering our knowledge of the molecular etiology of this agriculturally important disease.

**Synthetic Biology for Production of Renewable Chemicals**

Gabriel Rodriguez, Chemistry  
Co-author: Shota Atsumi  
Talk Session 4D

Increasing global demand and reliance on petroleum-derived chemicals will necessitate alternative sources for chemical feedstoks. Currently, 99% of chemical feedstocks are derived from petroleum and natural gas. Synthetic biology enables renewable production of chemicals from microorganisms by constructing unique metabolic pathways. Here, we engineer Escherichia coli for production of isobutyraldehyde, a high volume chemical. We overexpressed 4 genes to produce isobutyraldehyde in E. coli. However, this strain overwhelmingly produced isobutanol (1.5 g/L/OD600) isobutanol vs 0.14 g/L/OD600 isobutyraldehyde) because of endogenous isobutyraldehyde reductases (IBR). To eliminate isobutanol, we removed 8 candidate IBRs from the E. coli genome: yqhD, adhP, eutG, yiaY, yigB, betA, fucO, and eufE. Combined deletions greatly increased isobutyraldehyde (1.5 g/L/OD600) and decreased isobutanol (0.4 g/L/OD600). We showed that YqhD, AdhP, EutG, YigB, and FucO are active toward isobutyraldehyde. Finally, the optimized strain produced 35 g/L isobutyraldehyde after 5 days.

**Barriga llena, corazón contento: Globalization of the food system and the negotiation of cultural identity for women in Puerto Rico**

Maria Elena Rodriguez, Community Development  
Talk Session 1B

In the island of Puerto Rico, indigenous Taino, colonial Spanish, and African slave influences have produced a complex food culture that is currently being re-shaped by numerous global forces. This paper is the product of research conducted in 2012 in Fajardo, Puerto Rico, surrounding food, culture, and identity among Puerto Rican women. Oral histories showcase the role that food plays in developing and negotiating identity within an ever-shifting food system. I contextualize this study within a legacy of colonialism and explore its influence on the Puerto Rican food system. I look specifically at the impact of corporate-driven globalization on the island’s food system, and how this articulates with Puerto Rico’s political relationship with the United States. In analyzing the research data a number of themes emerge. Among them are the role of cultural dishes in...
creating identity within a contested political landscape, the negotiation of gender roles through food work, and the impact of culinary tourism and professional chefs on the changing definition of “traditional” Puerto Rican food. In this paper I use these themes to explore the complexity of the Puerto Rican food system, and initiate a discussion on where it may be headed.

Longitudinal changes in bone turnover markers following Roux-en-Y gastric bypass surgery
Tara Rogers, Nutritional Biology
Coauthors: T.S. Rogers; P.J. Havel; B.M. Wolfe; M.D. Van Loan; J. Blankenship
Talk Session 3A
Bariatric surgery is associated with changes in bone metabolism; the mechanism is unclear. We examined changes in bone turnover for 1 yr following Roux-en-Y gastric bypass surgery (RYGBP). Obese adults (n=20; BMI 45.6 ±1.6 kg/m2) were studied pre and 1, 3, 6, and 12 months post-RYGBP. Bone specific alkaline phosphatase (BAP) and N-telopeptide of type I collagen (NTx) were measured by ELISA. ANOVA was used to evaluate differences over time. We modeled the contributions of body weight, energy related hormones and inflammatory markers to BAP and NTx. The BAP/NTx ratio declined significantly (p<0.0001) within 1 month of surgery and remained low for 12 mo. post RYGBP. Before surgery, glucose and free fatty acids (FFA) explained 35.3% of the variance in BAP/NTx; post RYGBP, 48% of variance in BAP/NTx was explained by glucose, insulin and C-reactive protein (CRP). Neither weight nor composition contributed to the BAP/NTx ratio. BAP and NTx may be influenced by energy related hormones and inflammatory markers; more research is needed to elucidate relationships among these variables and bone metabolism.

GLP-1 Receptor Expression on Vagal Afferent Neurons Change According to Nutritional Status
Charlotte Ronveaux, Anatomy, Physiology and Cell Biology
Coauthors: H.E. Raybould; G. de Lartigue
Talk Session 1B
Glucagon like peptide-1 (GLP1) is released from the gut following a meal, and inhibits food intake (FI). Given the short half-life of GLP1, vagal afferent fibers that innervate the gut are the most likely site of action. Although GLP1 receptors (GLP1R) are expressed on vagal afferent neurons (VAN), GLP1 does not consistently inhibit FI when administered peripherally. Numerous receptors on VAN have been shown to change depending on nutritional status. We hypothesized that GLP1R expression on VAN increases in response to a meal to mediate GLP1-induced satiation. METHODS: Wistar rats were fasted 16 h or fasted and re-fed for 2 h. GLP1R expression was detected by immunohistochemistry and western blot. Food intake was measured following injection of GLP1 or saline (IP) in fasted or re-fed rats. RESULTS: The percentage of cells expressing GLP1R on VAN was significantly increased in re-fed vs. fasted rats (p<0.001); this was further confirmed by immunoblots. In fasted conditions, GLP1 failed to inhibit food intake; however, in response to a meal, GLP1 significantly reduced FI compared to saline (p<0.05). CONCLUSION: GLP1R on VAN is differentially regulated by nutritional status. GLP1-induced satiety requires elevated VAN GLP1R abundance.

“The Earth is Our Home”: Constructing the Global Environment
Rosamaria Rosen-Teeple, Geography
Poster # 59
Humanistic geography draws upon varied sources in order to present and reflect upon meaning and experience in and of place. In order to understand the construction of “global environment” and examine the feasibility of conceiving of the Earth as a “home” - a planet as a place - I have approached popular press texts and images from a humanistic standpoint. This grounded theory study seeks to describe the concept as it is being actively represented, while also demonstrating the utility of a structured, yet open methodology for future humanistic geographic explorations.

A Doorway Burned Open: An Homage to Mohamed Bouazizi
Cody Ross, Anthropology
Art Exhibit
This art piece is dedicated to the memory of Mohamed Bouazizi, a Tunisian street vendor who set himself ablaze on December 17th, 2010, in response to humiliation and harassment by local authorities. His personal act of protest became a catalyst for the Tunisian Revolution and the wider Arab Spring. His fearlessness in the face of pain and death awakened the inner courage of thousands to stand in protest for change in critical social and political issues across the world, despite the crushing violence that such protestors often faced — and still do. In the wake of Bouazizi’s death, the protests he inspired eventually led the former President of Tunisia, Zine El Abidine Ben Ali, to step down after 23 years in power. This art piece presents direct evidence of the horrific violence and destruction of fire, and haunts the viewer with the face of a human being who was burned alive. Bouazizi’s self immolation made the internal torment he felt visible and embodied; it gave the heaviest of weight to the lightness and philosophical wispiness of discourse per se on social justice. Bouazizi’s death played a role in opening doorways that few would have imagined possible. The door on which this art piece is etched was salvaged from a fire. The charred foam core of the door was etched and brazed to display the visage of Bouazizi.

Development of a Novel in vitro and in vivo Model of Human Breast Cancer
Ashley R. Rowson, Animal Biology
Coauthors: R. Manjarin; J.F. Trot; R.D. Cardiff; R.C. Hovey
Talk Session 4A
Breast cancer is the most frequently diagnosed cancer and the second leading cause of cancer-related deaths in the United States. While advances have been made for treating breast cancers, factors influencing its initiation and progression remain to be fully elucidated. A barrier to understanding breast tumorigenesis is an absence of model systems faithfully recapitulating the human breast. A novel model mimicking human breast architecture would be valuable to further resolve processes of breast cancer. We report significant progress to this end, and due to previously reported structural and cellular similarities, we hypothesized that primary mammary epithelial cells (MEC) derived from this model will undergo oncogenic transformation to produce tumors resembling those in human breast cancer. We utilized an oncogenic lentiviral vector to successfully transduce
and transform primary MEC in vitro as validated by soft agar transformation and growth assays. We further demonstrated the oncogenic capacity of transformed MEC by generating tumors in vivo in xenograft assay. Ultimately, we seek to develop a robust model with structural relevance to the human breast for important discoveries into mechanisms driving breast tumorigenesis.

**Feature-based attention effects in visual scene processing**

Ashley Royston, Psychology
Co-authors: Jesse Jon Bengson; George R. Mangun
Talk Session 3D

Our ability to attend to specific features across a visual scene may be of tremendous benefit in any rapidly changing situation. A hunter who becomes aware of a black shape in his periphery might bring home dinner or avoid death by bear attack; a driver who senses a wavering motion nearby may avoid colliding with one of the many novice cyclists seen around UCD each fall. Such attention to a feature across a scene—the occasional red of an early-season berry hidden among the foliage of a bush, a fine eye for significant pvalues in tables of results, or global attention to the “green” of locations and updates from “friendlies” in a video game— is now being studied. Researchers have employed behavioral and ERP designs to identify the conditions under which such “featural” attention may be able to operate independently of spatial attention, yielding controversial reports that featural attention can operate both as early as and separately from spatial attention. Here we present evidence that the effects may be more limited than initially thought, highlight important differences between “exact” and “conceptual” replications, and suggest that individual differences may be of considerable consequence.

**An electrical approach to drive migration of acanthamoebas to promote the clinical treatment of acanthamoeba keratitis**

Jolene Chang Rudell, School of Medicine
Co-authors: Jing Gao; James Chodosh; Ivan Schwab; Min Zhao
Talk Session 3A

Acanthamoeba keratitis (AK) is a devastating infection of the cornea with a rising incidence amongst contact lens wearers. AK is very difficult to treat, despite a complex medical regimen over the span of up to one year. Despite medical treatment, many patients require surgery and can even lose their vision. One difficulty in treating AK is that acanthamoebas hide in the corneal stroma and resist drug effects. Moving acanthamoebas closer to the corneal surface to make them more accessible to amoebicidal drugs would likely facilitate drug treatment of AK. In this study, we demonstrate that acanthamoebas move at random in the absence of an electric field in vitro, but move directionally in response to an electric field. We also find that the cell migration response is voltage-dependent. In addition, acanthamoebas also respond to electric fields in a three-dimensional agar system as well, which mimics the 3D environment of the cornea. These experiments show that acanthamoebas move directionally in response to an electric field in both a 2D and 3D culture system, implicating the role of electric fields in facilitating drug treatment of AK and ultimately aid patients in restoring their sight and quality of life.

**Interactions between electric fields and nanoparticle ceramics - the road to a transparent coffee cup.**

Jørgen Rufner, Chemical Engineering and Materials Science
Co-authors: Klaus van Benthem; Ricardo Castro
Talk Session 4C

In the world of material science, properties rule. Material properties are often the result of the microstructure created during processing. For the processing of metal and ceramic powders, “sintering” is employed. Previously, it has been shown that the presence of electric fields have a pronounced effect on the densification and microstructural evolution of various metal and ceramic systems. The sintering behavior of a specific ceramic system, magnesium aluminate spinel was investigated. Spinel nanopowder, comprised of 5-6nm average diameter particles, was sintered at 1300°C up to 90% relative density. A limiting factor in the densification of these powders was the presence of strong nanoparticle agglomerates. Nanoindentation was performed on individual agglomerates inside a transmission electron microscope to determine their strength. Additionally, an electric field of 100KV/m was applied during sintering resulting in enhanced grain growth. The overarching impacts and implications of this phenomena will be discussed.

**Scalable Fabrication of Multifunctional Photoactive Sensing Thin Films**

Donghyeon Ryu, Civil and Environmental Engineering
Co-authors: Frederick N. Meyers; Kenneth J. Loh
Talk Session 1D

Structural health monitoring (SHM) is urgently needed to maintain structures and prevent catastrophic accidents by detecting onset of damage in the structures in a timely manner. To date, a variety of sensors (e.g., piezoelectric transducers, fiber Bragg gratings, and wireless sensors) have been proposed for SHM. Yet, they still suffer from high energy demand, large form factors, and durability issues, particularly when applied for monitoring space structures and reusable spacecraft. Thus, the suggested photoactive self-sensing thin films can be a promising candidate for SHM of space structures due to their photocurrent-based/multifunctional sensing capabilities and conformable thin film configuration. Considering that space structures can take advantage of light-weight materials to enhance operational performance, the thin films can be an ideal sensing platform. In addition, multimodal sensing capabilities can be embedded to the thin films using functional polymers and nanomaterials. Furthermore, spatial sensing platforms are developed through scaled-up fabrication methodologies of the photoactive thin films, which can provide damage profiles (e.g., location, intensity, and type, among some others).

**When (Group) Size Matters: Category Learning and the Formation of Stereotypes About Minorities**

Dario Sacchi, Psychology
Co-authors: Dario Sacchi; Jeffrey Sherman
Talk Session 1A

Stereotypes can be defined as mental associations between groups and traits; as such, they should affect all social groups equally. In real life, however, stereotypes about minorities are much more prominent and harder to dispel than those about majority groups. The present research investigated potential
cognitive sources of this disparity through a series of empirical studies. Participants learned about two novel groups of different size and then completed several tasks designed to assess the strength of their mental associations between groups and traits. Results consistently indicated that newly-formed stereotypes about minority groups were stronger than those about majority groups. More importantly, our findings suggest that a basic learning process can account for this disparity. Specifically, the order in which people form different stereotypes determines their relative strength. Thus, people learn first about the features of the majority groups because they encounter them more often; consequently, people’s attention shifts and fixates on whatever traits set the minority groups apart. As a result, minority features are erroneously perceived as stronger predictors of group membership.

Emerging Adults’ Same- and Cross-Ethnicity Romantic Relationships and Warmth: The Role of Ethnic Identity
Natalie Sadler, Human Development
Talk Session 3D
Cross-ethnicity marriage continues to be on the rise in the United States. In 1980, less than 7% of new marriages were cross-ethnicity (Taylor et al., 2012). This percentage rose to 15% by 2010. In California, this number is 23%, with 33% of college students reporting cross-ethnicity dating (Fiebert, Karamol, & Kasdan, 2000). Earlier research found that cross-ethnicity relationships have more difficulties, indicated by less satisfaction and more dissolution (e.g., Gurung & Duong, 1999), than same-ethnicity relationships. However, these studies focus primarily on married adults from older cohorts. With the greater prevalence of cross-ethnicity dating, particularly among emerging adults (Taylor et al., 2012), differences between same- and cross-ethnicity relationships may have decreased. Additionally, unique attitudes related to ethnicity and culture, like centrality, may play a role in cross-ethnicity relationships. Examining cross-ethnic dating and factors that might promote high quality relationships among today’s emerging adults is important as these relationships are the precursors to tomorrow’s marriages.

Neuronal circuits underlying attention-dependent learning
Daniel Sanculi, Neuroscience
Poster # 20
Recent studies in the barn owl have shown that the top-down allocation of an attention-like process influences responses to both visual and auditory stimuli. The control structure involved in this sensory modulation is the arcopallial gaze fields (AGF) and its target is the optic tectum (OT). During sensory-motor learning, a visually-based signal feedbacks from OT to a major auditory processing center, the inferior colliculus (IC). However, under passive conditions entry of this instructive signal to the IC is blocked. Taken together, these results lead me to hypothesize that top-down attention via the AGF acts as a gate on the delivery of instructive information from OT to IC, and therefore as a gate on learning. I propose that microstimulation of the AGF will open the gate. To test this I will insert a single electrode into the AGF and characterize the auditory receptive fields. I will then use a multi-electrode array to locate a region in the IC with the same auditory tuning. Once spatially aligned sites are found I will measure the responses of IC neurons to auditory and visual stimuli and determine a baseline response. I will then measure auditory and visual responses in the IC while simultaneously stimulating the AGF.

Identification of Nrdp1 as a Novel Androgen Receptor Transcription Target Differentially Regulated in Androgen-Dependent and Independent Prostate Cancer
Rosalinda Savoy, Urology and Genetics
Poster # 58
The ErbB receptor tyrosine kinase family regulates proliferation in prostate cancer (PCa). ErbB3 can increase androgen receptor (AR) transcriptional activity causing castration resistant PCa (CRPC). AR also maintained castration sensitivity by suppressing ErbB3 levels through transcriptional regulation of E3 ubiquitin ligase Nrdp1. The promoter region of Nrdp1 contains three androgen response elements (ARE) - one located upstream (ARE3), and two in an internal promoter (ARE1 and ARE2). CHIP revealed AR binding in PCa cells to ARE3, is androgen regulated in androgen-dependent (AD) LNCaP PCa cells and AR binds in the presence of androgens. Luciferase assay on ARE3 showed significant response to androgens, whereas mutation abolished AR transcriptional activity. CHIP also showed that the AR failed to bind to ARE3 in CRPC sublines of LNCaP cells. Luciferase assay in LNCaP-AI showed decreased AR transcriptional activity on ARE3. Transfection of FlnA16-24 in C4-2 cells restored AR binding to ARE3. We identified Nrdp1 as a novel target of AR transcriptional activity in AD but not in CRPC cells. Indicating that the AR-binding protein FlnA16-24 is required for AR binding to the Nrdp1 promoter and regulation of Nrdp1 transcription.

NRVS and EXAFS Characterization of the Nitrogenase-CO Complex
Aubrey D. Scott, Chemistry
Co-authors: Stephen P. Cramer; Simon J. George; Christie H. Dapper; William E. Newton
Poster # 8
Nitrogenase is the enzyme that catalyzes the reduction of atmospheric N₂ into biologically accessible ammonia, a critical step in the earth’s nitrogen cycle. Recently, it has been shown that nitrogenase is also capable of reducing CO to complex hydrocarbons such as ethane and propane. What follows is a study of how CO binds to the FeMo-cofactor, the active site of nitrogenase, and how that binding affects the structure of the cofactor as a whole. We combine the methods of Extended X-ray Absorption Fine Structure (EXAFS) and Nuclear Resonance Vibrational Spectroscopy (NRVS) to observe structural changes to the FeMo-cofactor and directly detect CO bound to the cluster. EXAFS spectroscopy gives precise distances between atoms of the cofactor, enabling us to detect a slight bend in the cofactor upon CO binding. NRVS spectroscopy is a vibrational technique that allows monitoring of both the overall symmetry of the cluster through the cofactor’s “breathing” vibrational modes, as well as direct detection of Fe-C stretching vibrational bands. A considerable change in the structure of the cofactor is detected. Fe-C stretch frequencies are also characterized directly and compared to previous studies using infrared absorption.
Life After Prison: the relative inclusion of former prisoners in local reentry policy-making
Julie Setele, Sociology
Talk Session 4D
Over 2 million people are incarcerated in prisons in the United States and the majority of them will be released at some point. In many ways, prisoner reentry is best addressed as a local issue because formerly incarcerated people (FIPs) face local constraints to accessing resources like housing and employment and directly interface with local law enforcement; recent statewide changes in California amplify the importance of the local. In an ethnographic case study of the Reentry Council of San Francisco, a governmental advisory body, I examine the unusual collaboration between FIPs, prosecutors, defense attorneys, law enforcement, elected officials, social service providers, and community members. San Francisco has taken the unusual step of formally including FIPs in policymaking; however, a variety of structural and ideological barriers limit their substantive contributions to policy decisions. FIPs' full participation is inhibited by bureaucratic procedures that presume a high level of cultural and professional capital. My analysis focuses on moments of rupture at the Reentry Council, in which its official logic of FIP inclusion has been questioned, revealing other logics that guide the institution but typically remain veiled.

Me, My Cells, and Identity
Matan Shelomi, Entomology
Art Exhibit
This work touches on the theme of identity, specifically identity theft and genetic privacy. While identity theft can be serious, many aspects of who we are serve limited to no use for the average thief. We live in an era where the security-paranoid shred any document with their name on it, even if it’s printed in block letters in crayon, and panic lest their face may be recorded by a camera somewhere, somehow. I reject this overly cautious attitude by putting up for all to see the core of my identity: my genome. Printed on each painting is my actual karyogram: those are my chromosomes, containing all the genes that comprise my being. So, is this data useful? Have I placed myself at risk? Are there dark secrets in these lines? Is there anything potentially hazardous to my career, finances, social standing, etc. to be gleaned from the data I so casually display? More potentially hazardous to my career, finances, social standing, etc. to be gleaned from the data I so casually display? More than fingerprints or faces, our DNA defines us and separates us from everyone else, forensically and otherwise; and yet, without specialized tools and knowledge, it says nothing. A karyogram holds an immense amount of information—enough to build an entire human being—yet is itself near meaningless.

Extra-Axial Fluid as a Potential Early Biomarker in Infants Who Develop Autism
Mark D. Shen, Psychology
Co-authors: David G. Amaral; Sally Ozonoff; Christine Nordahl; Sandra L. Wootton-Gorges; Gregory S. Young
Talk Session 4C
It is unknown whether there are any brain-based markers during infancy that are associated with developing Autism. Our objective was to use MRI to identify any brain anomalies in 6 month-old infants who would later develop Autism. We conducted a prospective infant sibling study with 64 infants (41 “high-risk” infants who have an older sibling with Autism; 23 “low-risk” infants having no relatives with Autism). Infants underwent longitudinal MRI scans at three timepoints (6, 12 and 18 months of age) in conjunction with behavioral assessments. Diagnostic confirmation was made at 24-36 months for Autism, Developmental Delays, or typical development. Infants who later developed Autism (n=10) had significantly greater Extra-axial Fluid at 6 months, which persisted and remained elevated at 12 and 18 months. Extra-axial Fluid is characterized by excessive cerebrospinal fluid in the subarachnoid space, particularly over the frontal lobes. Autism infants also had larger brain volume at 12 and 24 months of age. The presence of Extra-axial Fluid detected at 6 months raises the potential to aid in the early detection of children at risk for Autism. This finding is currently being replicated in a multisite study of 400 infants.

A Low cost inline LED colorimeter-based phenolic sensor for red wine fermentations
Nicholas L. Shrake, Electrical and Computer Engineering
Co-authors: Andre Knoesen; Rajeevan Amirtharajah; Roger Boulton; Charles “Chik” Brenneman
Poster # 53
Phenolic Compounds in wine dictate the taste, color, and mouth-feel of wine. Extracted anthocyanin compounds give red wine its rich red color while tannin extraction leads to bitterness and astringency. Winemakers will benefit from a sensor measurement of these phenolic compounds because it allows them to make temperature and pressing decisions. The result is higher quality wine and improved control of the fermentation process. Quantifying phenolic compounds in wine is currently limited by time of analysis and requires sample preparation (filtration or centrifugation). The developed inline colorimeter sensor measures wine in-situ and therefore provides measurements in real-time. In addition, the colorimeter sensor is extremely low cost because it uses LEDs as a light source and does not require complicated optical filters or gratings. In the future, a low-cost absorption colorimeter could be deployed to both research and commercial wineries. The low-cost approach is appealing for integration with the Cypress Semiconductor Integrated Fermentation Control System (IFCS) that provides automated brix (sugar density) measurements.

Sunlight Initiated Cycling of Phenols in Atmospheric Aqueous Phases
Jeremy D. Smith, Agricultural and Environmental Chemistry
Co-author: Cort Anastasio
Poster # 37
Aqueous phases, such as fog, clouds and aqueous aerosols, are an important medium for atmospheric chemistry. These aqueous phases can act as a sink for important oxidants and create new reaction conditions. Combustion of wood releases organic compounds, such as phenols, benzene-diols and aromatic carbonyls that are highly water soluble due to the high oxygen content of wood lignin. Phenols and benzene-diols compounds are volatile and released into the gas-phase when wood is burned, whereas aromatic carbonyls are less volatile and are released as compounds on/in aerosols. If atmospheric liquid water content is high enough, these compounds can dissolve into the aqueous phase. Once in the aqueous phase these carbonyl com-
pounds absorb significant amounts of solar radiation, leading to excited chemical states. Our results show that these excited states rapidly oxidize phenols/ benzene-diols, transforming the phenols/benzene-diols into highly absorbing, low-volatility products. The production of low-volatility compounds from previously volatile compounds is classified as Secondary Organic Aerosol (SOA). Our evidence suggests a novel mechanistic pathway for aqueous SOA that does not include traditional oxidants.

When big data matters -- the power of graph algorithms
Tianhong Song, Computer Science
Co-author: Bertram Ludaescher
Poster # 71
One big challenge we’re facing now is the explosion of information rather than lack of information. While Algorithm is an effective step-by-step procedure for calculations and it plays an important role on extracting useful information from the sea of information. Graph is a common data structure to model relationship between objects, e.g. Internet, social network, production line etc. Rather than working on the problem directly, we can convert it to a graph, which is more formalized and simplified, then apply algorithm to solve the problem efficiently. We’re working on a special type of graphs called provenance graph and we’re trying to find an efficient way to analyze the graph to get useful information. Since provenance graph has been widely used to represent the history of data flow for general data processing, it can be used to validate data products, debug processing steps, etc. For example, we can find out what has happened during the processing if we find the output data is suspicious and directly fix the part causing the problem rather than modifying the whole process.

Violence in the Workplace: A Prevention Program for Health Care Workers
Kathy Speegle-Clark, Betty Irene Moore School of Nursing
Talk Session 4B
Violence in the Workplace: A Prevention Program for Health Care Workers Health care facilities were once thought of as “safe havens,” but are now plagued with significant increases in aggression among patients, visitors, and staff. Health care professionals suffer from a tolerance of workplace violence and the perception that their profession implies the acceptance of that violence. As a result, people who experience violence on a day-to-day basis become habituated to it as a part of the human condition. Violence can be prevented and cultural norms altered. Societies, communities, and individuals can make a difference and reject the notion of “an acceptable level” of violence.

The role of oxytocin and vasopressin in female bias towards social withdrawal following social stress
Michael Q. Steinman, Psychology
Coauthors: Jennifer A. Knight; Brian C. Trainor
Talk Session 2B
Major depression affects about 10% of Americans. One major model of depression exposes a rodent to social stress imposed by a dominant same-sex member of their species. The stress causes depressive-like behaviors and associated changes in the brain. Low aggression in female rodents has biased the findings toward male biology, a problem since women are 2X as likely as men to report depression. The California mouse (Peromyscus californicus), however, is a species where both sexes are aggressive and even weeks after 3 consecutive days of brief social stress, females avoid interacting with unfamiliar males while males maintain high sociability with unfamiliar males. Oxytocin (OT) and vasopressin (VP) are brain proteins that regulate social behaviors and stress response. I stained the brains of stressed and control male and female mice with markers for OT, VP, and cfos, a protein that shows recent cell activity. Both sexes showed similar increases in OT and VP activity during stress. Still, 2 wk after stress females had changes in OT neuron number while in males VP staining changed. This suggests an association between long term changes in OT and VP circuits and female bias toward social avoidance after social stress.

Same as it ever was? Gender and Children’s Toys Advertisements over the 20th Century
Elizabeth Sweet, Sociology
Talk Session 1C
Scholars and cultural critics have argued that the current gender-based marketing of children’s toys is pervasive and problematic, yet there is little research on how the gender segregation and stereotyping of toys today fits into a historical context. Do contemporary toys merely reflect the repackaging of persistent gender beliefs, or has there been a real change in the relationship between gender and toy marketing over time? I address this question, using data drawn from an in-depth content analysis of toy advertisements in a sample of Sears catalogs that span the 20th century. Results show that the extent to which toys ads were gendered at key time points, and the specific ways in which gender manifested, has been fluid over time. At the turn of the century, gender played a very minor role in toy advertisements but by the quarter and mid-century, roughly half of toy ads were gendered and many reflected traditional gender stereotypes. In the 1970’s, the trend reverses and there is an increase both in gender-neutral toys and ads that challenge gender stereotypes. However, by the close of the century the gender-typing of toys reverts to levels similar to the mid-century and new mechanisms of signaling gender emerge.

The Role of Race Surfaces in Racehorse Musculoskeletal Injuries
Jennifer Symons, Biomedical Engineering
Paper Finalist
Musculoskeletal injuries (MS) are the leading cause of racehorse fatalities. Many factors have been implicated in these MS fatalities, including race surface. Race surfaces are a promising avenue for injury prevention because these materials can be designed and controlled through material selection and maintenance procedures. However, understanding the role of race surfaces in racehorse MS injuries requires research techniques from many different disciplines. Soil mechanical testing techniques are needed to quantify soil behavior. Soil behavior affects hoof and limb motion that are quantified by biomechanical engineering techniques. Veterinary anatomy and tissue mechanics are needed to understand how these limb motions contribute to musculoskeletal injury.
Rainwater Harvesting for Evaporative Cooling Applications  
Nasim Tajmand, Civil and Environmental Engineering  
Co-author: Mark Modera  
Talk Session 4A  
Evaporative cooling technologies work well in hot dry climates because their small total energy consumption. However, evaporative cooling systems require a continuous water supply to cool a building during hot periods. On-site rainwater harvesting can be an alternative water source for evaporative cooling applications because of the minuscule amount of hardness in rainwater, scale formation is prevented. This extends the system life and increases the system efficiency, which consequently decreases water and electricity consumption while maintaining optimal performance. To examine the effect of long term storage of rain water on bacterial growth patterns, a 2500-Gallon Polypropylene tank was used to collect rain water from a residential composite shingle roof. During the period of November to December 2012, the tank was filled with rainwater. The rainwater is currently being stored for summer and the water quality is being examined on a weekly basis. In this study, twelve water temperature sensors and one air temperature sensor are recording temperature variation both for water and air. Results of the water quality parameters obtained in this experiment will determine the feasibility of the system.

Conflict Continuity: Reconstructing Trade in Colusa County using Obsidian Sourcing  
Susan Talcott, Anthropology  
Co-authors: Gregory R. Burns; Carly Whelan; Jeffrey R. Ferguson  
Poster # 69  
Ethnographic accounts suggest historic animosity between the Hill Patwin and River Patwin Native American tribes of the Sacramento Valley. If these accounts accurately represent persistent prehistoric conflict, a barrier to trade and mobility between the groups may be evident in the archaeological record. There are two main obsidian sources in the area. While the Borax Lake obsidian source is the closest obsidian source to both of the Patwin tribes it is only directly accessible to the Hill Patwin. The most likely two ways for the River Patwin to access Borax Lake obsidian would be to travel through Hill Patwin territory or trade with the Hill Patwin for the obsidian. Distribution of Borax Lake obsidian could serve as a proxy for economic and social interaction between the linguistic divisions. Using obsidian X-Ray Fluorescence (XRF) and Instrumental Neutron Activation Analysis (INAA) elemental composition analysis we source obsidian from several sites in Colusa County including two newly discovered sites in Hill Patwin territory and compare them with previous XRF results from Colusa County.

Diastereoselective Mannich-Type Reactions of a-Cyano Succinic Anhydrides with Imines Leading to α-Lactams  
Darlene Q. Tan, Chemistry  
Co-authors: Ommidala Pattawong; Ashkaan Younai; James C. Fettinger; Paul H. Y. Cheong; Jared T. Shaw  
Poster # 21  
Densely substituted α-lactams (2-pyrrrolidinones) and pyrrolidines are found among natural products and pharmaceutical compounds. The prevalence of these structural motifs has driven the development of new synthetic methodologies. Although each of these methods offers certain advantages, drawbacks include limited substrate scope, expensive catalysts, and multi-step processes. Our work shows an efficient and diastereoselective synthesis of tetra- and pentasubstituted α-lactams by the reaction between imines and mono- and di-substituted cyanosuccinic anhydrides. We demonstrate the first examples of stereodiversity from chiral amines and chiral anhydrides in the formation of α-lactams. Importantly, we disclose computational evidence that this reaction, and by analogy, related reactions of imines and anhydrides, proceed by a Mannich-type mechanism that explains both the relative reactivity and stereochemical outcome of this α-lactam synthesis.

Starch production and properties of microalgae grown under elevated CO₂  
Orn-uma Tanadul, Plant Sciences  
Co-authors: John M. Labavitch; Ann L. T. Powell; Jean S. Vandergheynst; Diane M. Beckles  
Poster # 55  
Microalgae may be useful as a feedstock for producing biofuels because they accumulate high levels of lipid and starch. Currently, biofuel production from microalgae is mainly based on lipid conversion. However, algal-produced starch has potential value as a biofuel precursor. Besides selection of algal strains, growth conditions may influence starch production and starch molecular structure. Starch accumulation in Chlorella sorokiniana was studied during culture under ambient air or 2% CO₂. Cells grown under 2% CO₂ produced much more starch than in air. Under 2% CO₂ starch granules were mainly stromal starch; while granules produced by air-cultured algae were primarily pyrenoid starch. The starch from cells grown in air was cup-shaped and contained higher numbers of large starch granules than those from high CO₂ which were disk-shaped. The starch from cells grown in high CO₂ also contained more of the highly branched, easily digested glucan called amylopectin compared with air-grown cells (P<0.05). These data suggested that CO₂ concentration can influence starch production and starch physico-chemical properties, which could affect starch hydrolysis in bioreactors, an important step in biofuel production.

Visual Research Archives: Rethinking and redesigning the management of research materials  
Christine Tao, Design  
Co-author: Ashish Subedy  
Talk Session 1D  
Researchers accumulate a diverse range and vast number of invaluable resources—books, articles, images, conversations, websites, and other pivotal artifacts throughout the research process, but these materials are useless if they cannot be effectively stored and retrieved. Through empirical interview-based research, this project identifies problems with existing reference management systems and explores design strategies for improving the organization, dimensionality, clarity and accessibility of information stored in personal digital research archives. Existing reference management applications constrain researchers to fixed entries presented in linear alphabetical lists of text stored in folder hierarchies that are stripped of defining visual, relational, spatial and contextual information attributes. This project proposes researchers can more effectively store and retrieve essential resources if
they are visually presented and exist as mobile units that can be spatially configured into meaningful and memorable groups and retrieved by an expanded set of contextual search characteristics.

**Electoral Systems as Conflict Management**
Daniel Tapia-Jiménez, Political Science
Talk Session 4A

How do democracies differ with respect to ethnic politics? In particular, how do electoral rules affect the likelihood of ethnic conflict? Two subfields in the political science discipline offer insights to these questions. First, studies of electoral systems have shown that electoral rules have real and discernible effects on the political behavior of actors in democracies. Meanwhile, studies of ethnic conflict explore the political motivations for ethnic conflict and recent literature suggests that electoral frustration is one such motivation. These two literatures suggest that electoral rules shape political behaviors in many different ways and that a tendency for conflictual behavior is one of them. Thus scholars have sought to design electoral systems as a way to curb potential ethnic violence. The debate in this hybrid literature is between two camps: consociationalists, who prescribe representative electoral systems; and centripetalists, who argue for electoral rules that encourage accommodation across ethnic divides. This paper argues that representation without accommodation increases the risk of conflict and takes the ethnic group as the unit of analysis as a step to improve inferences regarding group behavior.

**Lashing Out: Governments’ Margin of Safety and International Conflict**
Timothy W. Taylor, Political Science
Paper Finalist

Why are some governments more conflict prone than others? While ample studies have been dedicated to explore the numerous differences between democracies and other political systems, variation within democracies is an important avenue of research to build an understanding of international conflict. To this end, this project seeks to address the degree to which variation in governments’ electoral vulnerability can explain a state’s behavior in joining international conflicts. Put succinctly, how are differences in a government’s margin of safety related to its propensity to engage in interstate conflict? This paper constructs and then empirically tests an argument that governments are more prone to engage in militarized disputes when they are in a position of greater electoral vulnerability.

**The Electoral Salience of Trade Policy: Evidence from a Two-Dimensional Experiment**
Timothy W. Taylor, Political Science
Talk Session 2A

Why do some issues become politically salient while others do not? Trade policy, for example, was a key electoral issue throughout most of the 19th Century, but has received little attention in recent elections. Existing literature essentially argues that politicians can choose to make issues salient by placing them on the political agenda. However, while politicians propose many bills and raise many issues publically only a handful becomes politically salient. Using experimental evidence, I argue that politicians can not simply make issues salient, but rather are constrained by characteristics of the issues themselves. Specifically, two dimensions of an issue affect the likelihood of that issue becoming salient. First, issues with large welfare consequences should be more salient. Second, more complex issues should be less salient. I thus hypothesize that an issue’s salience should increase with the magnitude of its welfare effects and decrease with its complexity.

**Linkages between pathogens and cattle fecal loads and microbial water quality in aquatic ecosystem in Sierra Nevada meadows, California**
Anyarat Thiptara, School of Veterinary Medicine, Population Health and Reproduction
Coauthors: Edward R. Atwill; Tamara Vodovoz; Ronald F. Bond; Jennifer A. Carabez; Xunde Li; Chengling Xiao; Kristine L. Fernandez; Melissa L. Partyka; Claudia L. Bonilla; Stephanie Huang; Kenneth W. Tate
Poster # 6

Water-related diseases remain the leading cause of morbidity and mortality worldwide. We conducted a cross-sectional study to clarify the link between waterborne pathogens and cattle grazing practices in Sierra Nevada ecosystems, California. Neither *Salmonella* nor *E. coli* O157:H7 were found in fecal and water samples. *Cryptosporidium* and *Giardia* loads in meadow creek were ranging from 0.28 oocysts/L and 0.23 cysts/L, respectively. Ingestion of 3.69-1 and 4.3-14.3 L of creek water will generate a 50% probability of infection with *Cryptosporidium* and *Giardia*, respectively. Sequence analyses confirmed *C. parvum* and mixed concentrations of *G. intestinalis* assemblages B and C in water. The overall prevalence of *Giardia* and *Cryptosporidium* in cattle was 19.5% and 2.4%, respectively. The *Giardia* positivity were 60% and 14% with excretion intensities of 6,169 cysts/g and 42,694 cysts/g of feces in calves and adults, respectively. Calves had 4.3 times higher risk to yield a positive result for *Giardia* than were adults (CI 1.31-14.21; P = 0.04). Genotyping of positive feces revealed *C. andersonii* and *G. intestinalis* assemblage E. We could not find evidence that the source of protozoa in the water originated from the cattle.

**Association between cattle fecal loads in the riparian zones and cattle grazing management and spatial factors in Sierra Nevada meadows of California**
Anyarat Thiptara, School of Veterinary Medicine, Population Health and Reproduction
Coauthors: Edward R. Atwill; Kenneth W. Tate
Talk Session 2D

Summer grazing in the Sierra Nevada meadows of California began in the 1860 and cattle have become the predominant grazing animal. Cattle serve as a natural major reservoir of waterborne pathogens. The CDC reported 134 recreational water-related diseases in 38 states, recently. Therefore, cattle grazing in mountain meadows may elevate the risk of these diseases. To construct strategies for reducing fecal deposition, it is crucial to understand why some areas have higher fecal deposition. We conducted a cross-sectional study with over 160 transects in areas adjacent to the creeks across the Sierra Nevada meadows to investigate various factors that led to high fecal deposition in the summer of 2012. Using a mixed model,
we found that areas adjacent to the creeks, having plant communities with a high percentage of grass and cattle trails were associated with a significant increase in fecal deposition. The cattle density was also associated with a high fecal load. In contrast, if these areas have substantial adjacent pastures, fecal deposition significantly declined. These results suggest that grazing management plans should be implemented in areas having narrow adjacent pastures, especially, the areas where having a large percentage of grass, cattle trails and cattle density.

OsGSK: Bridging salt stress response to starch biosynthesis in rice
Maysaya Thitisaksakul, Plant Biology
Co-authors: John M Labavitch; Eduardo Blumwald; Diane M Beckles
Poster # 49
Soil salinity is one of the major factors limiting global cereal yield. Rice (Oryza sativa L.) is a staple for 3 billion people and it is also one of the most salt-sensitive cereals. Understanding rice response to salinity at the molecular and physiological level is important for developing germplasm less susceptible to salt stress. One of the mechanisms rice plants may exploit to tolerate salinity is to alter their carbohydrate levels; however, how this happens is not fully understood. Convincing evidence comes from studies of a Glycogen Synthase Kinase 3-like homolog (MsK4) in alfalfa that once ectopically expressed in Arabidopsis plants, enhanced its survival and increased starch content under high saline environment. This research project therefore investigates the rice GSK-3-like protein [OsGSK3], as a possible link bridging the salt stress responsive pathway to the starch pathway. We used bioinformatics tools to identify and clone the closest rice MsK4 isoforms and investigated their genomic and amino acid sequence structure. Expression analysis indicates that OsGSK3 expression is salt inducible and root-localized. We also created and verified a construct to generate rice OsGSK3 overexpressor lines.

Reducing Carbon Dioxide to Chemical Feedstocks using Aluminum Electrocatalysts
Emily Thompson, Chemistry
Co-authors: Thomas Myers; Louise Berben
Poster # 27
To counter and help control the effects of human-induced climate change we need to find a way to lower and counteract the amount of greenhouse gases released into the atmosphere. Furthermore, we need a way to convert these gases into something useful, like a fuel, instead of just sequestering them. To be most applicable, the conversion process needs to be able to occur at room temperature, at atmospheric pressure, and with low energy requirements. Our research is designed to fill that niche. We are synthesizing and testing aluminum complexes capable of doing electrochemistry that can convert CO₂ into useful products. Aluminum is cheap and highly abundant, making it an ideal, widespread potential catalyst. However, little research has been done on its potential to act as an electrocatalyst. Using a small amount of electricity, ideally from a solar cell, our redox-active aluminum complexes can convert CO₂ into chemical feedstocks or fuels, thus creating a carbon neutral source of fuel.

Viviendo Verde: Green is Not White
Organizer: Alberto Antonio Valdivia, Geography
Panelists: Rosalba Lopez, Community Development; Maria Elena Rodríguez, Community Development; Rasheed Hislop, International Agriculture Development
Panel Session 4
Viviendo Verde: green is not white” will be an active dialogue. Our panel explores the ways in which critical perspectives provide a framework for reclaiming cultural knowledge. We incorporate indigenous epistemologies as a means of healing: healing our diets, lands, identities, and bodies. This workshop/encuentro pedagogically includes methods to facilitate the sharing of knowledge amongst participants that embrace ceremony, arte, baile, oral histories, film, photography, poetry, comida, música, testimonios y más. Decolonize your mind and learn from your corazón. “Green is not white” refers to the reclamation of our stolen sustainable living practices from the green movement which continues to racially segregate, discriminate, marginalize, and exploit communities of color. Green can not be just a luxury for white people. From this we seek to form new paths forward.

The Ties that Bind: Experimental Evidence on the Effect of Ethnic Cues on Vote Choice
Kristina Victor, Political Science
Paper Finalist
The growing Latino population, in the U.S., has drawn the attention of politicians, campaigns, and the media. Recent research shows: (1) a Latino on the ballot mobilizes co-ethnic voters, (2) Latinos overwhelmingly report they believe Latinos are more likely to vote for a co-ethnic over a non-Latino, and (3) a majority of Latino respondents report they would prefer a Latino over a non-Latino candidate, given equal qualifications. Although this evidence indicates Latinos appear to prefer co-ethnic candidates, there is limited causal evidence to suggest Latino voters use ethnic cues when voting. Using an experimental design I address the missing causal link. I find the number, and type of ethnic cue matters. Even when party labels are available, Latino participants increasingly prefer the co-ethnic candidate when ethnic cues are present. This experiment provides the causal link for previous observational and survey research.

The Ties that Bind: Experimental Evidence on the Effect of Ethnic Cues on Vote
Kristina Victor, Political Science
Talk Session 3C
The growing Latino population has drawn the attention of politicians, campaigns, and the media. Recent research shows: (1) a Latino on the ballot mobilizes co-ethnic voters, (2) Latinos overwhelmingly report they would prefer a Latino over a non-Latino candidate, given equal qualifications. Although this evidence indicates Latinos appear to prefer co-ethnic candidates, there is limited causal evidence to suggest Latino voters use ethnic cues when voting. Using an experimental design I address the missing causal link. I find the number, and type of ethnic cue matters. Even when party labels are available, Latino participants increasingly prefer the co-ethnic candidate when ethnic cues are present. This experiment provides the causal link for previous research.
Food that flies: why aquatic insects matter to breeding birds
Robert Walsh, Ecology
Talk Session 4A
California supports a spectacular array of bird life, much of it concentrated in riparian woodlands—those ribbons of lush vegetation growing alongside streams and rivers. While water and dense nesting habitat are attractive to breeding birds, so too may be the abundant insect prey supported by streams. Aquatic insects such as dragonflies, mosquitoes, and midges emerge from water as winged adults, and in so doing they make aquatic resources available to insecteating birds. We investigated the extent to which emergent aquatic insects act as a resource subsidy to breeding songbirds along Putah Creek. Tree Swallows nesting up to a half-kilometer away from water took aquatic insects as prey, and nesting swallow diets showed up to 40% reliance on aquatic insects. Using isotopic analysis, we found the chemical signature of aquatic insect use was widespread among bird species. Thus, despite relatively limited landscape coverage, streams play a disproportionately important role in supporting birds through their reliable production of emergent aquatic insects. Winged insects and birds link water and upland habitats, underscoring the need for a broad perspective for the conservation and management of riparian zones.

A few ‘few’s: The meaning difference between ‘few’ and ‘a few’
Kristen Ware, Linguistics
Talk Session 2D
‘Few’ and ‘a few’ present a puzzle for linguists. Both combine with a noun to form a noun phrase apparently meaning ‘a small number of (noun),’ but they behave differently with respect to complement set anaphora:
1. Few children ate their ice cream. They threw it away instead.
2. A few children ate their ice cream. They ate the vanilla first. In combination with ‘few,’ the plural anaphor ‘they’ takes as its referent the children who did not eat their ice cream—the complement of the set ostensibly introduced by ‘few children.’ When used with ‘a few’, however, ‘they’ takes as its referent the children who did eat their ice cream. Current semantic theory treats ‘few’ and ‘a few’ identically, making an explanation of this data impossible. This paper develops a semantics of ‘few’ and ‘a few’ that accommodates this difference. The solution is based on the assumption that the referent of an anaphor must be explicitly introduced in the preceding discourse. I propose that while ‘a few’ operates on the noun, ‘few’ operates over the event structure of the clause. As such, the set of people who could have participated in the verbal predicate is salient in the semantic structure of ‘few,’ enabling anaphoric reference to this ‘complement set.’

Label Propagation with 11-Graphs
Chelsea Weaver, Mathematics
Cor-author: Naoki Saito
Poster # 12
Given a massive amount of data, suppose we know that each datum falls into one of a number of classes, but we do not know which data belong to which class. Label propagation, a branch of machine learning, is a method of automating this classification using vertex/edge graphs. The premise of this approach is that vertices of the graph represent individual data points, and the edges connect points that are similar to each other. Further, we add weights to the edges to represent varying levels of similarity between points. A small number of the vertices correspond to labeled points, for which the classes are known, and we classify the remaining vertices based on the labeled points to which they are most closely connected. Determining which pairs of vertices to connect and the weight of the edges, i.e., the method of graph construction, is an important and unresolved question; the accuracy of the classification depends crucially on how well the graph connects similar points. In my talk, I will describe a few classical graph construction methods and explain why these methods fail. I will also discuss my research regarding a new method called “l1-graphs,” a technique that utilizes linear algebra and themes from compressive sensing.

Genetic test for feed efficiency predicts differences between sire groups
Kristina Weber, Animal Biology
Corauthors: Bryan Welly; Juan Antonio Rendon; Christopher Antwi; Egleu Mendes; Alison Van Eenennaam
Talk Session 2C
Due to the high cost of feed in beef production systems, there has been interest in selecting cattle for feed efficiency, or ability to convert feed to body weight. One measure of feed efficiency is residual feed intake (RFI), the amount of feed consumed above that expected for a given metabolic body weight and rate of gain. The objective of this study was to determine whether a genetic test for RFI could predict differences in RFI between sire groups. We selected two Angus bulls (HIGH, LOW) which were predicted to differ in RFI by 0.32 kg/d from the HD50K genetic test (Pfizer Animal Genetics, Kalamazoo, MI), to use as sires. At eight months of age, eight steer progeny of each sire were measured for feed efficiency (RFI-GROW) over 70d using a GrowSafe System (Airdrie, AB Canada), while fed a growing ration. Following that, steers were reassessed for feed efficiency (RFI-FINISH) over 91d average (70-105d) while individually housed and fed a finishing ration. There was a trend toward LOW steers having lower RFI-GROW (0.64 kg/d, P=0.087). RFI-FINISH was lower for LOW steers (0.56 kg/d, P<0.05). This demonstrates that genetic tests can be effective at predicting differences in feed efficiency.

Shady Business: Singing Songs about Plant & Leaf Development
Donnelly West, Plant Biology
Performance
Using more traditional methods of communication (music, storytelling, etc.), I engage people in the genetic and molecular research that I conduct in tomato plants and their wild relatives. Currently, there is limited understanding of the way that plants differentiate tissue in to complex organs such as leaves, flowers, roots, etc. My research strives to isolate important stem cells and determine genes that are responsible for leaf tissue differentiation. Through this performance, the basis of plant development from seed to plant will be interactive and interesting even to those not typically enthralled by such processes. As a researcher, I believe it
is my responsibility to confer my scientific enthusiasm to as many people as possible and music seems like a universal solvent. By using clever rhymes, a catchy tune and a little less jargon, art can be used to clearly communicate complex ideas about biological systems in order to both entertain and educate audiences.

**Statin Medications Related to Improved Outcomes in Patients with Critical Limb Ischemia**

Gregory G. Westin, School of Medicine, Clinical Research Co-authors: Ehrin J. Armstrong; David Anderson; Shelby Potkin; Ezra Amsterdam; John R. Laird

Talk Session 2A

Context: PAD affects around 8 million people in the United States. Patients with CLI (non-healing ulcers from arterial insufficiency) have a major amputation rate of up to 40% at 5yrs and mortality of 20-25% in the year after presentation. Statins are beneficial in preventing adverse cardiovascular and cerebrovascular events in patients with known coronary artery disease (CAD), diabetes, or other risk factors, and there is evidence for their use in the overall PAD population. However, their value in patients with CLI is uncertain. Our Contribution: This is the first analysis of the relationship between LDL levels and clinical outcomes in CLI patients. We report the prevalence of statin use in CLI patients and longitudinal trends for this therapy; these compare favorably to other reports in PAD populations, but lag behind those with CAD. We add to the understudied area of medical therapy for CLI patients by including robust statistical adjustment for differences and analysis of overall cardiovascular outcomes. Future Directions: Future studies should investigate the optimal statin type and dose, barriers to more widespread use of statin medications, and the best medical treatment and prevention strategies for patients with CLI.

**Reengineering the Aeronautical Design Process with Evolutionary Algorithms**

Brian Weston, Mechanical and Aerospace Engineering

Talk Session 2B

In the 21st century, with exponential population growth, depleting natural resources, and increasing environmental regulations, greater energy efficient transportation systems will need to be developed for environmental sustainability. NASA’s Aeronautics Research Mission Directorate has made the development of green aviation its primary objective. Energy efficient aircraft of the future will require innovations in the aeronautical design process to further reduce aerodynamic drag. My research will streamline the aeronautical design process by improving the current computational modeling tools. By improving the algorithms in the modeling software, design engineers will be able to rapidly prototype design ideas and scan several alternative ideas. Understanding these tradeoffs in the preliminary design stage is very important in optimization problems involving several constraints, i.e. maximize the lift to drag ratio while maintaining a certain wing thickness. The algorithms that I propose to implement will help pave the way for re-engineering the aerodynamic design process. Once established, these algorithms can be applied to other industries such as reducing the aerodynamic drag of cars in the automotive industry.

**Dental Pathology of Southern Sea Otters (Enhydra lutris nereis)**

Jenna Winer, School of Veterinary Medicine

Co-authors: Shannon Liong; F.J.M. Verstraelen

Talk Session 1A

Southern sea otter museum specimen skulls (n = 1,205), acquired from strandings, were examined macroscopically; results from all young adult and adult specimens were pooled by tooth type. 92% of teeth were present, with 6.5% artificially absent, 0.6% absent due to acquired loss and 0.03% congenitally absent. Three pairs of fused teeth were encountered, including 2 instances of fused maxillary first incisor teeth. Supernumerary teeth were associated with 97 normal teeth in 68 specimens. At least 1 persistent deciduous tooth was present in 6 skulls. The majority (94.6%) of alveoli were not associated with bony changes consistent with periodontitis; however, the majority (74.4%) of specimens did have at least 1 tooth associated with mild periodontitis, the most common location of which was the mandibular third premolar (56.6%). Approximately half of the teeth (52.0%) were abraded; almost all adult specimens (98.1%) contained at least 1 abraded tooth, while fewer young adults were affected (76.4%). Tooth fractures were uncommon, affecting 1,343 teeth (4.5%). Periapical lesions were associated with 409 teeth (1.3%) in a total of 176 specimens, and these would likely have caused considerable morbidty while the animals were alive.

**Utilizing Pedigreed Dogs as Animal Models for Orofacial Clefts**

Zena Wolf, School of Veterinary Medicine, Population Health and Reproduction

Co-authors: Claire Wade; Nili Karmi; Amy Young; Danika Bannasch

Talk Session 3B

Pedigreed dogs represent a valuable genetic resource for study...
Racial Microaggressions and the Stress Effects of This Involuntary Myn-Slaughter
Gloria Wong, Psychology
Co-authors: Nolan Zane; Sumie Okazaki
Talk Session 1D
The impact of blatant racial discrimination have been documented, but little is known about the impact of indirect subtle forms. A common form of subtle discrimination are microaggressions, which are “brief and commonplace daily verbal and non-verbal, behavioral, or environmental indignities, whether intentional or unintentional, that communicate hostile, derogatory, or negative slights and insults toward members of oppressed groups.” Racial microaggressions continue to exist and are commonly experienced by People of Color. Therefore, major aim of my line of study is to examine the effects of racial microaggression as a stressor. I apply traditional transactional stress models to the microaggressions process model to explore the proximal effects of racial microaggressions. These everyday stressors perpetrated by White ideologies wear and tear at the marginalized which may affect the psychological and physiological well-being of People of Color. A thorough examination of how racial microaggressions are processed by the target not only sheds light on the target’s experience, but also will help to minimize the gap between the racial realities of the perpetrators and the racially marginalized.

Reaching for the Lyric Register
Kurt Wooden, English, Creative Writing Performance
My poetry meditates on quiet revelations, usually prosaic things that aren’t considered impactful enough by many people to warrant conscious thought let alone treatment in poetic form, e.g. witnessing two people kissing, a loved one’s return. My poems dwell on these moments and attempt to give them voice, to give them breath, and to place them not only in our conscious thought but, ideally, in the lyric register.

Superhydrophobicity-enabled Interfacial Microfluidics on Textile
Siyuan Xing, Biomedical Engineering
Co-authors: Jia Jiang; Tingrui Pan
Poster # 67
In this abstract, we have first introduced a new interfacial microfluidic transport principle to automatically drive three-dimensional liquid flows on a micropatterned superhydrophobic textile (MST) platform. Specifically, the MST system utilizes the surface tension-induced hydrostatic pressure to facilitate the liquid motion along the yarns. The MST was simply fabricated by stitching superhydrophilic cotton yarns onto a superhydrophobic (SH) fabric with well-controlled geometrical patterns. By the extreme wetting contrast on the SH textile substrate, the sizes of the stitching patterns and the geometric configuration of connecting threads will control the surface tension-induced pressure gradient as well as the flow resistance, which provides a flexible control of flow rate on textile.

Impact of Videoconferencing on Stress in Hospitalized Children
Nikki Hsuan-Hui Yang, School of Medicine, Pediatrics and Epidemiology
Co-authors: Madan Darmar; Nayla M. Hojman; Diana Sundberg; Gary L. Wold; James P. Marcin
Poster # 54
Introduction: Family-Link is a videoconferencing program at the UC Davis Children’s Hospital that connects hospitalized children and their parents to family and friends outside the hospital using laptops. The goal is to evaluate whether the use of Family-Link impacts the level of stress experienced by the child and family during hospitalization. Methods: Children were included if they had an expected length of hospitalization of more than 5 days, from January 2011 to September, 2012. Stress was evaluated using a
survey modified from a previously validated parental stress survey. The survey was administered to the parent at the time of admission and close to discharge. The mean stress scores were compared using a Student’s t-test. Results: There was a significant reduction in the mean levels of stress for both groups (12.4, p<0.05 among Family-Link users; 11.3, p<0.05 among non-Family-Link users). Conclusion: Our analyses demonstrate that children and families using Family-Link during hospitalization have a greater reduction in stress scores than those children and families than did not use Family-Link. The use of Family-Link may have contributed to the reported decrease in hospitalized children’s stress score.

**Cost-Effectiveness Analysis of a Pediatric Critical Care Telemedicine Program**
Nikki Hsuan-Hui Yang, School of Medicine, Pediatrics and Epidemiology
Co-authors: Madan Dharmar; Byung-Kwang Yoo; J. Paul Leigh; James P. Marcin
Talk Session 4D
**OBJECTIVE:** To evaluate the cost-effectiveness of critical care telemedicine consultations to children presenting with asthma, bronchiolitis, dehydration, fever, and pneumonia to rural emergency departments (EDs), compared to the current standard of telephone consultations. **METHODS:** We developed a decision-analytic model to estimate the incremental cost-effectiveness ratio (ICER) and to compare the costs and effects of the use of telemedicine and telephone consultation among children. Effectiveness measure was the transfer of children from the ED to a higher critical care center. Unit of ICER was the incremental “cost per transfer avoided.” **RESULTS:** Probabilistic cost-effectiveness analysis showed that the telemedicine program is more effective and less costly. Proportion of children with “avoided” transfer was 39.4% among the telemedicine group compared to 12.5% among the telephone group, resulting in an effectiveness of telemedicine of 30.7%. Cost of each transfer was lower for the telemedicine group than the telephone group by $6,130-$10,385. **CONCLUSION:** Pediatric critical care telemedicine consultations to rural EDs helps to reduce the transfer rate, and is more cost-saving and cost-effective than telephone consultations.

**Phenotypic and functional parallels between antigen-nonspecific CD8+ memory T cells following cancer immunotherapy and influenza infection**
Anthony E. Zamora, School of Medicine, Dermatology
Co-authors: Gail D. Sckisel; Julia K. Tietze; Nicole Baumgarth; William J. Murphy
Poster # 5
One of the hallmarks of adaptive immunity is the development of specificity towards antigens by immune cells. Memory T cells are an important component of acquired immunity, providing the host a great deal of protection due to their rapid acquisition of effector function and low requirement for costimulation. In addition to antigen-specific T cells, the presence of bystander activated T cells has been well documented in various pathogenic infections and autoimmunity. We have recently characterized a population of memory CD8+ T cells following systemic immunotherapy (IT) with agonistic anti-CD40/IL-2 that display increased expression of NKG2D but not CD25, indicating a lack of TCR engagement. Likewise, primary infection with influenza resulted in rapid expansion of memory CD8+ T cells displaying this same bystander phenotype. IT-based stimulation and viral infection resulted in antigen-nonspecific activation of memory CD8+ T cells, with NKG2D ligation inducing MHC-unrestricted cytotoxicity and leading to antitumor and antiviral effects. These results suggest a common mechanism whereby antigen-nonspecific CD8+ T cells play an important, NKG2D-mediated, role in both anticancer immune responses and viral clearance.

**Structural Health Monitoring and Damage Detection of Wind Turbine Blades Using Nanocomposite Sensors with Updating Numerical Models**
Yingjun Zhao, Civil and Environmental Engineering
Co-author: Kenneth J. Loh
Talk Session 3C
Wind energy is recently gaining its popularity due to its sustainable and environmental-friendly nature among many arising types of renewable energies. However, wind turbines usually suffer from mechanical deformations caused by aerodynamic instability and crucial working environment, thereby increasing wind cost-of-energy. It has been found that failure usually stems from damage occurring in the fiber-reinforced polymer composite wind blades. Therefore, the research objective is to derive an integrated monitoring and modeling solution for assessing wind turbine performance and predicting their long-term reliability. The proposed research involves design, characterization, and implementation of nanocomposite-based sensors for in situ damage detection in composite wind blades with carbon nanotube-based thin films to achieve strain sensitivity, damage localization and identification via implementation of electrical impedance tomography algorithm. The spatial strain measurements obtained during static and dynamic load testing will be used for updating the numerical models, thus providing an in situ sensing technology tailored for wind turbine structures for the purpose of monitoring and prognosis.

**Natural Gas Vehicle Fuel Economy Analysis and efficiency improvement**
Lin Zhu, Institute of Transportation Studies
Co-authors: Andrew Burke; Hengbing Zhao
Talk Session 2B
Natural gas has been widely recognized as a low carbon, cost economical and domestically available fuel. Recent well to wheel studies suggest that efficient natural gas vehicles could provide low GHG emissions. Thus, what’s natural gas’s role in transportation? It is a bridge-fuel or a long-term fuel? We will conduct a vehicle modeling study to better understand different high efficiency options for using natural gas in light duty vehicles. Engine technology using compressed natural gas (CNG) will be reviewed and engine models appropriate for use in the hybrid vehicles simulations formulated. Detailed simulations will be made of hybrid vehicles using CNG as the fuel and comparisons made with similar simulations made using gasoline as the fuel. Cost/economic comparisons will be made between CNG and gasoline fueled advanced vehicles to determine whether the present interest in CNG is likely to be short term or persist in the long term.
A System for Automatic Animation of Piano Performances
Yuanfeng Zhu, Computer Science
Co-authors: Yuanfeng Zhu; Ajay Sundar RamaKrishnan; Bernd Hamann; Michael Neff
Paper Finalist
This paper presents the first system for automatically generating 3D animations of piano performance, given an input music file. A graph theory-based motion planning method is devised to decide which fingers to strike the piano keys. Anticipating the music progression, the positions of unused fingers are calculated to make efficient fingering of future notes. Initial key poses of the hands are determined based on the finger positions and piano theory. An optimization method is used to produce energy-saving pose sequence. Motion transitions between poses are generated using a combination of sampled piano playing motion and music features. Our approach is validated through direct comparison with actual piano playing and simulation of a complete music piece requiring various playing skills.

Characterization and Antimicrobial Functions of Cellulose Materials Incorporated with Photo-active Anthraquinone Compounds
Jingyuan Zhuo, Agricultural and Environmental Chemistry
Co-authors: Jingyuan Zhuo; Gang Sun
Poster # 38
Light induced antimicrobial and self-cleaning functions are introduced to cotton cellulose materials by direct dyeing processes. Significant amount of reactive oxygen species (ROS) as active agents, especially hydrogen peroxide and hydroxyl radicals, were detected on the treated materials upon light irradiation. The colorants can be incorporated onto cellulose fabric through a vat dyeing process. Some anthraquinone structures from the dyed materials were characterized by using Fourier Transform Infrared Spectroscopy (FTIR). Scanning Electron Microscope (SEM) was used to analyze the surface morphology changes of the fibers. The light-generated reactive oxygen species on the materials lead to over 99% antibacterial functions against E. coli with 1 hour contact under UVA exposure. The light stability, reusability and mechanical properties of the cotton fabrics were evaluated as well.

Microscale High Asymmetric Longitudinal Field Ion Mobility Spectrometer (HALF-IMS) Chemical Detection Device
Yuriy Zrodnikov, Mechanical and Aerospace Engineering
Co-authors: Cristina E. Davis; Alexander A. Aksenov
Talk Session 2C
Detection of trace chemicals in gas samples is an important problem for environmental monitoring, homeland security and medical diagnostics. The high asymmetric longitudinal field ion mobility spectrometer (HALF-IMS) is a portable chemical sensor which separates mixtures of ionized molecules by exploiting differences in ionic mobility at both high and low electric fields (E-fields). The system operates at standard room temperatures and pressures. After a sample is introduced into the system, it is ionized by an ultraviolet photoionization source and introduced into the drift tube. The microfabricated drift tube features a novel spatially-varying E-field that pushes ions through the system. Differences in ionic mobilities among ions allow the applied voltages to be specified in such a way that only one specific type of ion passes through to the detector.
All IGPS events will take place in south campus at the Walter A. Buehler Alumni Center and the UC Davis Conference Center.

The next IGPS Symposium will be held on April 3 - 4, 2014 at the UC Davis Conference Center. For the latest IGPS Symposium updates, we invite you to visit our website: http://gradstudies.ucdavis.edu/about/igps.html

Save the Date!